



# Measuring Broadband Australia



## Report 18 Appendix, August 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%	18
NBN25	100%	100%	100%	100%	100%	92
NBN50	100%	100%	100%	100%	100%	571
NBN100	100%	100%	100%	100%	100%	400
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	100%	76%	0%	0%	0%	92
NBN50	100%	97%	84%	65%	0%	571
NBN100	100%	99%	98%	92%	86%	400

RSP	Download plan	1 UHD	2 UHD	3 UHD	4 UHD	Panel size
Aussie Broadband	50	99%	97%	69%	36%	74
Dodo & iPrimus	50	100%	98%	80%	57%	45
Exetel	50	100%	100%	86%	74%	43
iiNet	50	100%	99%	90%	71%	78
Optus	50	100%	100%	97%	83%	63
Telstra	50	100%	99%	91%	76%	99
TPG	50	100%	99%	95%	77%	80
RSP	Download plan	1 UHD	2 UHD	3 UHD	4 UHD	Panel size
Aussie Broadband	100	100%	99%	97%	93%	73
Optus	100	100%	100%	100%	98%	52
Telstra	100	100%	100%	100%	100%	55
Superloop	100	100%	100%	100%	100%	40

# 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 98.2% of plan speed for Dodo & iPrimus across all NBN plans with a 95% confidence interval of  $\pm 2.9\%$ . If we were to repeat our sampling 100 times, we expect that this average would fall between 95.3% and 101.1% 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	96.5%	14.4%	94.5% - 98.5%	196	70,358
All hours	Dodo & iPrimus	98.2%	13.9%	95.3% - 101.1%	88	31,670
All hours	Exetel	103.5%	10.2%	101.1% - 105.8%	71	25,508
All hours	iiNet	98.2%	13.0%	96.1% - 100.4%	142	54,039
All hours	Launtel	102.1%	13.3%	98.5% - 105.7%	53	17,459
All hours	MyRepublic	97.2%	14.5%	93.2% - 101.2%	50	17,732
All hours	Optus	101.0%	13.5%	98.6% - 103.4%	122	44,187
All hours	Telstra	101.0%	14.1%	98.9% - 103.0%	182	69,447
All hours	TPG	100.3%	12.6%	98.3% - 102.2%	153	50,359
All hours	Superloop	98.9%	11.7%	96.1% - 101.7%	69	25,012
All hours	Vodafone	97.1%	10.9%	94.0% - 100.2%	47	15,255

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	95.1%	14.6%	93.1% - 97.2%	196	12,270
Busy hours	Dodo & iPrimus	96.4%	14.3%	93.4% - 99.4%	87	5,485
Busy hours	Exetel	102.3%	10.0%	100.0% - 104.6%	71	4,395
Busy hours	iiNet	97.0%	13.0%	94.8% - 99.1%	141	9,398
Busy hours	Launtel	100.1%	13.4%	96.5% - 103.7%	53	3,099
Busy hours	MyRepublic	88.8%	16.2%	84.4% - 93.3%	50	2,963
Busy hours	Optus	99.5%	14.1%	97.0% - 102.0%	122	7,337
Busy hours	Telstra	99.7%	14.0%	97.7% - 101.7%	182	12,192
Busy hours	TPG	99.1%	12.8%	97.0% - 101.1%	153	8,729
Busy hours	Superloop	97.1%	12.0%	94.3% - 99.9%	69	4,288
Busy hours	Vodafone	96.4%	10.8%	93.3% - 99.5%	47	2,630

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	83.1%	18.1%	80.6% - 85.7%	196	57,334
All hours	Dodo & iPrimus	87.0%	13.6%	84.2% - 89.9%	88	25,827
All hours	Exetel	88.7%	13.3%	85.6% - 91.7%	71	20,937
All hours	iiNet	84.0%	20.1%	80.7% - 87.3%	142	43,824
All hours	Launtel	87.9%	12.2%	84.6% - 91.2%	53	14,093
All hours	MyRepublic	86.7%	16.9%	82.0% - 91.4%	50	14,535
All hours	Optus	86.3%	14.7%	83.7% - 88.9%	122	36,292
All hours	Telstra	86.4%	16.4%	84.1% - 88.8%	182	56,147
All hours	TPG	83.7%	20.4%	80.4% - 86.9%	153	41,111
All hours	Superloop	87.2%	14.5%	83.8% - 90.7%	69	20,499
All hours	Vodafone	87.3%	14.1%	83.2% - 91.3%	47	12,426

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	82.7%	18.2%	80.1% - 85.2%	196	6,176
Busy hours	Dodo & iPrimus	86.6%	13.7%	83.7% - 89.5%	87	2,769
Busy hours	Exetel	88.5%	13.3%	85.4% - 91.6%	71	2,230
Busy hours	iiNet	83.7%	20.1%	80.4% - 87.0%	141	4,790
Busy hours	Launtel	87.7%	12.2%	84.4% - 91.0%	52	1,555
Busy hours	MyRepublic	85.5%	16.6%	80.9% - 90.1%	50	1,498
Busy hours	Optus	85.8%	14.9%	83.2% - 88.5%	122	3,695
Busy hours	Telstra	86.2%	16.4%	83.8% - 88.6%	182	6,104
Busy hours	TPG	83.5%	20.6%	80.2% - 86.8%	151	4,392
Busy hours	Superloop	86.5%	15.0%	83.0% - 90.1%	68	2,146
Busy hours	Vodafone	87.2%	13.7%	83.3% - 91.1%	47	1,306

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	94.7%	16.7%	90.9% - 98.6%	74	27,346
All hours	Aussie Broadband	100	96.6%	13.8%	93.4% - 99.8%	73	25,314
All hours	Dodo & iPrimus	50	97.3%	15.9%	92.6% - 101.9%	45	17,057
All hours	Exetel	50	103.3%	11.6%	99.9% - 106.7%	44	16,503
All hours	iiNet	50	97.8%	14.9%	94.5% - 101.1%	78	28,985
All hours	Optus	50	103.1%	10.4%	100.5% - 105.7%	63	23,292
All hours	Optus	100	97.5%	16.6%	93.0% - 102.1%	52	18,172
All hours	Telstra	50	100.5%	15.4%	97.5% - 103.6%	100	38,839
All hours	Telstra	100	99.9%	11.5%	96.8% - 102.9%	55	19,875
All hours	TPG	50	100.9%	12.2%	98.3% - 103.6%	82	26,872
All hours	Superloop	100	98.7%	10.3%	95.5% - 101.9%	40	14,309

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	93.4%	16.7%	89.5% - 97.2%	74	4,772
Busy hours	Aussie Broadband	100	95.5%	13.8%	92.3% - 98.7%	73	4,402
Busy hours	Dodo & iPrimus	50	95.8%	16.4%	91.0% - 100.6%	44	3,033
Busy hours	Exetel	50	102.1%	11.4%	98.7% - 105.5%	44	2,800
Busy hours	iiNet	50	96.4%	14.7%	93.1% - 99.7%	77	4,974
Busy hours	Optus	50	101.7%	11.1%	99.0% - 104.5%	63	3,896
Busy hours	Optus	100	95.9%	17.1%	91.2% - 100.5%	52	2,972
Busy hours	Telstra	50	99.2%	15.3%	96.2% - 102.2%	100	6,902
Busy hours	Telstra	100	98.8%	11.3%	95.8% - 101.8%	55	3,353
Busy hours	TPG	50	99.9%	12.3%	97.2% - 102.5%	82	4,600
Busy hours	Superloop	100	96.9%	10.6%	93.6% - 100.2%	40	2,505

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	82.0%	19.8%	78.6% - 85.5%	126	37,129
All hours	Dodo & iPrimus	20	85.5%	15.1%	81.7% - 89.3%	60	17,921
All hours	Exetel	20	86.3%	16.0%	81.7% - 90.9%	46	14,112
All hours	iiNet	20	80.6%	22.7%	75.9% - 85.3%	91	27,558
All hours	Optus	20	85.8%	16.0%	82.1% - 89.4%	75	22,629
All hours	Optus	40	87.0%	13.3%	82.9% - 91.2%	40	11,459
All hours	Telstra	20	85.4%	17.8%	82.5% - 88.4%	141	43,459
All hours	TPG	20	81.9%	22.0%	77.5% - 86.2%	98	25,903
All hours	Superloop	20	86.4%	16.7%	81.4% - 91.5%	42	12,345

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	81.7%	19.8%	78.3% - 85.2%	126	4,013
Busy hours	Dodo & iPrimus	20	85.0%	15.2%	81.1% - 88.8%	59	1,954
Busy hours	Exetel	20	86.0%	16.0%	81.4% - 90.7%	46	1,500
Busy hours	iiNet	20	80.3%	22.7%	75.6% - 85.0%	90	2,986
Busy hours	Optus	20	85.6%	16.1%	81.9% - 89.2%	75	2,334
Busy hours	Optus	40	86.0%	13.9%	81.7% - 90.3%	40	1,140
Busy hours	Telstra	20	85.2%	17.7%	82.3% - 88.1%	141	4,674
Busy hours	TPG	20	81.7%	22.2%	77.2% - 86.1%	96	2,692
Busy hours	Superloop	20	85.5%	17.2%	80.3% - 90.7%	42	1,285



RSP	Average daily outages lasting longer than 30 seconds	Standard deviation	95% confidence interval of the mean	Panel size
Aussie Broadband	0.29	1.09	0.14 - 0.45	196
Dodo & iPrimus	0.46	1.17	0.22 - 0.70	88
Exetel	0.13	0.25	0.07 - 0.19	71
iiNet	0.19	0.56	0.10 - 0.28	142
Launtel	0.39	1.30	0.04 - 0.74	52
MyRepublic	0.40	0.72	0.20 - 0.60	49
Optus	0.30	0.96	0.13 - 0.47	122
Telstra	0.18	0.44	0.12 - 0.25	181
TPG	0.32	1.25	0.12 - 0.52	151
Superloop	0.34	1.01	0.10 - 0.57	69
Vodafone	0.40	1.08	0.09 - 0.71	47

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	11.1%	25.0%	50.0%	13.9%
Dodo & iPrimus	28.4%	28.2%	19.3%	24.1%
Exetel	25.1%	36.7%	22.1%	16.1%
iiNet	23.2%	33.5%	34.4%	9.0%
Launtel	29.9%	30.9%	26.6%	12.6%
MyRepublic	38.7%	33.7%	19.5%	8.1%
Optus	54.3%	30.0%	8.2%	7.5%
Superloop	16.6%	30.0%	28.3%	25.1%
Telstra	25.5%	21.8%	18.2%	34.5%
TPG	27.7%	38.3%	22.0%	12.0%
Vodafone	35.3%	30.6%	27.0%	7.1%

# 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 97.3% of plan speed for users subscribed to 100Mbps NBN fixed-line plans with a 95% confidence interval of  $\pm 1.3\%$ . If we were to repeat our sampling 100 times, we expect that this average would fall between 96.0% and 98.6% 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	102.0%	6.4%	99.0% - 104.9%	18	6,530
All hours	25	103.2%	8.6%	101.4% - 104.9%	94	36,321
All hours	50	99.6%	14.1%	98.5% - 100.8%	582	213,756
All hours	100	97.3%	13.4%	96.0% - 98.6%	405	139,410
All hours	250	101.9%	11.3%	99.4% - 104.4%	80	27,566

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	100.4%	7.9%	96.8% - 104.1%	18	1,174
Busy hours	25	102.0%	9.1%	100.2% - 103.8%	94	6,519
Busy hours	50	98.1%	14.2%	97.0% - 99.3%	580	36,927
Busy hours	100	95.5%	13.9%	94.1% - 96.8%	405	23,745
Busy hours	250	98.8%	13.2%	95.9% - 101.7%	80	4,773

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	93.2%	10.2%	88.5% - 97.9%	18	5,327
All hours	5	88.0%	15.4%	84.0% - 92.0%	58	18,382
All hours	20	84.1%	18.8%	82.7% - 85.4%	785	231,794
All hours	40	88.5%	11.1%	87.0% - 90.0%	214	59,370

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	92.8%	10.9%	87.8% - 97.8%	18	589
Busy hours	5	87.6%	15.3%	83.6% - 91.5%	58	2,053
Busy hours	20	83.7%	18.8%	82.4% - 85.1%	781	24,752
Busy hours	40	87.9%	11.2%	86.4% - 89.4%	213	6,158

# 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 104.8% of plan speed for fibre to the premises NBN fixed-line services with a 95% confidence interval of  $\pm 0.8\%$ . If we were to repeat our sampling 100 times, we expect that this average would fall between 103.9% and 105.6% (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	104.8%	7.4%	103.9% - 105.6%	306	108,314
All hours	Fibre to the curb - FTTC	101.5%	8.4%	99.9% - 103.1%	109	38,533
All hours	Hybrid fibre-coaxial - HFC	104.1%	6.5%	103.3% - 104.9%	266	91,485
All hours	Fibre to the node - FTTN	93.4%	16.5%	92.0% - 94.8%	528	195,021

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	102.8%	8.5%	101.8% - 103.7%	306	18,602
Busy hours	Fibre to the curb - FTTC	100.3%	8.6%	98.6% - 101.9%	109	6,684
Busy hours	Hybrid fibre-coaxial - HFC	102.1%	7.9%	101.1% - 103.0%	265	15,800
Busy hours	Fibre to the node - FTTN	91.9%	16.7%	90.4% - 93.3%	527	33,756

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	91.7%	6.0%	91.0% - 92.4%	306	88,522
All hours	Fibre to the curb - FTTC	91.2%	5.8%	90.1% - 92.3%	109	31,426
All hours	Hybrid fibre-coaxial - HFC	90.7%	9.9%	89.5% - 91.9%	266	74,628
All hours	Fibre to the node - FTTN	78.4%	22.1%	76.5% - 80.3%	528	158,667

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	91.4%	6.1%	90.7% - 92.1%	304	9,472
Busy hours	Fibre to the curb - FTTC	90.9%	5.6%	89.9% - 92.0%	109	3,302
Busy hours	Hybrid fibre-coaxial - HFC	90.1%	10.1%	88.9% - 91.3%	264	7,955
Busy hours	Fibre to the node - FTTN	78.1%	22.1%	76.2% - 80.0%	526	16,990

Technology	Average daily outages lasting longer than 30 seconds	Standard deviation	95% confidence interval of the mean	Panel size
Fibre to the premises - FTTP	0.17	0.55	0.11 - 0.23	304
Fibre to the curb - FTTC	0.43	1.61	0.13 - 0.74	109
Hybrid fibre-coaxial - HFC	0.38	0.97	0.26 - 0.49	265
Fibre to the node - FTTN	0.30	0.97	0.21 - 0.38	526

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	42.1%	29.0%	21.6%	7.3%
Fibre to the node - FTTN	22.6%	25.5%	32.3%	19.6%
Fibre to the premises - FTTP	36.0%	33.1%	22.1%	8.8%
Hybrid fibre-coaxial - HFC	30.9%	31.9%	19.4%	17.8%

# 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 96.7% of plan speed for NBN fixed-line services in WA, with a 95% confidence interval of  $\pm 3.0\%$ . If we were to repeat our sampling 100 times, we expect that this average would fall between 93.7% and 99.7% (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	100.3%	12.8%	99.1% - 101.6%	383	139,791
All hours	ACT	97.1%	14.5%	93.4% - 100.7%	61	22,007
All hours	VIC	99.8%	12.7%	98.4% - 101.2%	327	115,214
All hours	QLD	97.8%	14.2%	95.9% - 99.7%	206	71,795
All hours	WA	96.7%	15.2%	93.7% - 99.7%	101	35,402
All hours	TAS	100.2%	13.0%	96.8% - 103.6%	57	20,528
All hours	NT + SA	101.2%	11.4%	98.6% - 103.8%	74	28,616

# 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	98.0%	98.0%	57	62	98.0%
Dodo & iPrimus	100.0%	92.0%	37	18	97.4%
Exetel	100.0%	100.0%	40	18	100.0%
iiNet	100.0%	90.0%	63	31	96.7%
MyRepublic	100.0%	93.0%	16	24	95.8%
Optus	100.0%	100.0%	55	44	100.0%
Superloop	96.0%	93.0%	19	34	94.1%
Telstra	100.0%	100.0%	84	47	100.0%
TPG	100.0%	90.0%	73	26	97.4%
Vodafone	100.0%	90.0%	21	20	95.1%

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	1%	92%
Dodo & iPrimus	47%	93%
Exetel	82%	86%
iiNet	50%	98%
Launtel	52%	86%
MyRepublic	8%	41%
Optus	49%	94%
Superloop	81%	98%
Telstra	21%	97%
TPG	74%	100%
Vodafone	70%	81%

# 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	196	15	8%
Dodo & iPrimus	88	5	6%
Exetel	71	3	4%
iiNet	142	8	6%
Launtel	53	3	6%
MyRepublic	50	4	8%
Optus	122	7	6%
Other RSPs	36	1	3%
Superloop	69	4	6%
Telstra	182	13	7%
TPG	153	8	5%
Vodafone	47	2	4%
Total	1,209	73	6%

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	9	0	0%
Fibre to the node - FTTN	25	67	2	3%
Fibre to the node - FTTN	50	319	42	13%
Fibre to the node - FTTN	100	124	24	19%
Fibre to the node - FTTN	Other NBN plans	9	0	0%
Fibre to the node - FTTN	All NBN Plans	528	68	13%

# 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	785 Mbps	182.3 Mbps	752.5 Mbps - 817.4 Mbps	121	41,656
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	714.9 Mbps	181.1 Mbps	682.7 Mbps - 747.2 Mbps	121	7,189
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	45.8 Mbps	2.8 Mbps	45.3 Mbps - 46.3 Mbps	121	33,671
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	45.5 Mbps	2.9 Mbps	45 Mbps - 46.1 Mbps	120	3,593
Plan	Average daily outages lasting longer than 30 seconds		Standard deviation	95% confidence interval of the mean	Panel size	
Very High Speed	0.24		0.59	0.1 - 0.34	120	
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	23.8%	25.0%	14.3%	37.0%		









# 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	101.3%	27.7%	95.0% - 107.7%	73	25,983
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	77.6%	29.4%	70.8% - 84.3%	73	4,434
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	65.9%	23.2%	60.6% - 71.3%	73	21,376
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	51.3%	23.0%	46.0% - 56.6%	73	2,292
Technology	Average daily outages lasting longer than 30 seconds		Standard deviation	95% confidence interval of the mean	Panel size	
Fixed Wireless	0.27		0.53	0.1 - 0.39	73	
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	24.2%	20.3%	27.8%	27.7%		

# Test Definitions & Glossary

## 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
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.
All hours	Refers to tests conducted at any time of the day.
Busiest hour	Fifth lowest hourly average speed out of all busy hours in the month (including weekends cf. 'busy hours').
Busy hours	Refers to tests conducted between 19:00:00 and 22:59:59, Monday to Friday.
Customer-Premises Equipment (CPE)	Network equipment provided by an RSP (generally including a home router/gateway).
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.
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.
Impaired service	FTTN / Fibre to the Node services where the maximum attainable line speed measured by NBN Co is below plan speed.
NBN Service	A proxy for a single household which accesses the internet through the NBN.
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.
SamKnows	The independent testing provider appointed to conduct testing for Measuring Broadband Australia. <a href="https://samknows.com/">https://samknows.com/</a>
Testing Infrastructure	SamKnows-maintained test servers hosted within Australia.
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.
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').
Whitebox	A purpose-built hardware measurement agent manufactured by SamKnows, installed in volunteers' homes.