

best in test.

For adding something on top in Australia and reaching an overall score of 905 dots in mobile network benchmarking survey we proudly award this certificate to

Telstra Australia

Score 905 out of 1000 in Total

Score 244 out of 270 in Voice Services

Score 432 out of 480 in Data Services

Score 229 out of 250 in Crowdsourced Quality



Hakan Ekmen

Global Networks Lead, Comms Industry





Measurement Overview

umlaut tested and compared the 5G/LTE performance of voice and data services from different network providers on its smartphones in both metropolitan and regional areas of Australia. The performance benchmarking was performed by umlaut between 03.10.2023 and 31.10.2023 in various cities, towns and connecting roads. Dedicated measurements were taken via outdoor drive tests and walk tests using a Samsung Galaxy S23+. All data measurements were performed in 5G preferred mode. Voice measurements were performed in 5G/5G preferred mode on both sides, while call origin has been alternated.

In addition crowdsourced performance data has been collected and evaluated between CW20 2023 and CW43 2023.

The following pages provide a comparative overview about the performance results observed for the different tested service types.



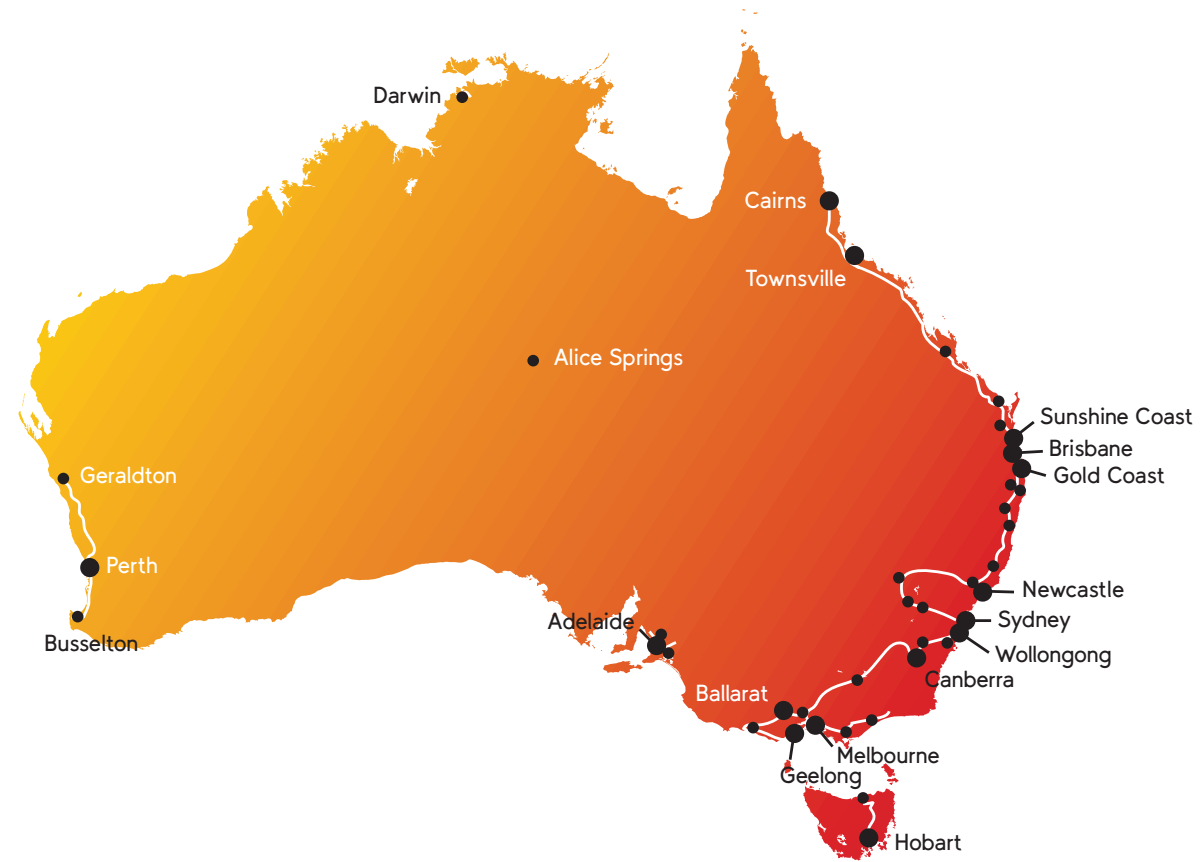
Measurement setup

Drivetest	Voice	Data
Device	Samsung Galaxy S23+	Samsung Galaxy S23+
Test Cases	Mobile-to-Mobile (M2M) Side1 (5G Preferred) to Side2 (5G Preferred) 105 sec call window 70 sec call duration 15 sec call setup timeout Multi-RAB traffic injection on both sides Generic OTT Voice Channel	Data 5G preferred HTTP DL DataStream 7s HTTP UL DataStream 7s HTTPS 10MB DL fixed file transfer HTTPS 5MB UL fixed file transfer Web Browsing – Kepler E-Gaming Live web pages 1 YouTube Full HD video ~ 45s 1 YouTube live stream ~ 45s
Mobility and Route Types	100% Drive test (45 Days) & 100% City Walk Test (10 Days) 61.1% in Cities, 16.1% in Towns and 22.8% on Roads	
Samples	33,066	244,383
Dates	55 measurement days (45 DT + 10 WT) 03.10.2023 – 31.10.2023	
Crowd Data Assessment	24 Weeks CW20 2023 – CW43 2023	



Testing areas

Drive route

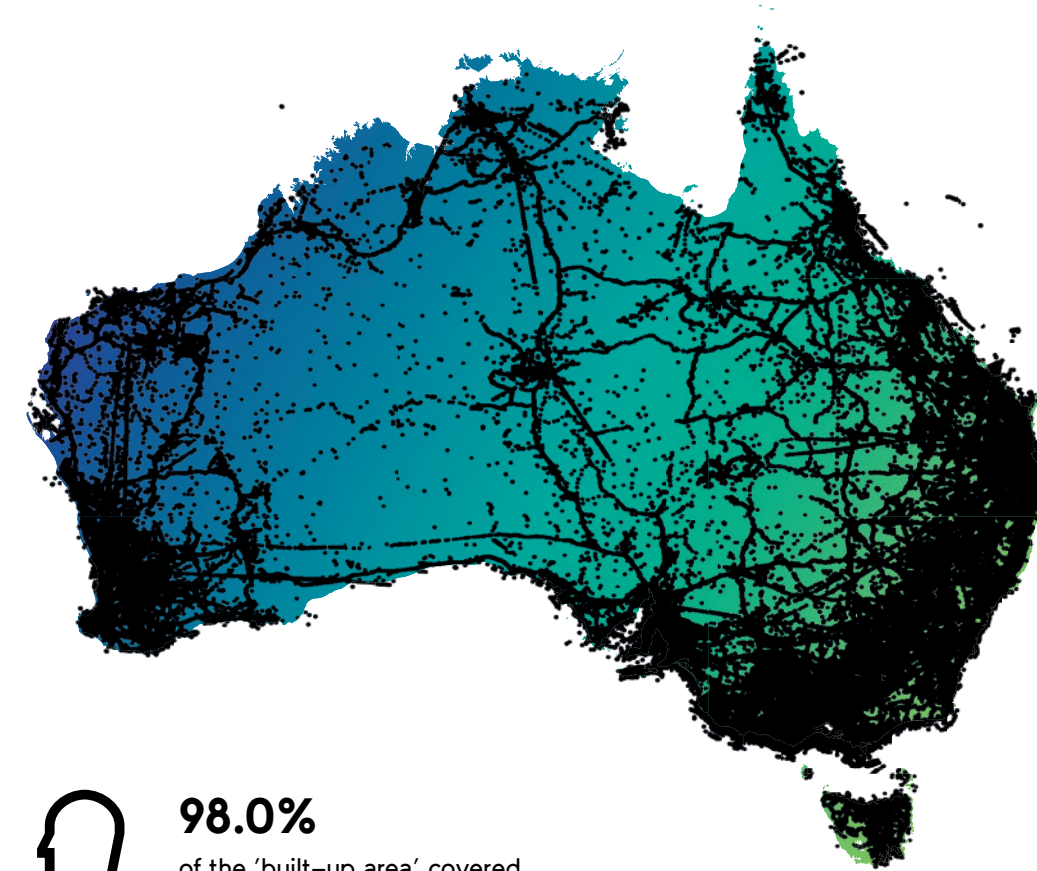


23,000 km
measuring distance



~74 %
of population measured

Crowdsourcing based test area



98.0%
of the 'built-up area' covered



99.0%
of the 'Population area' covered



707,106 km²
size of tested area



Claims




Best in test
Telstra Australia



Best in data
Telstra Australia



Best in voice
Telstra Australia



Best in Reliability
Telstra Australia



Best in crowd-sourced quality
Telstra Australia



Methodology

The leader in mobile benchmarking, umlaut, has analyzed the mobile networks of Australia with regards to mobile network performance. We measure smartphone voice and data performance based on extensive drivetests – from major metropolitan areas to smaller cities and connection roads.

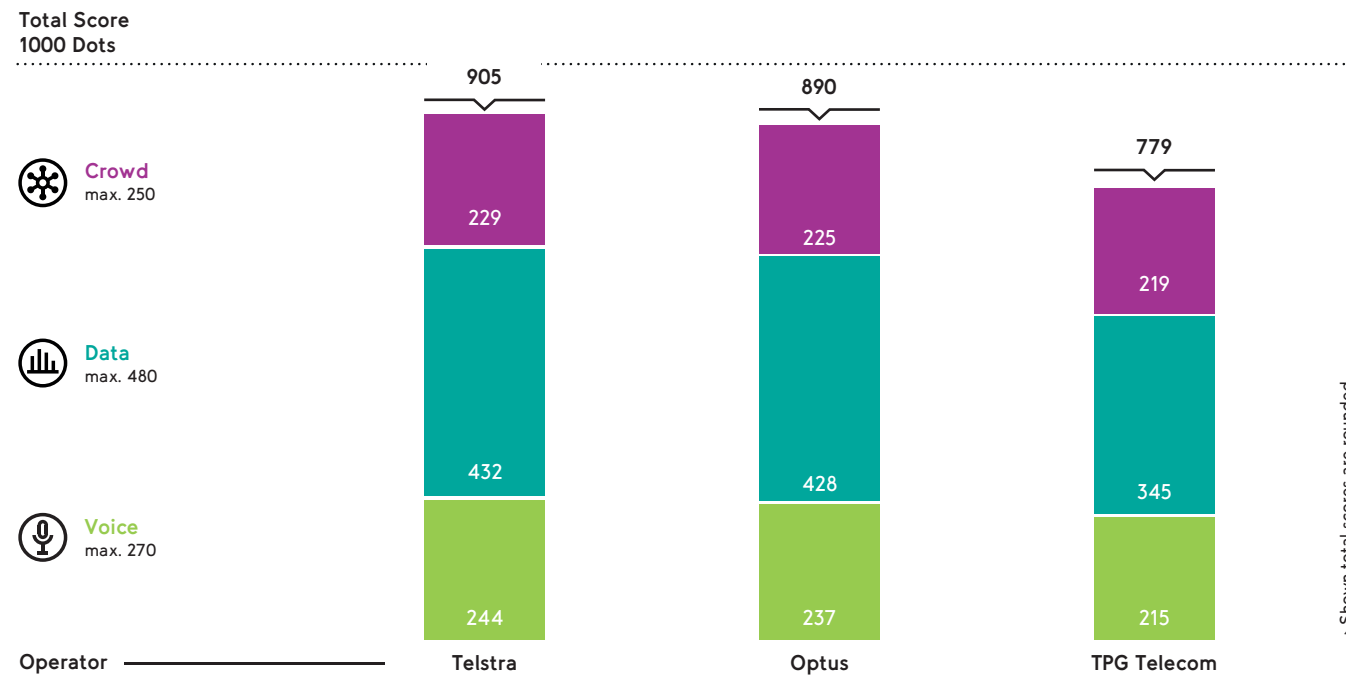
We objectively define the routes and test methodology and publish the results through certificates or public benchmark reports. In addition crowdsourced performance data has been collected and evaluated. As the de-facto industry standard, our benchmarking methodology focuses on customer-experienced network quality and covers a wide range of mobile services. Today, more than 200 mobile networks in more than 120 countries are being evaluated by our unique scoring

methodology. It allows a technical analysis that is unprecedented in its level of detail and enables comparisons between the network performance and capability of each mobile network. Our public benchmarks as well as the certificate benchmarks help network operators to demonstrate how well they are delivering wireless connections to consumers, business users and enterprises and reveals the areas of improvement.



Score and breakdown

Telstra achieved the highest overall score among competitors with 905 dots out of 1000.



Overall score considering Voice, Data and Crowdsourcing.

Total score

		Telstra	Optus	TPG Telecom
Voice	max. 270	244	237	215
Cities Drivetest	122	96%	92%	88%
Cities Walktest	41	97%	98%	96%
Towns Drivetest	54	97%	94%	86%
Roads Drivetest	54	65%	66%	41%
Data	max. 480	432	428	345
Cities Drivetest	216	96%	93%	90%
Cities Walktest	72	95%	92%	92%
Towns Drivetest	96	94%	91%	62%
Roads Drivetest	96	69%	76%	26%
Crowdsourced Quality	max. 250	229	225	219
Broadband Coverage	100	95%	92%	87%
Download Speed	56	90%	88%	86%
Upload Speed	19	87%	80%	82%
Latency	50	87%	89%	89%
Voice	11	96%	95%	96%
Stability	14	94%	95%	92%
Total	1000	905	890	779

Shown scores are rounded.



Achieved percentage of the maximum score in each of the different data services.

Data	Service Group	max	Telstra	Optus	TPG Telecom
Cities Drivetest	Web Browsing	48,6	97%	96%	95%
	File Download	48,6	98%	97%	86%
	File Upload	48,6	95%	88%	91%
	YouTube	48,6	95%	92%	89%
	OTT	21,6	91%	92%	89%
Cities Walktest	Web Browsing	16,2	97%	96%	94%
	File Download	16,2	96%	95%	88%
	File Upload	16,2	95%	85%	93%
	YouTube	16,2	93%	92%	94%
	OTT	7,2	95%	93%	93%
Towns Drivetest	Web Browsing	21,6	96%	96%	72%
	File Download	21,6	97%	90%	56%
	File Upload	21,6	93%	86%	57%
	YouTube	21,6	93%	92%	51%
	OTT	9,6	90%	89%	84%
Roads Drivetest	Web Browsing	21,6	74%	85%	31%
	File Download	21,6	68%	75%	19%
	File Upload	21,6	71%	67%	14%
	YouTube	21,6	63%	76%	30%
	OTT	9,6	73%	81%	47%



Achieved percentage of the maximum score in each of the different crowdsourcing services.

Crowd	Service Group	max	Telstra	Optus	TPG Telecom
Crowdsourced Quality	Broadband Coverage	100	95%	92%	87%
	DL Speed	56	90%	88%	86%
	UL Speed	19	87%	80%	82%
	Latency	50	87%	89%	89%
	Voice	11	96%	95%	96%
	Stability	14	94%	95%	92%



Reliability



Reliability score considering Voice Reliability, Data Reliability and Consistent UE.

Total score

	Service Group	max	Telstra	Optus	TPG Telecom
Reliability	Voice Reliability	149	87%	83%	71%
	Data Reliability	264	93%	93%	73%
	Consistent User Experience	117	94%	94%	93%

Score achievement in school grades:
 outstanding (≥95%), very good (≥85% and <95%), good (≥75% and ≤85%), satisfactory (≤65% and <75%), sufficient (≤55% and <65%).



Voice KPI overview

Achieved values of all networks under test in each of the relevant Voice Key Performance Indicators (KPIs) for the geographical categories "Cities", "Towns" and "Roads".

Voice	Service Group	Unit	Telstra	Optus	TPG Telecom
Cities Drivetest	Qualifier	[%]	99,8	99,0	98,6
	Call Setup Time (P90)	[s]	1,9	2,1	2,7
	Speech Quality (P10)	[MOS-LQO]	4,4	4,3	4,3
	Multirab connectivity	[%]	100,0	99,9	100,0
Cities Walktest	Qualifier	[%]	99,7	99,8	99,7
	Call Setup Time (P90)	[s]	1,6	1,6	2,0
	Speech Quality (P10)	[MOS-LQO]	4,6	4,6	4,5
	Multirab connectivity	[%]	100,0	100,0	100,0
Towns Drivetest	Qualifier	[%]	99,8	99,3	98,0
	Call Setup Time (P90)	[s]	1,9	2,3	2,3
	Speech Quality (P10)	[MOS-LQO]	4,4	4,4	4,5
	Multirab connectivity	[%]	100,0	100,0	99,9
Roads Drivetest	Qualifier	[%]	91,9	91,5	82,0
	Call Setup Time (P90)	[s]	2,7	2,4	3,1
	Speech Quality (P10)	[MOS-LQO]	4,0	4,2	3,6
	Multirab connectivity	[%]	99,0	99,9	97,4



Data Services KPI overview

Achieved values of all networks under test in each of the relevant Data Key Performance Indicators (KPIs) for the geographical category "Cities".

Data Cities	KPI Name	Unit	Telstra	Optus	TPG Telecom
HTTP Web Page DL Smartphone	Qualifier	[%]	99,9	99,8	99,7
	Overall Session Time	[s]	1,5	1,4	1,6
HTTP 10MB DL Smartphone	Qualifier	[%]	100,0	100,0	99,9
	Overall Session Time	[s]	1,0	1,2	2,5
	90% faster than	[Mbit/s]	67,8	40,5	16,6
	10% faster than	[Mbit/s]	320,0	351,0	205,1
HTTP 5MB UL Smartphone	Qualifier	[%]	100,0	99,9	99,9
	Average Session Time	[s]	2,0	3,2	2,5
	90% faster than	[Mbit/s]	10,8	6,0	8,6
	10% faster than	[Mbit/s]	81,8	76,0	52,6
HTTP DL FDTT	Qualifier	[%]	100,0	99,8	99,7
	10% faster than	[Mbit/s]	764,9	896,5	378,1
	faster than 20 Mbit/s	[%]	98,8	97,8	89,5
	faster than 100 Mbit/s	[%]	93,1	80,2	58,8
HTTP UL FDTT	Qualifier	[%]	99,9	99,7	99,9
	10% faster than	[Mbit/s]	114,0	104,9	65,8
	faster than 2 Mbit/s	[%]	99,6	98,5	99,6
	faster than 5 Mbit/s	[%]	98,0	93,3	97,0
YouTube	Qualifier	[%]	100,0	99,5	99,1
	Start Time	[s]	2,2	2,3	2,3
	AVG Resolution	[p]	1078,6	1078,4	1077,1
YouTube Live Smartphone	Qualifier	[%]	99,8	99,5	98,8
	Start Time	[s]	2,5	2,6	2,7
	AVG Resolution	[p]	1079,5	1077,6	1075,4
Interactivity	Qualifier	[%]	96,8	95,3	96,3
	Interactivity egaming	[%]	75,0	70,2	65,7
Conversational App	Qualifier	[%]	99,9	99,7	99,7
	Speech Quality (P10)	[MOS-LQO]	3,1	3,4	3,3



Data Services KPI overview

Achieved values of all networks under test in each of the relevant Data Key Performance Indicators (KPIs) for the geographical category "Cities Walktest".

Data Cities Walktest	KPI Name	Unit	Telstra	Optus	TPG Telecom
HTTP Web Page DL Smartphone	Qualifier	[%]	99,9	99,8	99,5
	Overall Session Time	[s]	1,5	1,5	1,6
HTTP 10MB DL Smartphone	Qualifier	[%]	100,0	100,0	100,0
	Overall Session Time	[s]	1,4	1,4	2,5
	90% faster than	[Mbit/s]	44,1	40,1	18,2
	10% faster than	[Mbit/s]	305,3	325,7	187,7
HTTP 5MB UL Smartphone	Qualifier	[%]	100,0	99,5	100,0
	Average Session Time	[s]	2,0	3,8	2,2
	90% faster than	[Mbit/s]	13,7	6,1	12,7
HTTP DL FDTT	10% faster than	[Mbit/s]	84,9	73,4	53,9
	Qualifier	[%]	99,7	99,5	100,0
	10% faster than	[Mbit/s]	728,8	709,6	363,7
HTTP UL FDTT	faster than 20 Mbit/s	[%]	95,1	96,9	92,1
	faster than 100 Mbit/s	[%]	84,4	76,8	57,3
	Qualifier	[%]	100,0	99,2	100,0
YouTube	10% faster than	[Mbit/s]	119,5	99,9	68,5
	faster than 2 Mbit/s	[%]	98,9	98,4	99,2
	faster than 5 Mbit/s	[%]	96,1	93,2	98,1
	Qualifier	[%]	99,7	99,7	99,5
YouTube Live Smartphone	Start Time	[s]	2,2	2,3	2,2
	AVG Resolution	[p]	1078,3	1077,4	1078,7
	Qualifier	[%]	99,5	99,5	100,0
Interactivity	Start Time	[s]	2,5	2,8	2,6
	AVG Resolution	[p]	1078,1	1078,6	1076,7
	Qualifier	[%]	97,4	91,3	97,7
Conversational App	Interactivity egaming	[%]	81,0	74,8	68,7
	Qualifier	[%]	99,6	99,6	99,5
Speech Quality (P10)	Speech Quality (P10)	[MOS-LQO]	3,6	4,0	3,9



Achieved values of all networks under test in each of the relevant Data Key Performance Indicators (KPIs) for the geographical category "Towns".

Data Towns	KPI Name	Unit	Telstra	Optus	TPG Telecom
HTTP Web Page DL Smartphone	Qualifier	[%]	99,9	99,9	96,5
	Overall Session Time	[s]	1,6	1,6	2,0
HTTP 10MB DL Smartphone	Qualifier	[%]	99,9	100,0	97,5
	Overall Session Time	[s]	1,5	1,8	5,4
	90% faster than	[Mbit/s]	43,7	26,9	6,5
	10% faster than	[Mbit/s]	260,2	207,0	168,4
HTTP 5MB UL Smartphone	Qualifier	[%]	100,0	99,8	97,3
	Average Session Time	[s]	2,4	3,2	6,9
	90% faster than	[Mbit/s]	9,1	6,4	2,5
HTTP DL FDTT	10% faster than	[Mbit/s]	65,5	46,0	43,7
	Qualifier	[%]	100,0	99,9	96,6
	10% faster than	[Mbit/s]	647,3	457,7	258,1
HTTP UL FDTT	faster than 20 Mbit/s	[%]	98,3	94,8	73,8
	faster than 100 Mbit/s	[%]	87,3	49,6	33,5
	Qualifier	[%]	100,0	99,8	97,3
YouTube	10% faster than	[Mbit/s]	86,2	59,5	54,1
	faster than 2 Mbit/s	[%]	99,5	98,6	93,6
	faster than 5 Mbit/s	[%]	96,8	93,3	82,5
	Qualifier	[%]	99,7	99,9	93,2
YouTube Live Smartphone	Start Time	[s]	2,4	2,4	2,6
	AVG Resolution	[p]	1078,1	1077,5	1067,2
	Qualifier	[%]	99,7	99,4	92,5
Interactivity	Start Time	[s]	2,6	2,8	3,1
	AVG Resolution	[p]	1079,2	1078,0	1062,9
	Qualifier	[%]	94,4	94,8	91,0
Conversational App	Interactivity egaming	[%]	72,3	64,8	62,0
	Qualifier	[%]	99,7	99,6	99,2
Speech Quality (P10)	Speech Quality (P10)	[MOS-LQO]	3,1	3,4	3,3



Data Services KPI overview

Achieved values of all networks under test in each of the relevant Data Key Performance Indicators (KPIs) for the geographical category "Roads".

Data Roads	KPI Name	Unit	Telstra	Optus	TPG Telecom
HTTP Web Page DL Smartphone	Qualifier	[%]	96,0	97,3	77,8
	Overall Session Time	[s]	2,2	1,8	2,6
HTTP 10MB DL Smartphone	Qualifier	[%]	96,8	98,0	81,4
	Overall Session Time	[s]	6,9	4,8	11,1
	90% faster than	[Mbit/s]	4,4	7,5	2,7
	10% faster than	[Mbit/s]	205,7	145,3	127,5
HTTP 5MB UL Smartphone	Qualifier	[%]	96,8	96,7	73,5
	Average Session Time	[s]	5,7	6,6	15,7
	90% faster than	[Mbit/s]	3,3	2,7	0,9
	10% faster than	[Mbit/s]	44,6	37,9	30,2
HTTP DL FDTT	Qualifier	[%]	96,9	97,5	78,4
	10% faster than	[Mbit/s]	388,0	205,3	161,6
	faster than 20 Mbit/s	[%]	67,4	73,8	41,6
	faster than 100 Mbit/s	[%]	31,3	31,5	18,5
HTTP UL FDTT	Qualifier	[%]	96,8	95,8	72,7
	10% faster than	[Mbit/s]	59,4	47,9	36,8
	faster than 2 Mbit/s	[%]	93,1	94,3	77,5
	faster than 5 Mbit/s	[%]	84,3	81,8	52,5
YouTube	Qualifier	[%]	93,2	96,4	69,8
	Start Time	[s]	2,9	2,7	3,4
	AVG Resolution	[p]	1071,8	1073,5	1046,2
YouTube Live Smartphone	Qualifier	[%]	91,8	94,2	67,5
	Start Time	[s]	3,3	3,1	3,9
	AVG Resolution	[p]	1063,6	1072,2	1025,0
Interactivity	Qualifier	[%]	84,6	88,8	59,2
	Interactivity egaming	[%]	60,7	63,2	56,1
Conversational App	Qualifier	[%]	98,2	98,1	94,5
	Speech Quality (P10)	[MOS-LQO]	2,7	3,2	2,7



Crowd KPI overview

Achieved values of all networks under test in each of the relevant Crowd Key Performance Indicators (KPIs) for the categories "Broadband Coverage", "Download Speed", "Latency", "Voice Crowd" and "Stability".

Category	KPI name	Unit	Telstra	Optus	TPG Telecom
Broadband Coverage	Coverage Quality	[%]	97.4	97.3	95.4
	Coverage Reach	[%]	94.2	83.8	76.6
	Time on broadband	[%]	98.6	98.5	98.2
Download Speed	Basic internet class	[%]	96.1	96.4	95.7
	HD video class	[%]	86.9	86.5	84.9
	UHD video class	[%]	34.6	33.4	32.5
Latency	Gaming class	[%]	96.4	96.3	96.1
	OTT voice class	[%]	80.1	86.3	85.6
Voice	HD voice	[%]	97.0	96.7	97.5
Download Speed Active	90% faster than	[Mbit/s]	5.2	4.4	4.0
	10% faster than	[Mbit/s]	224.1	180.4	144.7
	AVG data rate	[Mbit/s]	87.4	73.0	58.0
Upload Speed Active	90% faster than	[Mbit/s]	2.3	2.0	2.1
	10% faster than	[Mbit/s]	39.0	35.3	38.3
	AVG data rate	[Mbit/s]	17.8	15.1	16.5
Stability	Transaction success	[%]	94.2	94.9	92.4



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