Audit Report

5G Australia, December 2020 – January 2021

umlaut

Foreword

For the inhabitants of the densely populated urban areas in Australia, it is particularly interesting to see how the operators perform in their home cities. Therefore, we have performed individual analyses for the largest Australian metropolitan areas.

More than 14 million (or 60 per cent of all) Australians live in one of the six largest urban areas of the country–plus another 368,000 in its capital Canberra. Therefore we have taken a closer look at the individual results of Adelaide, Brisbane, Canberra, Gold Coast, Hobart, Melbourne, Perth, Sydney and Toowoomba.

5G campaign — Intro

The leader in mobile benchmarking, umlaut, has analyzed the mobile networks in Australia with regards to 5G mobile network performance. This audit report was commissioned by Telstra.

We measure smartphone data performance based on extensive drivetests.
As the de–facto industry standard, our benchmarking methodology focuses on customer–perceived 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 methodology. It allows a technical analysis that is unprecedented in its level of detail and enables comparisons between the net–work performance and capability of each mobile network. Our 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.

Data use case
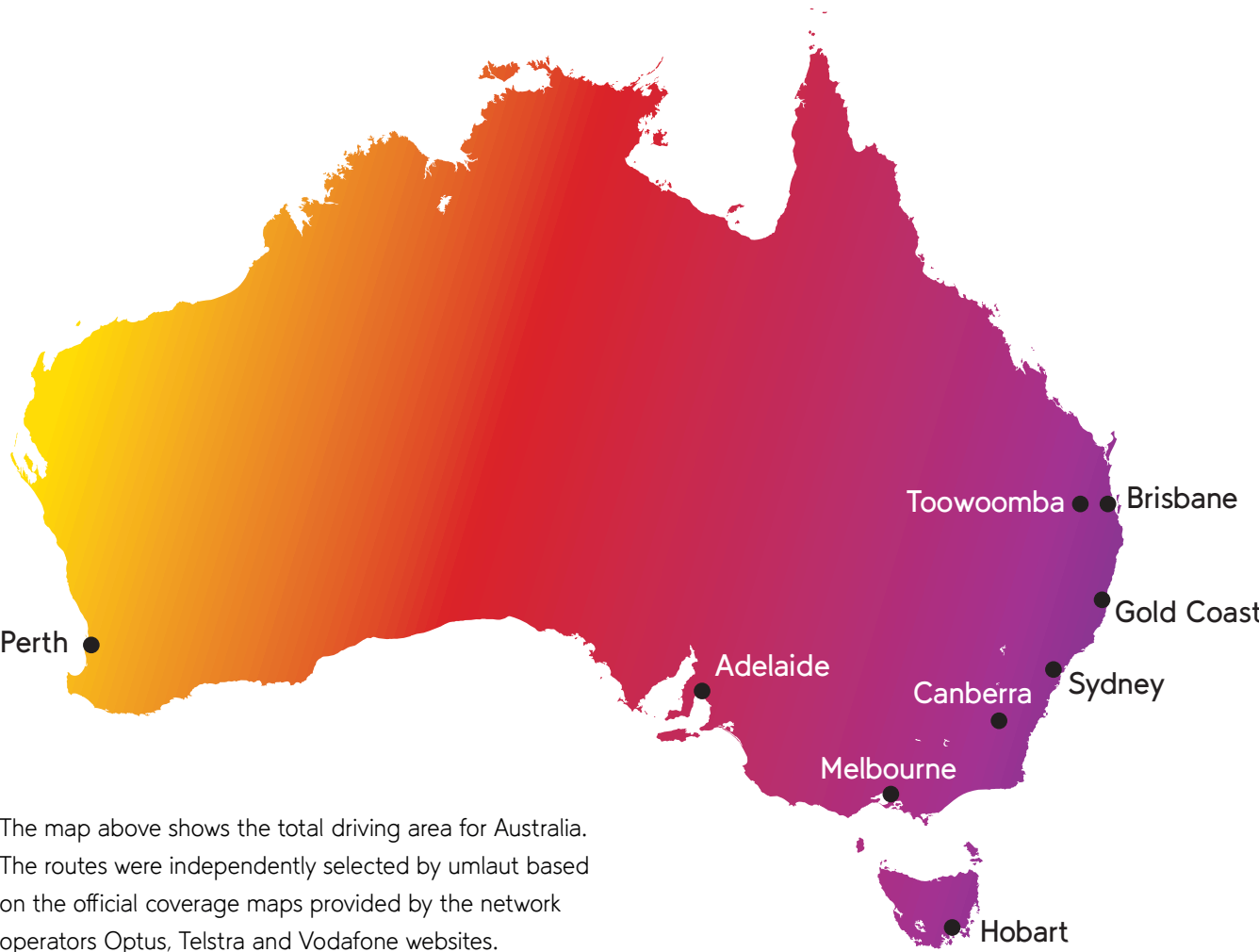• Stress test file DL/UL
• Live web browsing
• YouTube
• Latency

Equipment
• Samsung S20+ 5G–Exynos
• 5G Preferred Mode

Drive Period: 01/12/2020 – 12/12/2020
Crowd Period: 2020 W32 – 2021 W02

City	Km driven	Scope
Adelaide	440	5G
Brisbane	735	5G
Canberra	447	5G
Gold Coast	248	5G
Hobart	277	5G
Melbourne	1231	5G
Perth	409	5G
Sydney	1240	5G
Toowoomba	310	5G

The map above shows the total driving area for Australia. The routes were independently selected by umlaut based on the official coverage maps provided by the network operators Optus, Telstra and Vodafone websites.

5G Coverage Maps Telstra:
https://www.telstra.com.au/5g
5G Coverage Maps Optus:
https://www.optus.com.au/for–you/5g
5G Coverage Maps Vodafone:
https://www.vodafone.com.au/support/network/5g

5337 km
Total scope

5G availability

Measured from UE

City	Optus		Telstra		Vodafone	
	5G–LTE Mixed Session	LTE	5G–LTE Mixed Session	LTE	5G–LTE Mixed Session	LTE
Adelaide	34.3%	65.7%	75.0%	25.0%	2.6%	97.4%
Brisbane	32.4%	67.6%	62.8%	37.2%	2.4%	97.6%
Canberra	32.3%	67.7%	63.9%	36.1%	4.5%	95.5%
Gold Coast	28.6%	71.4%	61.3%	38.7%	4.6%	95.4%
Hobart	0.0%	100.0%	88.2%	11.8%	0.0%	100.0%
Melbourne	39.5%	60.5%	69.4%	30.6%	3.1%	96.9%
Perth	33.0%	67.0%	52.7%	47.3%	0.0%	100.0%
Sydney	31.4%	68.6%	61.5%	38.5%	4.6%	95.4%
Toowoomba	0.0%	100.0%	75.1%	24.9%	0.0%	100.0%

The table shows the 5G availability measured in Adelaide, Brisbane, Canberra, Gold Coast, Hobart, Melbourne, Perth, Sydney and Toowoomba. All data sequences from the umlaut use case are taken into account.
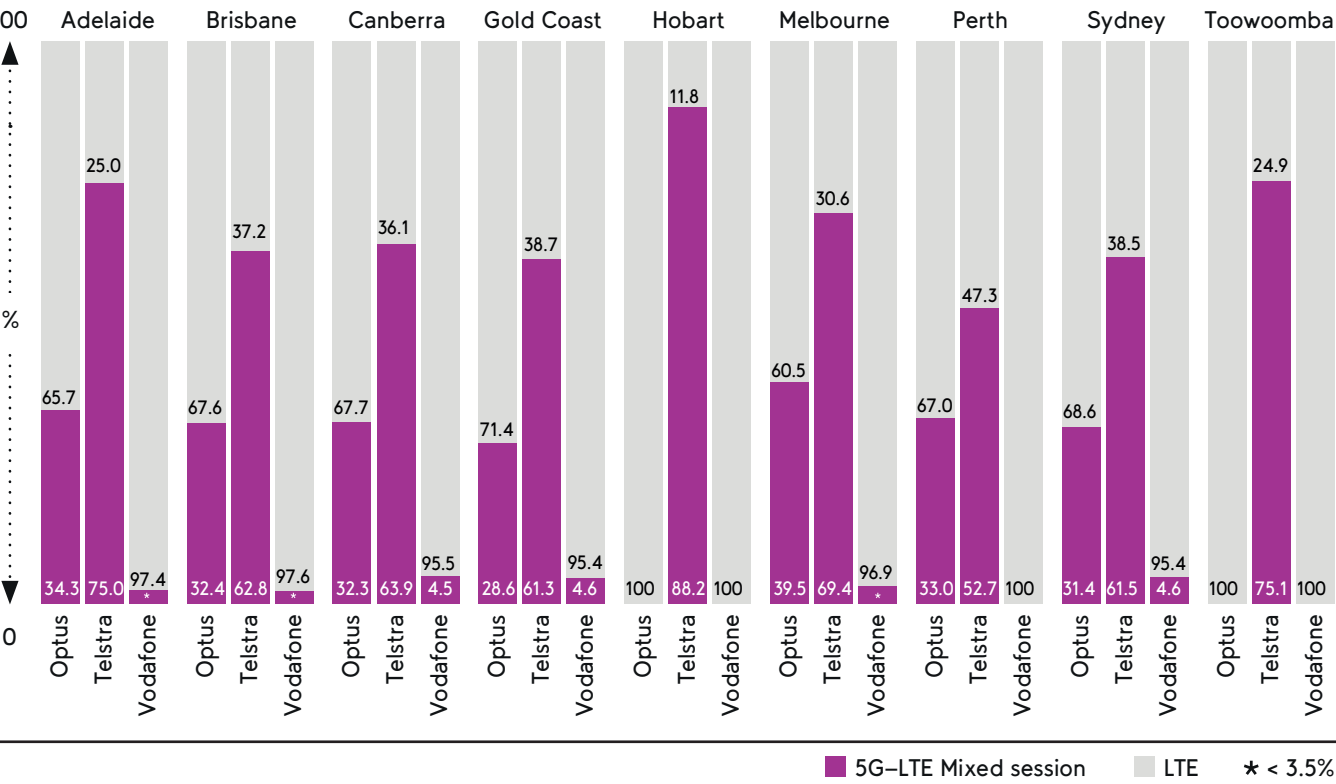5G availability is defined as the share of time a user is actually using the 5G network (represented by the percentage of test cases during which the UE was using 5G). In cases of very low 5G availability (below 3%), separate 5G KPI barcharts are omitted from the views on the following pages for absence of statistical confidence.

5G availability

Measured from UE

	Adelaide			Brisbane			Canberra			Gold Coast			Hobart			Melbourne			Perth			Sydney			Toowoomba		

5G–LTE Mixed session values: Adelaide — Optus 25.0/65.7, Telstra 75.0, Vodafone *; Brisbane — 37.2, 62.8, *; Canberra — 36.1, 63.9, 4.5; Gold Coast — 38.7, 61.3, 4.6; Hobart — 11.8, 88.2; Melbourne — 30.6, 69.4, *; Perth — 47.3, 52.7; Sydney — 38.5, 61.5, 4.6; Toowoomba — 24.9, 75.1.

LTE values: Adelaide — Optus 34.3, Vodafone 97.4; Brisbane 32.4, 97.6; Canberra 32.3, 95.5; Gold Coast 28.6, 95.4; Hobart Optus 100, Vodafone 100; Melbourne 39.5, 96.9; Perth 33.0, 100; Sydney 31.4, 95.4; Toowoomba 100, 100.

Legend: ■ 5G–LTE Mixed session ■ LTE ★ < 3.5%

The graph shows the 5G availability measured in Adelaide, Brisbane, Canberra, Gold Coast, Hobart, Melbourne, Perth, Sydney and Toowoomba. All data sequences from the umlaut use case are taken into account.
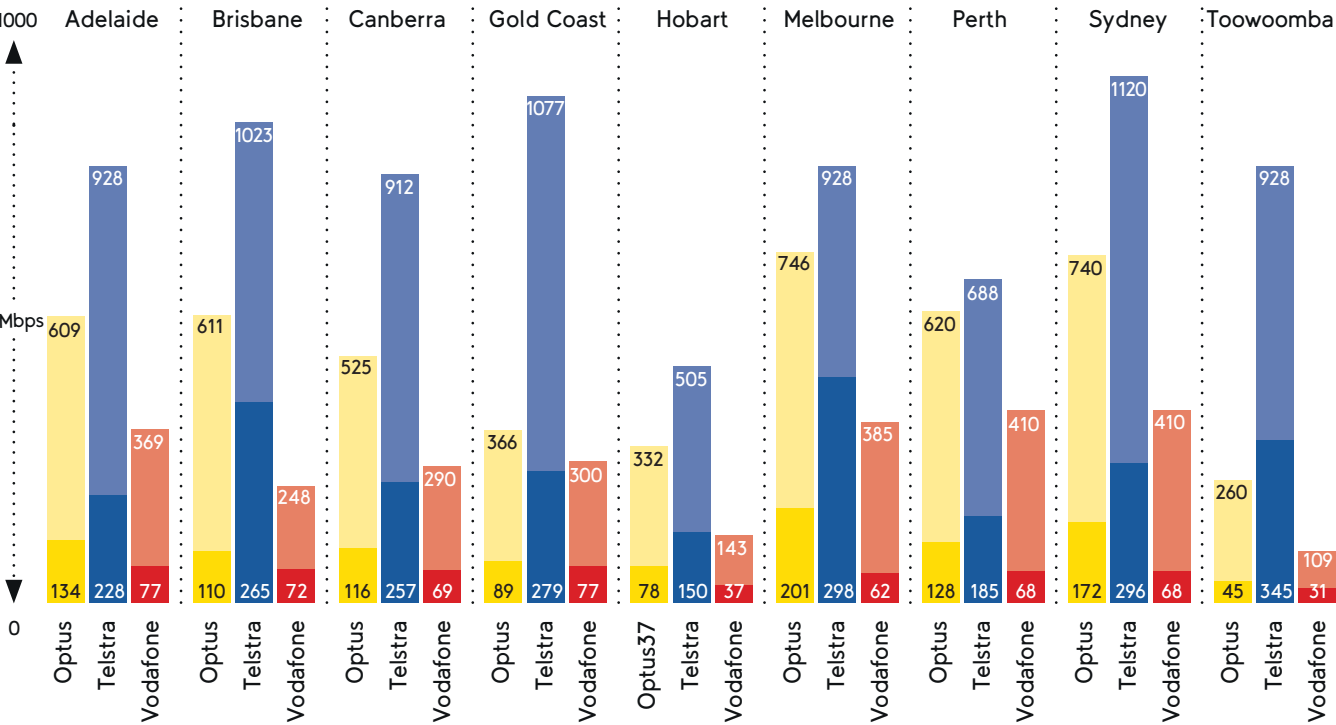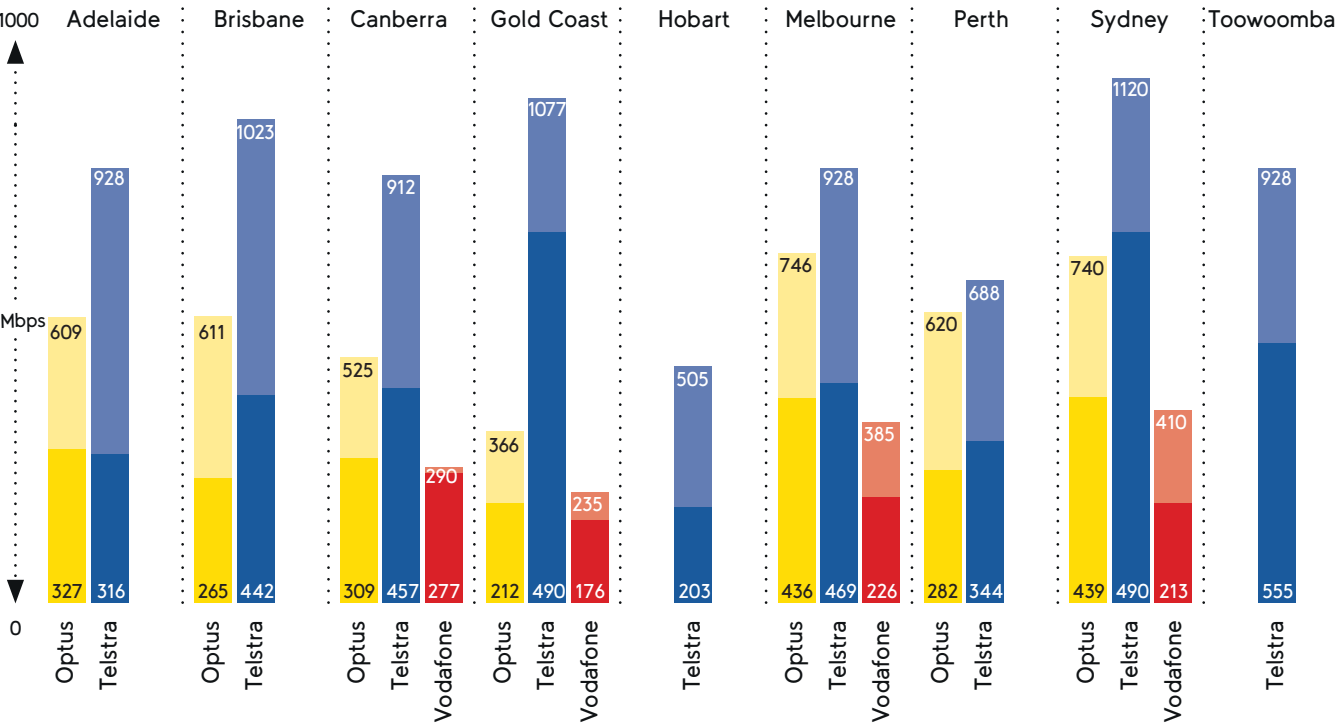
Datastream Download

Avg. & Max. Throughputs — All technologies

The graph shows the average throughput (darker shade) and the maximum throughput (lighter shade) for all technologies. All data sequences from the umlaut use case are taken into account.

Avg. & Max. Throughputs — 5G

The graph shows the average throughput (darker shade) and the maximum throughput (lighter shade) for 5G only. All data sequences from the umlaut use case are taken into account. For Optus and Vodafone there are no 5G captures during the drive test in Hobart and Toowoomba.

Data KPI overview

All technologies

All technologies	KPI Name	Unit	Optus	Telstra	Vodafone
HTTP Live Page DL Smartphone	Qualifier	[%]	99,6	99,9	99,6
	Overall Session Time	[s]	1,3	1,4	1,4
HTTP Static Page DL Smartphone	Qualifier	[%]	99,5	99,8	99,9
	Overall Session Time	[s]	1,2	1,2	1,1
HTTP 5MB DL Smartphone	Qualifier	[%]	99,4	99,7	99,5
	Average Session Time	[s]	2,3	1,5	2,4
	90% faster than	[Mbit/s]	10,9	23,7	11,6
	10% faster than	[Mbit/s]	126,2	166,9	75,4
HTTP 2500KB UL Smartphone	Qualifier	[%]	99,7	99,9	99,7
	Average Session Time	[s]	2,2	2,2	2,1
	90% faster than	[Mbit/s]	5,6	4,9	5,4
	10% faster than	[Mbit/s]	32,8	40,2	35,0
HTTP DL FDTT	Qualifier	[%]	99,2	100,0	99,9
	Average Data Rate	[Mbit/s]	137,9	268,7	61,6
	90% faster than	[Mbit/s]	12,4	28,7	11,2
	10% faster than	[Mbit/s]	388,2	603,0	132,7
HTTP UL FDTT	Qualifier	[%]	99,2	99,4	99,7
	Average Data Rate	[Mbit/s]	25,7	36,4	24,3
	90% faster than	[Mbit/s]	6,1	5,6	5,8
	10% faster than	[Mbit/s]	46,8	82,0	50,1
YouTube	Qualifier	[%]	98,7	99,7	99,0
	Start Time	[s]	1,6	1,6	1,6
	AVG Resolution	[p]	915	920	916
YouTube Live Smartphone	Qualifier	[%]	98,0	99,6	98,7
	Start Time	[s]	2,8	2,8	2,9
	AVG Resolution	[p]	1033	1038	1035

Achieved values of all networks under test in each of the relevant Data Key Performance Indicators (KPIs) in Australia from all collected test samples.

5G

5G	KPI Name	Unit	Optus	Telstra	Vodafone
HTTP Live Page DL Smartphone	Qualifier	[%]	99,8	100,0	99,7
	Overall Session Time	[s]	1,3	1,4	1,4
HTTP Static Page DL Smartphone	Qualifier	[%]	99,7	99,8	99,0
	Overall Session Time	[s]	1,2	1,1	1,4
HTTP 5MB DL Smartphone	Qualifier	[%]	98,4	99,7	98,3
	Average Session Time	[s]	1,7	1,1	1,7
	90% faster than	[Mbit/s]	19,9	41,2	24,5
	10% faster than	[Mbit/s]	167,4	172,4	108,6
HTTP 2500KB UL Smartphone	Qualifier	[%]	99,7	99,9	100,0
	Average Session Time	[s]	2,3	1,9	1,8
	90% faster than	[Mbit/s]	5,4	6,4	7,2
	10% faster than	[Mbit/s]	38,8	43,2	34,1
HTTP DL FDTT	Qualifier	[%]	99,2	99,9	100,0
	Average Data Rate	[Mbit/s]	304,2	365,7	194,5
	90% faster than	[Mbit/s]	52,2	80,0	53,4
	10% faster than	[Mbit/s]	551,3	671,7	308,9
HTTP UL FDTT	Qualifier	[%]	98,3	99,6	96,7
	Average Data Rate	[Mbit/s]	29,3	42,7	29,8
	90% faster than	[Mbit/s]	6,1	7,7	10,4
	10% faster than	[Mbit/s]	59,8	87,4	52,1
YouTube	Qualifier	[%]	99,3	99,9	100,0
	Start Time	[s]	1,6	1,6	1,7
	AVG Resolution	[p]	919	920	917
YouTube Live Smartphone	Qualifier	[%]	98,0	99,6	100,0
	Start Time	[s]	2,7	2,8	2,8
	AVG Resolution	[p]	1037	1038	1040

Achieved values of all networks under test in each of the relevant Data Key Performance Indicators (KPIs) in Australia for a subset of „All Technologies" test samples which were carried over 5G. Vodafone sample based on 5G Measurements captured in Sydney only.

Crowd — 5G

In our crowdsourcing analysis, we took a detailed look at the performance of 5G capable users in Australia.

DL Speed KPIs indicate the percentage, how many of the large downloads observed during everyday usage on the users handsets were fast enough for
- Basic internet (>2Mbps)
- HD video (>5Mbps)
- UHD video (>20Mbps)

5G connected share indicates, how many of those down-loads actually involved a 5G connection (knowing that in Non–Standalone deployments, the 5G connection will always exist in parallel to a 4G connection).

Latency KPIs indicate the percentage, how many of the latency executed on users handsets were good enough for
- OTT voice servies (faster than 100ms)
- Gaming (faster than 50ms)

Crowd KPI overview
Timeperiod 2020 W32 to 2021 W02.

Category	KPI name	Unit	Optus	Telstra	Vodafone
Broadband Coverage	5G connection share	[%]	23,6	32,0	14,6
Download Speed	Basic internet class	[%]	94,4	95,5	95,2
	HD video class	[%]	81,1	83,9	80,4
	UHD video class	[%]	20,1	24,4	17,9
Latency	Gaming class	[%]	83,6	79,0	85,2
	OTT voice class	[%]	97,0	97,8	92,6

Key takeaways

≋ Telstra shows the widest 5G availability in each of the tested cities.

⫰ Telstra shows the highest down–load throughputs nationally for 5G.

⫰ Telstra shows the highest 5G peak throughput in all tested cities. In average 5G throughput, Telstra leads in eight of nine cities.

≋ In the crowdsourcing analysis Telstra is ahead of the competi–tion for the 5G connection share and download rates in all service classes.

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