



2018

Countrywide benchmarking  
test of mobile operators  
in Australia ranks Telstra as  
the best network in test

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## Countrywide benchmarking test of mobile operators in Australia ranks Telstra as the best network in test

### Executive Summary

The Systemics Group is a leading provider of independent Quality of Experience benchmarking services for mobile networks.

Systemics Group conducted an independent National benchmark survey of Australia's three mobile networks Optus, Telstra and Vodafone from September through to November 2018.

Unlike other benchmark surveys of Australia's mobile networks, our aim was to conduct a truly national survey, covering a drive distance of more than 42 000 km, equivalent to driving the circumference of the earth and our largest scale public benchmark in a single country. The survey included a total measurement time of 758 hours, over 20,000 voice calls, and the transfer of almost 5,000 GB of data.

The survey was conducted in four geographical categories – Major Cities, Smaller Cities, Main Roads, Rural and Remote Areas. Four major service categories were tested - Voice, Web Browsing, Data download/upload and YouTube video.

Telstra achieved the highest score of 68.66 points out of a possible total of 100 and won our survey followed by Optus with the score of 65.55 and Vodafone – 50.79 points.

Telstra's overall win is due to the best score in all 4 services categories and 3 out of 4 geographical categories, these being Major Cities, Main Roads and Rural and Remote Areas.

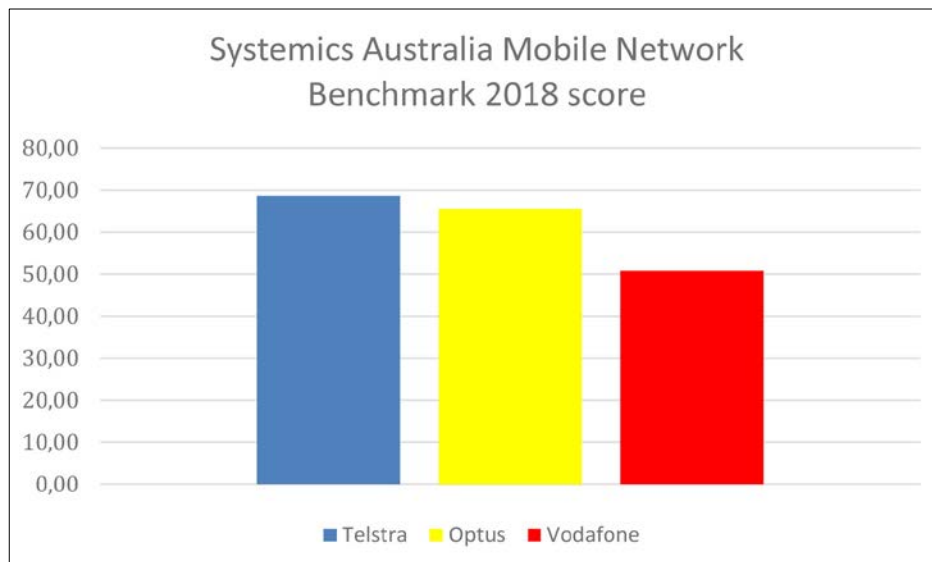
Telstra's superior network coverage throughout the country is best illustrated by the extent of the routes that each carrier supported voice call connectivity on. This is shown in the maps below. Telstra covers 82.61% of the roads driven outside the surveyed cities, compared to just 64.64% for Optus and 58.47% for Vodafone.

*Picture 1 – Voice calls attempts*

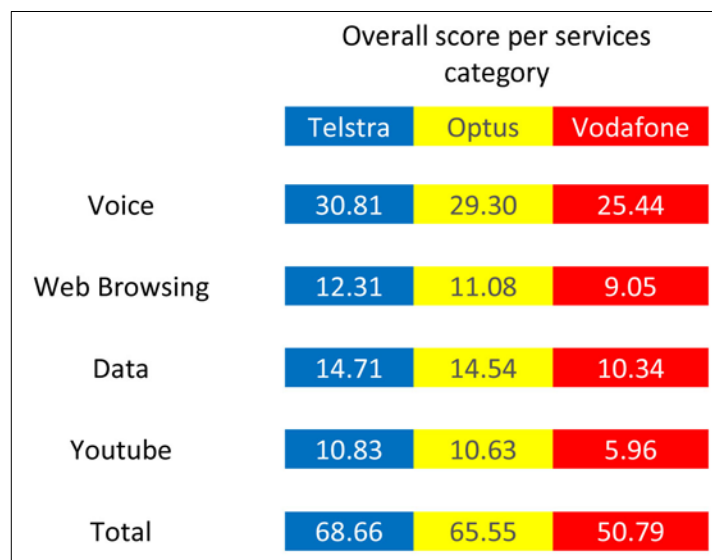


## Summary of results

The key results of the survey are summarised in the charts below.



Telstra topped the survey scoring overall and also lead nationally on all four service categories measured - Voice, Browsing, Data and YouTube.



Telstra also won in Major Cities, Main Roads and in Rural and Remote geographic categories. Optus won in the category of Smaller Cities.

	Overall score per geographical category		
	Telstra	Optus	Vodafone
Major Cities	30.41	29.51	28.74
Smaller Cities	18.65	20.03	13.64
Main Roads	12.57	12.23	6.67
Rural and Remote Areas	7.03	3.77	1.75
Total	68.66	65.55	50.79





## Geographical sample of the test

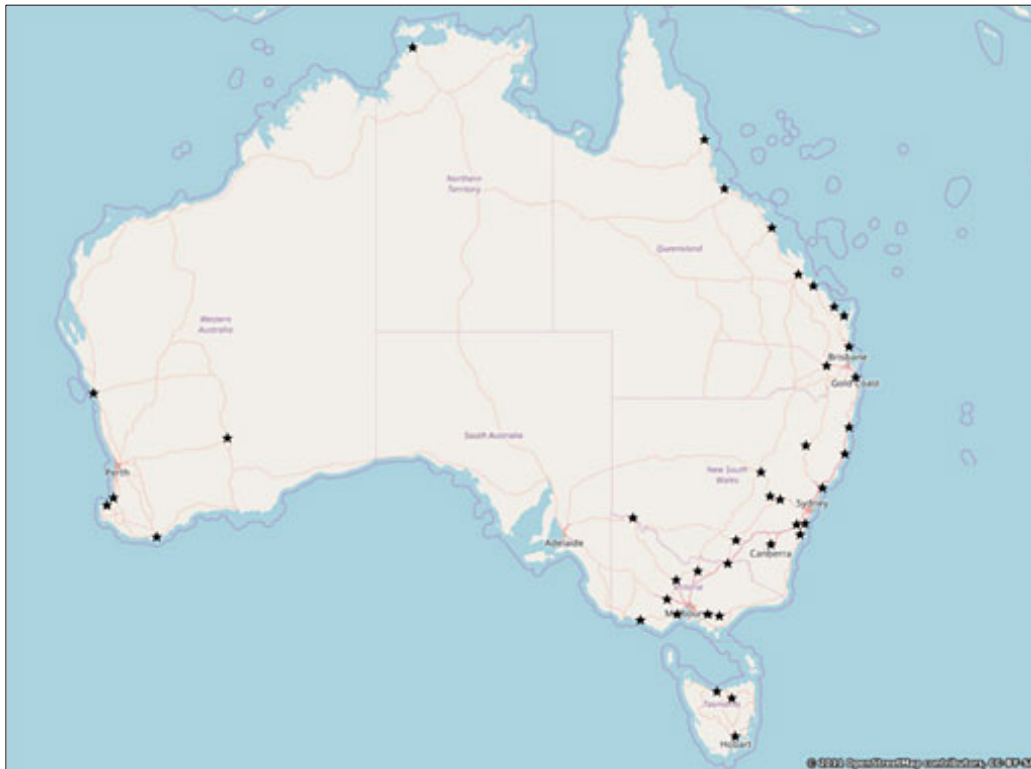
When conducting nationwide campaigns, we aim to achieve a geographical coverage of the entire country. In Australia, the test covered more than 42,000 km of drive route (see the map below), of which more than 25,000 km were roads outside of cities and towns. Apart from surveying the 5 largest cities of Australia our test cars visited 40 other cities and towns and covered the entire route of Highway 1.

Data collected during the test was aggregated into 4 categories: Major Cities, Smaller Cities, Main Roads, Rural and Remote areas. Major Cities included Sydney, Melbourne, Brisbane, Perth and Adelaide. Smaller cities included 40 regional cities shown in Picture 2 below. Roads that we surveyed outside of cities were divided into two categories – Main Roads and Rural and Remote areas. The latter category included those areas where the population density is less than one person per square kilometre. The results from the Major Cities category contributed 35% to the overall score, Smaller cities – 25% while Main Roads and Rural and Remote Areas categories contributed 20% each to the overall score.

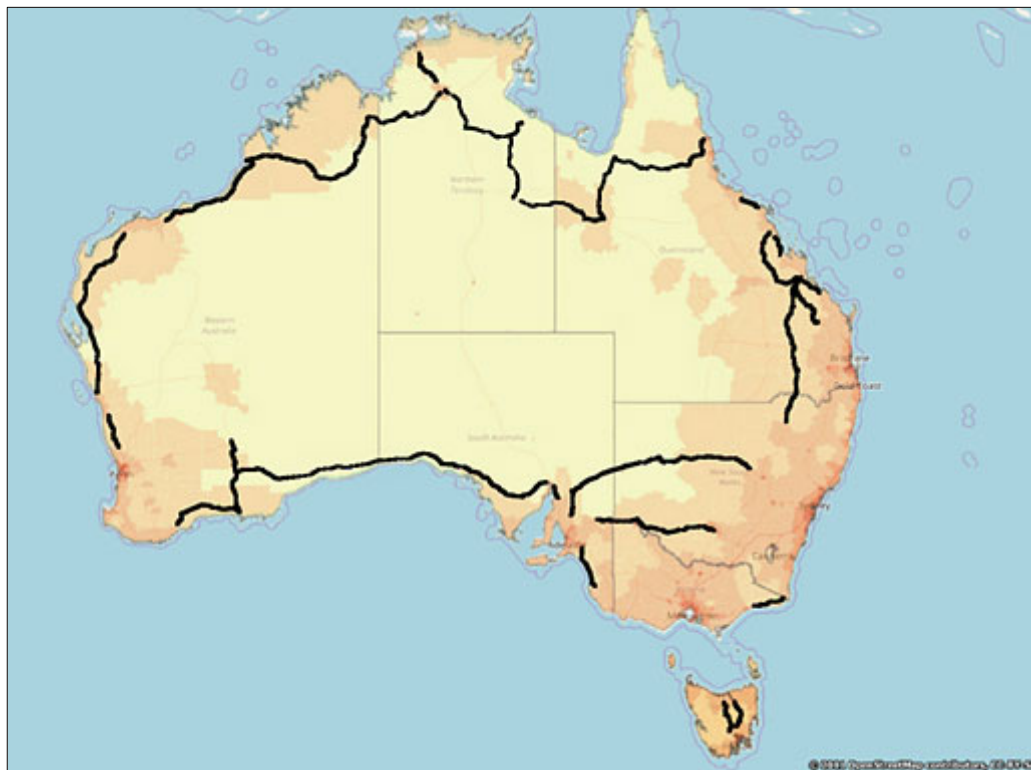
*Picture 2 – Drive route outside of cities and towns*



*Picture 3 – Smaller cities included in the test*



*Picture 4 – Rural and remote areas*



## How the survey was conducted

The benchmark test was conducted by two measurement cars equipped with Rohde & Schwarz Benchmark II systems. Samsung Galaxy S8 terminals were used to test data and voice services. Each car was equipped with 9 test terminals – 6 were dedicated to voice tests and 3 were used to test data services. We used commercially available SIM cards of all three operators. Data tests were carried out using a server located at an independent Internet Service Provider in Australia. Measurement cars were also equipped with radio scanners to measure the radio signal strength of 3G and 4G.

Measurements were performed from September till November 2018. More than 20,000 test calls were made for each of the tested operators. Assessing data services, we carried out more than 100,000 tests for each operator.

*Picture 5 – Testing mobile networks in remote areas*





## Test results

The results of the test show impressive performance of mobile networks in Australia. All three operators achieved very high results in the Major Cities category with Telstra achieving the highest score. We were especially impressed by voice services score, where all the operators deployed Enhanced Voice Services (EVS) technology that translates into outstanding audio quality of voice in mobile networks. Call Setup Success rates exceeded 99.7% which is an exceptional result.

In Smaller Cities category Optus marginally outperformed Telstra mainly due to the better quality of voice services. Vodafone, especially in data-related services, lags behind both Telstra and Optus.

In Main Roads category the results of Telstra are ahead of Optus although the differences are small, while the results of Vodafone are considerably lower compared to both Telstra and Optus mainly due to a worse performance of data services. This is caused by the lower network coverage of Vodafone on the main roads.

In Rural and Remote areas there is a clear advantage of Telstra over two other operators. In this sub-category, mobile services of Telstra were available in almost 50% more areas compared to Optus. Apart from a superior network coverage, Telstra service represented good overall quality. An average throughput of data download test in this sub-category was 21.6 Mbps, which is a very respectable result for very scarcely populated areas.

Picture 6 – Aggregated results

	Main Cities			Smaller Cities			Roads			Rural and Remote Areas		
	Telstra	Optus	Vodafone	Telstra	Optus	Vodafone	Telstra	Optus	Vodafone	Telstra	Optus	Vodafone
Voice max40	37,23	36,71	34,22	33,16	37,12	31,70	29,68	27,46	21,60	17,75	8,38	6,13
Browsing max20	15,33	14,80	14,76	11,95	10,86	9,25	12,78	12,09	6,45	7,01	3,86	1,42
		+			+			+			+	
Data max25	20,82	19,94	20,72	17,52	19,11	9,60	9,65	10,64	2,88	5,58	3,26	0,53
		+			+			+			+	
YouTube max15	13,51	12,87	12,43	11,97	13,04	4,01	10,75	10,95	2,40	4,81	3,35	0,66
		+			+			+			+	
Score	86,89	84,32	82,12	74,60	80,13	54,55	62,86	61,14	33,33	35,14	18,86	8,74
Category Weight	35%			25%			20%			20%		
Weighted Score	30,41	29,51	28,74	18,65	20,03	13,64	12,57	12,23	6,67	7,03	3,77	1,75
National score				Telstra	Optus	Vodafone						
				68,66	65,55	50,79						

**Telstra, with the total score of 68.66 is the winner of our test**, followed by Optus with the result of 65.55. Vodafone achieved the score of 50.79. Telstra is ranked as number one operator in our test mainly due to the very good performance of its services in Major and smaller cities and extensive network coverage outside of cities which translates into superior voice and data services availability. Optus is able to challenge Telstra's no. 1 position in Major

Cities and Smaller cities categories, where the results of Telstra and Optus are comparable. In Rural and Remote areas it clearly lacks the network coverage of Telstra. Vodafone offers mobile services with good quality in Major Cities achieving a score comparable to Telstra and Optus. In other geographical categories, there is a clear gap compared to the first two operators. This is mainly caused by their lower network coverage outside of cities.

Picture 7 – Major cities details

		Telstra	Optus	Vodafone
Service particular scores	Voice max40	37,23	36,71	34,22
	Browsing max20	15,33	14,80	14,76
		+		
	Data max25	20,82	19,94	20,72
		+		
	YouTube max15	13,51	12,87	12,43
		+		
Score		86,89	84,32	82,12
Category Weight		35%		
Weighted Score		30,41	29,51	28,74

Picture 8 – Smaller cities details

		Telstra	Optus	Vodafone
Service particular scores	Voice max40	33,16	37,12	31,70
	Browsing max20	11,95	10,86	9,25
		+		
	Data max25	17,52	19,11	9,60
		+		
	YouTube max15	11,97	13,04	4,01
		+		
Score		74,60	80,13	54,55
Category Weight		25%		
Weighted Score		18,65	20,03	13,64

Picture 9 – Roads details

		Telstra	Optus	Vodafone
Service particular scores	Voice max40	29,68	27,46	21,60
	Browsing max20	12,78	12,09	6,45
		+		
	Data max25	9,65	10,64	2,88
		+		
	YouTube max15	10,75	10,95	2,40
		+		
Score		62,86	61,14	33,33
Category Weight		20%		
Weighted Score		12,57	12,23	6,67

Picture 10 – Rural and remote areas details

		Telstra	Optus	Vodafone
Service particular scores	Voice max40	17,75	8,38	6,13
	Browsing max20	7,01	3,86	1,42
		+		
	Data max25	5,58	3,26	0,53
		+		
	YouTube max15	4,81	3,35	0,66
		+		
Score		35,14	18,86	8,74
Category Weight		20%		
Weighted Score		7,03	3,77	1,75

## International comparison of results

The Systemics Group has performed a number of similar national surveys of mobile networks quality predominantly in Europe and Middle East countries. Australia is a country where mobile operators invested heavily into LTE technologies. This is the dominant technology for both voice and data services with 3G technologies used only as a secondary network layer and 2G not being used at all. It brings several advantages over networks with 2G – 3G – LTE layers which is the most common network architecture in Europe. Due to continuous LTE coverage, there are not too many inter-technology handover issues and wide radio spectrum dedicated to LTE translates onto superior network performance when compared to most of the European networks.

Quality of mobile networks in Australia is hard to compare on like for like basis with smaller countries where close to 100% network coverage on the roads is a given. We would like to highlight some of the KPI values that we observed in Major Cities of Australia as they can be directly compared with KPIs that we recorded in Major Cities in European countries.

### Major Cities – selected KPIs

	Telstra	Optus	Vodafone
Call setup success rate (%)	99.92%	99.79%	99.71%
Average Voice MOS (1 - 5, higher is better)	4.52	4.61	4.56
Ave Data Speed DL (Mbps)	77.90	70.40	72.20
Fastest Data Speed DL - max value (Mbps)	361.67	387.18	308.23
Ave Data Speed UL (Mbps)	30.58	24.77	31.23
Fastest Data Speed UL - max value (Mbps)	63.17	65.64	65.17

The ranges of the above given KPIs, visible in Major Cities categories in surveys done in European countries are shown in the table below.

### Major Cities – selected KPIs

	European surveys ranges
Call setup success rate (%)	97.0 - 99.85%
Average Voice MOS (1 - 5, higher is better)	3.40 - 4.38
Ave Data Speed DL (Mbps)	37 - 79
Fastest Data Speed DL - max value (Mbps)	337.22
Ave Data Speed UL (Mbps)	22 - 35
Fastest Data Speed UL - max value (Mbps)	48.31

The KPI values depicted above observed in Major Cities in Australia have most often exceeded the ranges that we recorded in similar European surveys in Major Cities. This is proof of the excellent performance of networks in Australia compared to other countries.



## About Systemics Group

The Systemics Group is a leading provider of independent Quality of Experience benchmarking services for mobile operators and regulators. We have conducted national benchmarking campaigns of mobile networks in more than 20 countries.

The benchmarking tests that we perform are carried out using a fleet of 50+ Diversity Benchmarker II Rohde & Schwarz measurement systems with over 30 vehicles. Systemics from 2017 is a certified partner of Rohde & Schwarz in the mobile networks testing domain.

The Systemics Group comprises of Systemics-PAB, Nexus Telecom, Commsquare and NetQPro allowing us to offer a unique set of monitoring and testing tools for both mobile and fixed networks. We operate globally with offices and subsidiaries in Poland, Germany, Belgium, Greece, Ireland, United Kingdom, Canada, Russia, Jordan and Malaysia.

Our mission is to assist customers to understand and address the variety of issues affecting quality in mobile and fixed telecommunication networks. Expert know-how developed over many years, combined with large-scale operations and efficient cloud-based data post-processing, allows us unparalleled flexibility in conducting high quality large benchmarking projects in multiple countries worldwide.