



Benchmarking test of  
mobile operators in Austria  
shows A1 as the operator  
with the best network



## Summary of Results

In a test of Quality of Mobile Services conducted by Systemics-PAB in Austria, A1 achieved the highest score of 95.29 points out of 100, followed by Magenta (90.95 points) and Drei (82.69 points). Austrian operators offer their customers excellent quality of mobile service and the results they achieved are outstanding compared to similar benchmarking tests that we performed in other countries.

The summary of the results is shown in the table below:

*Table 1 – Summary of the results*

	Main Cities			Smaller Cities			Roads		
	Drei	Magenta	A1	Drei	Magenta	A1	Drei	Magenta	A1
Voice max 40 pts	38.59	39.61	39.45	38.33	39.65	39.53	26.02	37.47	38.72
+ Browsing max 10 pts	9.62	9.92	9.89	9.79	9.55	9.65	3.81	5.90	9.37
+ Data max 40 pts	37.84	38.36	37.68	36.66	37.75	37.50	17.47	25.00	34.54
+ YouTube max 10 pts	9.80	9.80	9.80	9.79	9.78	9.80	5.96	7.83	9.45
= Aggregation Scores	95.85	97.69	96.82	94.57	96.73	96.48	53.27	76.20	92.07
Aggregation Weights	40%			30%			30%		
Weighted Scores	38.34	39.07	38.73	28.37	29.02	28.94	15.98	22.86	27.62
Final Score	Drei	Magenta	A1						
	82.69	90.95	95.29						

Comparing the results achieved in particular geographical categories we can see the score achieved by all operators in Major Cities and Smaller Cities were very high and the differences between operators were marginal. In both of those categories Magenta achieved the highest result. In the Roads category A1 clearly outperformed two other operators and this was the most significant contributing factor to the overall win of A1 in our benchmark.

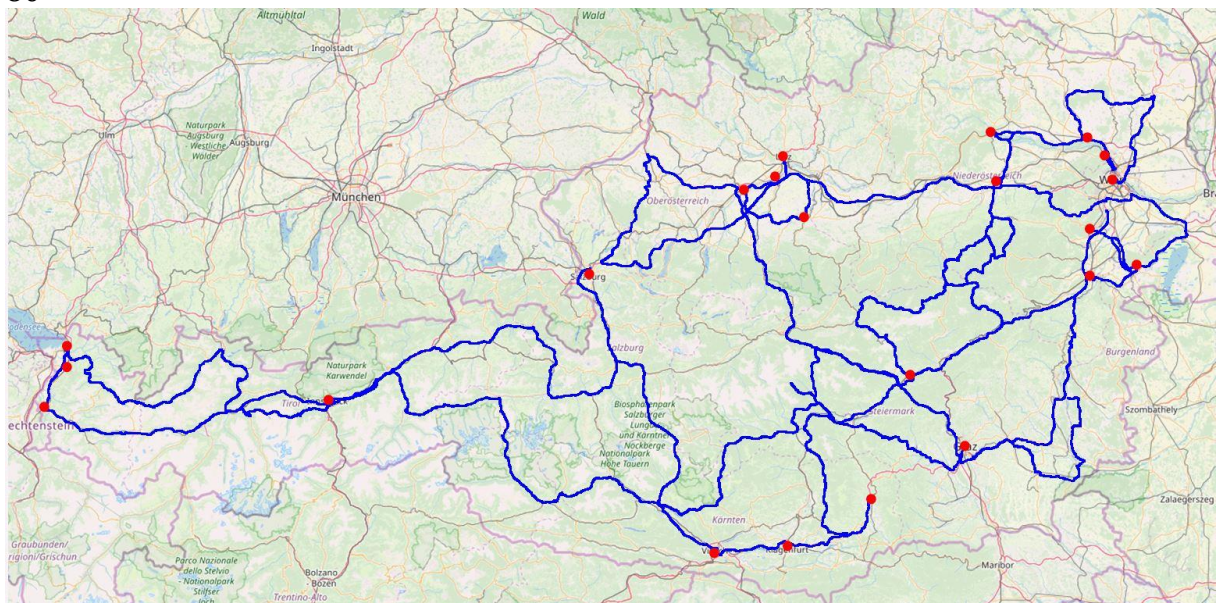
When looking at services categories A1 had the highest score in all the categories: Voice, Web Browsing, Data transmission and YouTube.

## Geographical coverage of the test

When conducting nationwide campaigns, we aim to achieve a geographical coverage of the entire country. In Austria, the test covered more than 7,000 km of drive route (see the map below), of which close to 3,500 km were roads outside of cities and towns. Our test cars visited all the regions of Austria and we see our survey as the one covering the widest area of the country amongst other similar benchmarks of mobile networks in Austria.

*Picture 1 – Drive route and tested cities and towns*

80



Data collected during the test was divided into 3 categories: Largest Cities, Smaller Cities and Roads. Largest cities included Vienna, Graz and Linz. Smaller cities included 19 cities in all regions of Austria.

## How the survey was conducted

The benchmark test was conducted by two measurement cars equipped with Rohde & Schwarz SmartBenchmarker systems. Samsung Galaxy S9 terminals were used to test voice and 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 Austria. Measurement cars were also equipped with Rohde & Schwarz radio scanners to measure the radio signal strength of 2G, 3G and 4G.

Measurements were performed in October 2019. Approximately 5500 test calls were made for each of the tested operators. Assessing data services, we carried out more than 25,000 different tests for each operator.



## Test results

The results of the test show excellent performance of mobile networks in Austria. Both A1 and Magenta achieved the score of over 90 points which is an outstanding result compared to what we tested in similar projects in other countries. The score of Drei above 80 points also reflects very good quality of mobile services.

In calculating the overall score we evaluated 4 main categories of services:

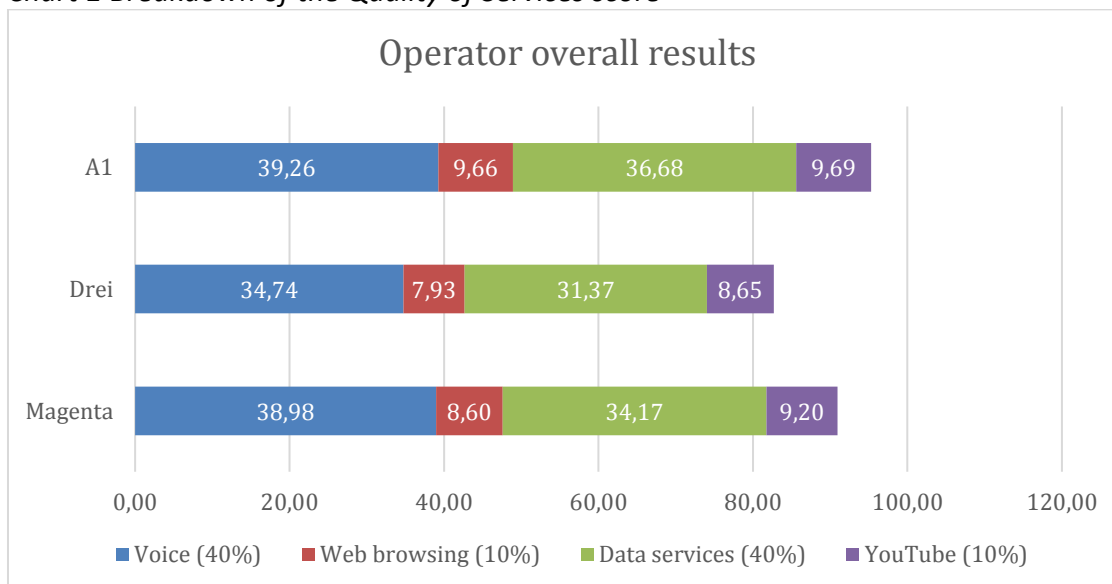
- Voice services affecting 40% of the overall score
- Data services affecting 40% of the overall score
- Web browsing with 10% impact on the overall score
- YouTube with 10% impact on the overall score.

Overall test results:

Drei	Magenta	A1
82.69	90.95	95.29

**A1 with a total score of 95.29 is the winner of our benchmark**, followed by Magenta with the result of 90.95. Drei achieved a score of 82.69.

Chart 1 Breakdown of the Quality of Services score



Comparing the results of A1 and Magenta we can see the higher overall score of A1 is achieved thanks to the superior performance of data services. The results achieved The difference between A1 and Magenta is visible when comparing the results of Roads category. The results of Drei show a gap compared to A1 and Magenta in Voice and Data categories. In Web browsing and YouTube categories the score of Drei is close to the two other operators.

In calculating the overall score we evaluated main KPIs related to voice and data services. There were 26 KPIs that were measured. In the sections below we give a summary view of the most important KPIs that contributed to the overall score.

## Voice services

Voice services results show a positive impact on quality of Voice over LTE (VoLTE) technology. In Austria all three operators deployed VoLTE in their networks and furthermore enabled Enhanced Voice Services (EVS). This means all operators offer superior HD Voice + quality compared to HD voice in 3G networks.

The table below is a summary of the most important voice services results showing average KPI values for Main Cities, Smaller Cities and Roads.

Table 2 – Summary of voice results

	Main Cities			Smaller Cities			Roads		
	Drei	Magenta	A1	Drei	Magenta	A1	Drei	Magenta	A1
Voice - Overall Session Success Rate [%]	99.7%	100.0%	99.6%	99.6%	99.9%	99.5%	94.6%	98.4%	99.4%
Voice - Average Call Setup Time [s]	2.6	1.3	2.0	2.6	1.3	2.0	3.0	1.4	2.1
Speech quality - Average MOS	4.64	4.67	4.62	4.62	4.67	4.62	4.43	4.63	4.57

Results of voice services are excellent for both A1 and Magenta. In Speech Quality and Average Call Setup Time both operators achieved the levels of KPIs that maximised the achievable score for these KPIs. Session Success Rate was at a very high level with, in the Roads category, a slight advantage of A1 over Magenta. Drei achieved very good results in Main Cities and Smaller Cities but in the Roads category there were some gaps in the availability of voice services that resulted in lower score. For both Magenta and A1 continuous LTE coverage meant that almost all voice tests were done in VoLTE technology. This translated into shorter call setup times and higher MOS scores.

## Data services

Mobile operators in Austria offer their customers excellent quality of data services. LTE Advanced (LTE+) is widely used in Austria. It allows to aggregate more than one LTE radio band and thus achieve higher throughputs of data transmission. We see a high extent of deployment of LTE+ as one of the main factors contributing to the results of data tests achieved by all three operators. In our test the usage of LTE+ exceeded 80% in data download test, which is the most demanding test in terms of network resources.

Table 3 – Summary of data results

	Main Cities			Smaller Cities			Roads		
	Drei	Magenta	A1	Drei	Magenta	A1	Drei	Magenta	A1
Data download - Overall Session Success Rate [%]	99.6%	100.0%	100.0%	99.9%	100.0%	99.9%	93.6%	96.2%	98.9%
Data download - Average Throughput [Mbps]	75.2	82.5	78.4	72.9	75.8	87.2	80.0	64.4	67.4
Data upload - Overall Session Success Rate [%]	99.5%	100.0%	100.0%	100.0%	100.0%	99.8%	93.9%	96.8%	99.2%
Data upload - Average Throughput [Mbps]	33.1	41.5	39.8	31.5	40.1	33.3	28.2	30.3	31.9
Web browsing - Overall Session Success Rate [%]	99.3%	99.6%	99.8%	99.5%	99.3%	99.4%	90.6%	96.0%	98.4%
Web browsing - Average Page Download Time [s]	2.45	2.31	2.46	2.53	2.45	2.45	2.60	2.55	2.59
YouTube HD - Overall Session Success Rate [%]	99.8%	99.9%	100.0%	99.8%	100.0%	99.9%	93.4%	96.4%	98.6%
YouTube HD - Average VMOS (video quality)	4.40	4.40	4.40	4.40	4.39	4.40	4.29	4.39	4.38

The results for data services show a success rate of more than 99.5% for Main and Smaller cities for all the operators. Outside of cities high retainability of service is maintained by A1, success rates ranging from 98.4% for web browsing to 99.2% for data upload. Magenta is slightly below with the success rates ranging from 96.0% to 96.8%, and Drei with the lowest results ranging from 90.6% to 93.9%. Advantage of A1 in data services retainability as shown by the Overall Session Success Rate was the biggest contributor to the higher result of A1 compared to Magenta and Drei.

In data download we can see very good results for all three operators, with Average Throughput exceeding 70 Mbps in Main Cities and Smaller Cities categories. Magenta achieved the highest Average Throughput result in Main Cities (82.5 Mbps), while A1 is the winner in Smaller Cities (87.2 Mbps) and Drei outperformed two other operators in Roads category (80.0 Mbps). In data upload the Average Throughput exceeds 30 Mbps in Main Cities and Smaller Cities categories for all three operators.

For web browsing the user experience shown as the time needed to download the complete web page is very comparable for all three operators. The same is true for YouTube test, where the video quality measured by VMOS results is almost the same for all three operators.

## About Systemics-PAB

The Systemics-PAB 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 25 countries.

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, gives us an unparalleled flexibility in conducting high-quality and complex projects in multiple countries worldwide. From 2017 Systemics-PAB is a certified partner of Rohde & Schwarz in the mobile networks testing domain. Systemics-PAB has also been a contributing member of ETSI working group developing guidance for Quality of Services testing in mobile networks.

