SYSTEMICS PAB
Network Quality Experts

Benchmark Measurements

of 5G coverage in Austria

show A1 as the operator

with the largest 5G network

November 2021

Summary of the Results

In a survey of 5G coverage conducted by Systemics-PAB in Austria, the network of A1 came on top with the largest 5G coverage in the country. All operators have very good coverage of 5G in Vienna and other major cities. Outside of major cities both A1 and Magenta have good 5G coverage. In our test A1 came out as the operator with the largest 5G network in Austria. It has a clear 5G coverage advantage over other operators across the country.

Picture 1 – 5G Coverage of A1


Picture 2 – 5G Coverage of Drei
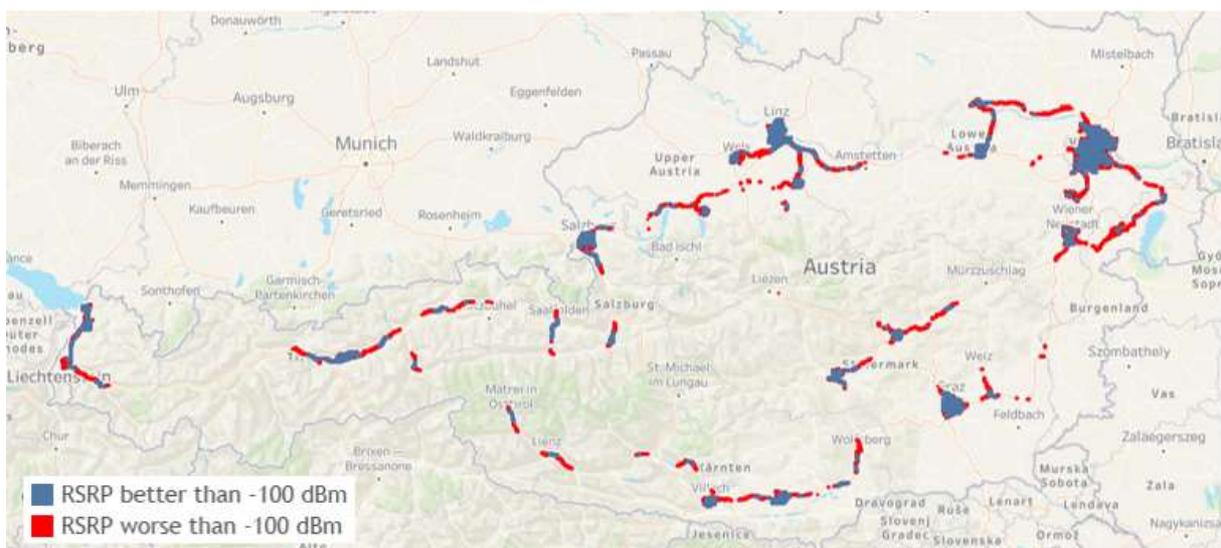
Picture 3 – 5G Coverage of Magenta

Geographical coverage of the measurements

Our aim was to do a comprehensive survey of 5G coverage throughout Austria. The test route included the largest cities – Vienna, Graz, Linz, Salzburg, Innsbruck, number of middle size towns and selection of roads covering all regions of Austria. The driveroute outside of main cities covered more than 2,500 km and is shown in the picture below.

Picture 4 – Drive route
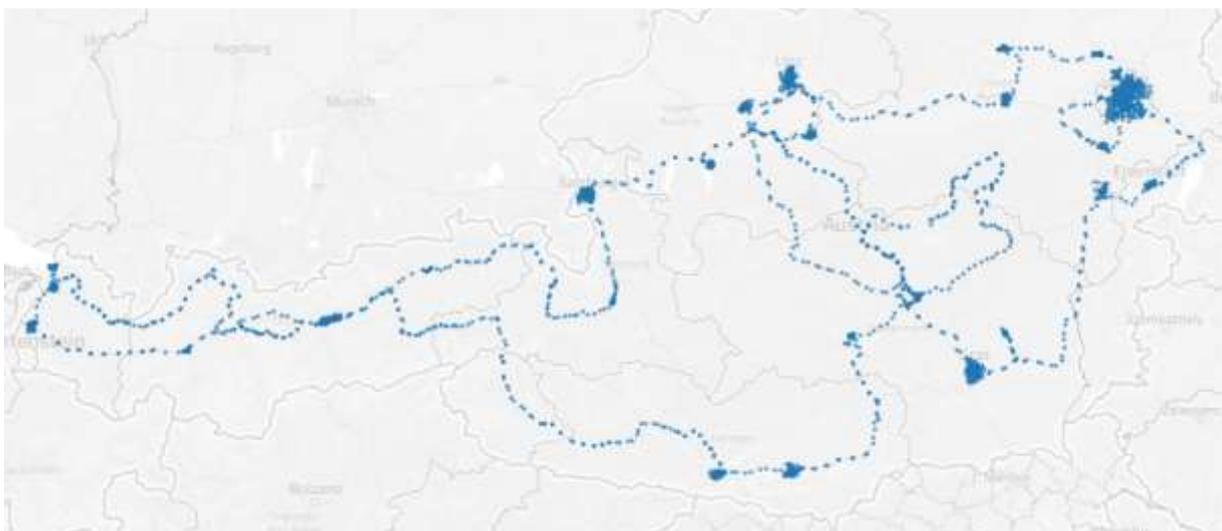
How the survey was conducted

The measurements were conducted by a measurement car equipped with a Rohde & Schwarz TSME-6 radio scanner collecting radio signal samples in all frequencies allocated to 5G in Austria. Scanner antenna was placed on the roof of the car.

Measurements were performed at the end of October and beginning of November 2021.

Test results

Radio scanner detected 5G radio networks in the following bands:

- A1 – 2100 MHz, 3500 MHz
- Drei – 2100 MHz, 3500 MHz
- Magenta – 700 MHz, 2100 MHz, 3500 MHz

2100 MHz is the main coverage band for A1, with 3500 MHz used mainly in the cities. Drei uses predominantly 3500 MHz band and its 5G network coverage concentrates in cities and towns. Magenta uses 2100 MHz and 3500 MHz throughout the country and in addition has also deployed 5G in 700 MHz band.

Evaluating the scanner results we combined all the radio signal samples with RSRP level better than -100 dBm. RSRP is a measure of radio signal strength and the threshold of -100 dBm as measured by the scanner in the car corresponds to normal indoor coverage of 5G in nearby buildings. In such locations we should have a reasonable indoor 5G coverage. Below that value 5G network can still be accessible outdoors, but in indoor locations the user would be redirected to 4G network instead.

Radio scanner collects radio signal samples with a frequency of around one second. With the measurement car moving at 50-60 km/h we collect a radio sample every 15 metres of the driveroute. To visualise these results on the map, we combine radio samples in a grid of squares 100 m x 100 m. For all samples within a given square an average RSCRP value is calculated and a dot representing the center of such a square is placed on the map. Individual dots do not reflect the same amount of samples in a given square, they are meant to represent extend of 5G radio coverage, but not the density of 5G network in a given location. Blue dots on the map depict those areas where the average RSRP value for 5G radio is better than -100 dBm which indicates normal indoor coverage. In areas marked in red the RSRP values of 5G radio is worse than -100 dBm. In those locations a user should still be able to use 5G networks outdoors, but 5G signal strength will not be sufficient for indoor usage.

To assess the 5G coverage we sum up the 100 m x 100 m squares with 5G RSRP values better than -100 dBm. The results for each of the operators are presented in a table and a chart below.

Table 2 – 5G coverage, number of 100 x 100 meters squares
with RSRP value for 5G radio better than -100 dBm

	A1	**Drei**	**Magenta**
Vienna area	**5 651**	3 771	5 132
Rest of Austria	**40 366**	16 923	35 696
Total	**46 017**	20 694	40 828
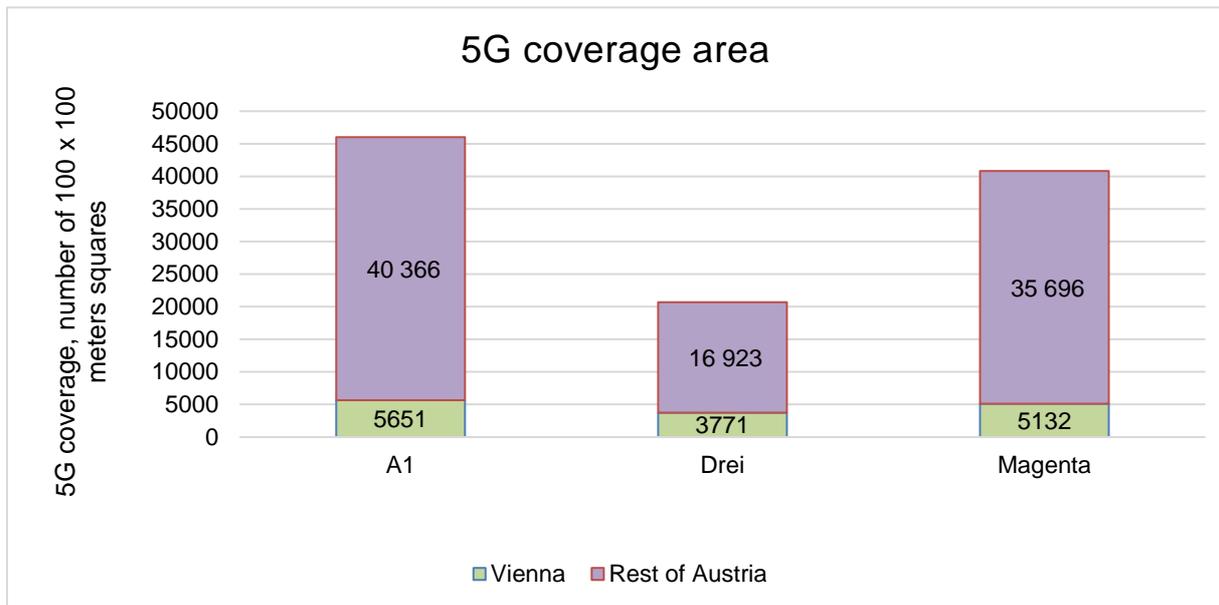
The total numbers shown in the table and the chart above represent country wide coverage of 5G that we measured in our survey. As we can see A1 is a clear leader in terms of 5G coverage in Austria.

Results shown in the maps in the summary section of this report are repeated here to show the 5G coverage maps of all three operators side by side. In addition we also present the close-up of 5G coverage results for Vienna.

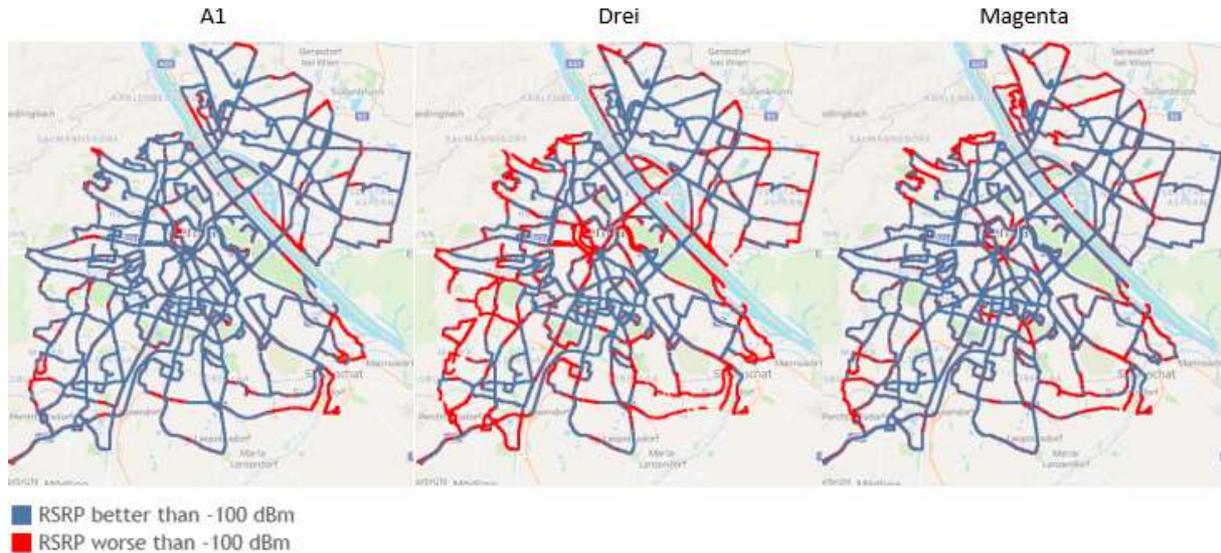*Picture 5 – 5G Coverage in Austria, comparison of operators*

A1

Drei

Magenta

RSRP better than -100 dBm
RSRP worse than -100 dBm

Picture 6 – 5G Coverage in Vienna, comparison of operators

- ■ RSRP better than -100 dBm
- ■ RSRP worse than -100 dBm

Conclusions

5G coverage in Austria has improved significantly in recent months. The survey of 5G coverage that Systemics-PAB conducted shows good 5G coverage in major cities from all three operators. While 5G coverage of Drei is mainly present in cities and towns, A1 and Magenta also provide extensive coverage outside of cities. Compared to Megenta A1 has deployed 5G more extensively in 2100 MHz band, and as a result it achieved 5G coverage advantege over its competitors. Our survey results show the 5G coverage of A1 being more than 10% larger than Magenta and more than 50% larger than Drei. Therefore we can conclude that A1 is the operator with the largest 5G network in Austria.

Systemics-PAB

Systemics-PAB is a leading provider of independent Quality of Experience benchmarking services for mobile operators and regulators. We have conducted various benchmarking campaigns of mobile networks in more than 50 countries representing among others Eurasia, Middle East, Africa, and Australia.

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.