

Systemics-PAB completes Orange DSBO 2020 network measurements and assessment, and starts DSBO 2021 with 5G included.

Periodic drive tests of mobile networks play a vital role in maintaining the highest standards of telecommunication services quality and customer experience when using the network. It also allows the assessment of the situation in the market as a whole and is one of the tools for stimulating competitiveness. The year 2021, is the sixth time in row that Systemics-PAB conducts the annual assessment of mobile networks as a part of the Orange DSBO project (Data Services Benchmarking and Optimization) It covers a number of European countries such as Belgium, Luxemburg, Moldova, Poland, Romania Slovakia and Spain. The results of this year’s campaign will be available in August 2021. The 2021 project will also include 5G measurements as the deployment of this technology is accelerating across the region.

Below, Systemics-PAB shares the overall performance and conclusions from the previous 2020 network survey. All operators in the seven European countries and Jordan in the Middle East were tested.

The aim of the project was to provide an independent and consistent assessment of data and voice services (including VoLTE) of all operators in the European countries where Orange is present (except France), as well as in Jordan. Additionally, an integral part of the project was to provide a deep analysis and recommendations to local operators in order to improve the quality of service which in turn would lead to better customer experience.



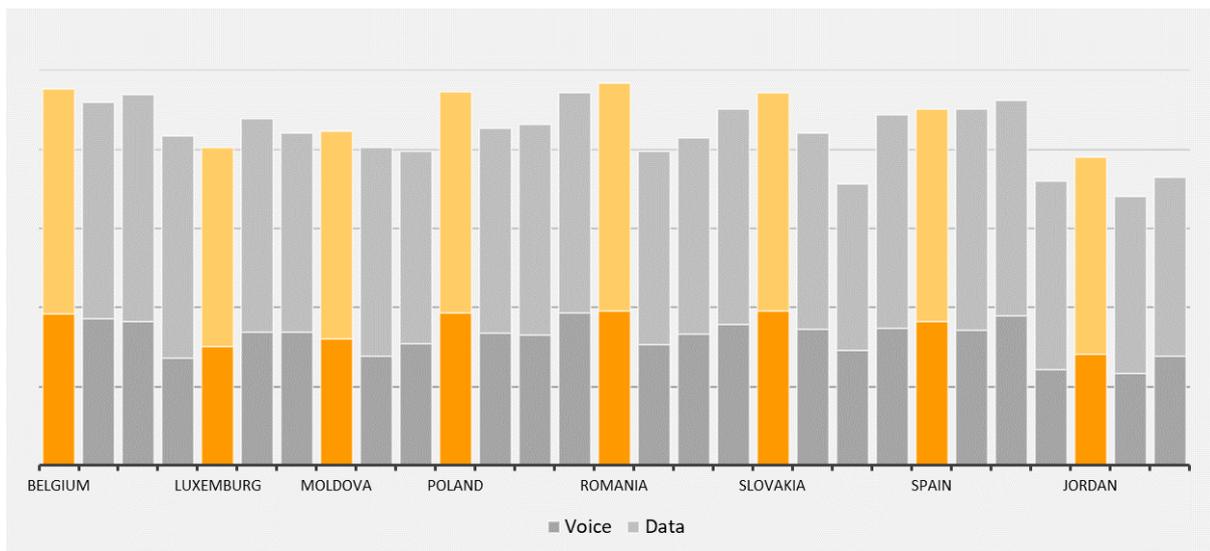
Despite the pandemic and its effect around the world, Systemics-PAB was able to successfully complete the extensive benchmarking campaign in 2020 to measure the quality of mobile telecommunication services offered by mobile network operators in the above-mentioned countries. The unprecedented situation we had to face since the spring of 2020 caused some delay but the project was able to be completed at the beginning of 2021.

The 2020 measurements were carried out using the SwissQual SmartBenchmarker system equipped with Samsung Galaxy S10 terminals for voice test and Samsung Galaxy S9 terminals for data tests. For the coverage assessment, Rohde and Schwarz radio scanners were used. Voice tests were conducted in mobile-to-mobile mode. Additional measurement channels were assigned to test WhatsApp voice services with Sony Xperia XZ2 terminals.

Systemics-PAB used 115 measurement days doing drive tests over 50,000 kilometres of roads for testing each of the 28 mobile networks in 8 countries. We visited 142 cities and towns to ensure that the survey covered more than 50% of each country’s population. During the

surveys, over 47,000 4G data sessions, 90,000 voice calls and 84,000 WhatsApp calls were conducted. Data tests generated 8.3TB of traffic.

The assessment of the quality of services was performed using international standards and Systemics-PAB expert knowledge. The scoring methodology approach according to ETSI Technical Report TR103559 Annex B was used. All the networks were scored against the best quality in voice and data categories. The overall maximum possible score is 1,000 point. In some countries, measurement results reached well above 900 scoring points. The comparison between countries and operators within countries are presented on the chart below.

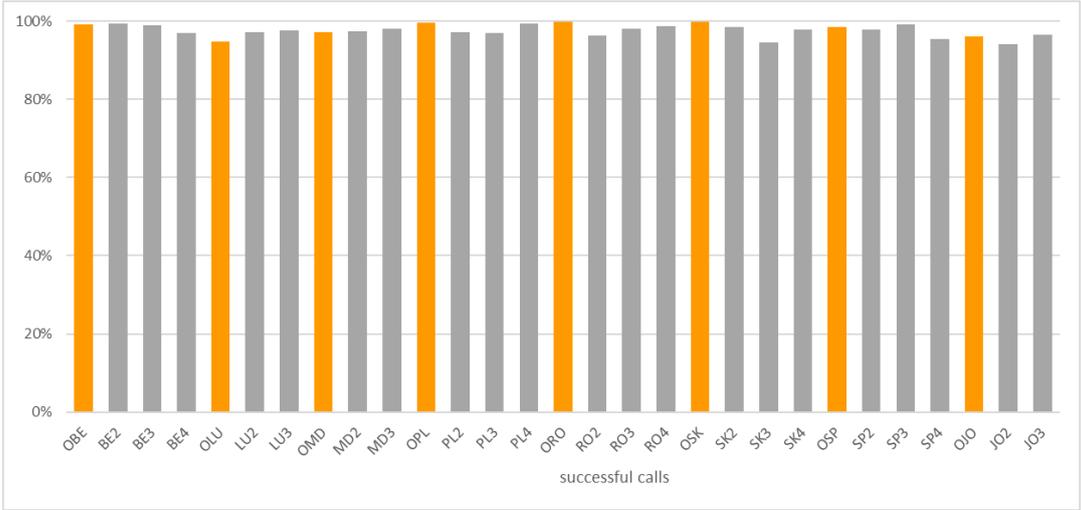
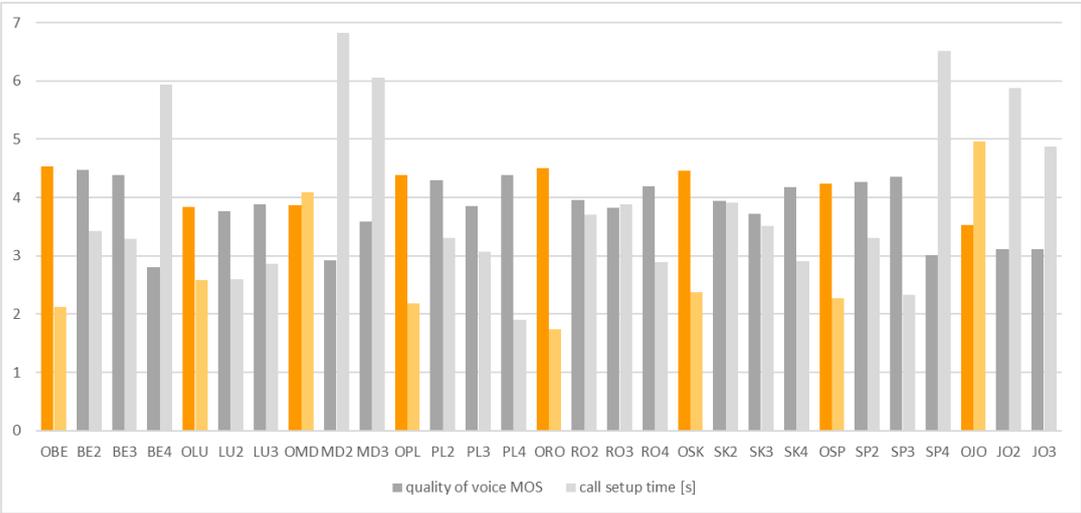


Systemics-PAB can confirm that in five out of seven European countries, Orange scored the highest number of points in the test. This was supported and proved by excellent results for voice and data tests with certificates awarded for the best mobile network in the test in the country.



In terms of voice services, all Orange networks demonstrated good Call Setup Time and Voice Quality for legacy voice and VoLTE.

Most of Orange’s European networks benefitted from the implementation of the EVS (Enhanced Voice Services Codec) codec which allowed them to enhance speech quality. The best VoLTE Voice Quality was measured for Orange Slovakia, Orange Poland, Orange Belgium, Orange Romania. All these networks show similar VoLTE usage and performance. Orange Moldova and Orange Luxembourg are at the early stages of VoLTE deployment. All Orange networks demonstrate similar VoLTE Call Setup Time, with Orange Belgium and Romania showing the shortest Call Setup Time. The following charts present voice testing results across Europe for the voice quality Mean Opinion Score (highest better), call setup time (shorter better) and the percentage of successful calls (successfully connected and properly terminated).

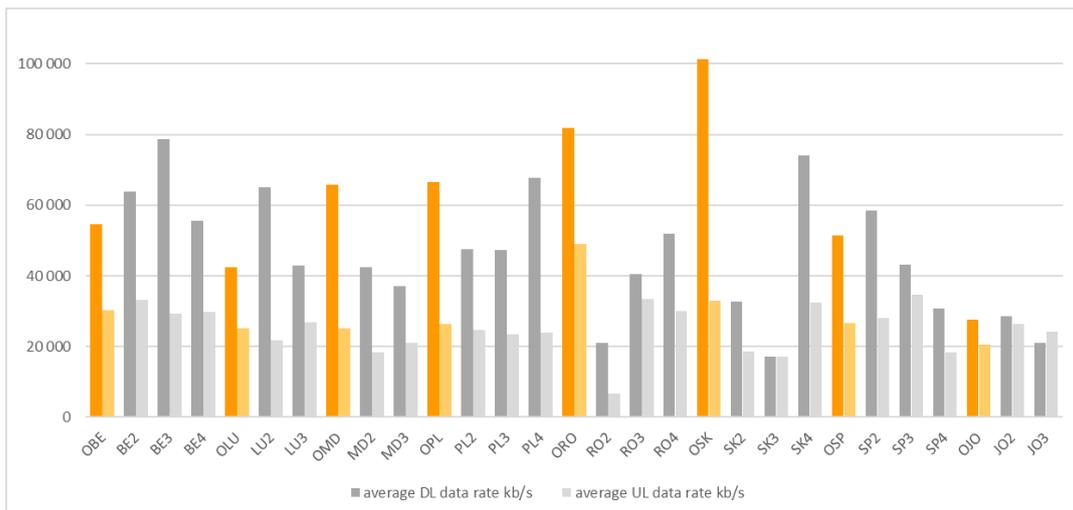
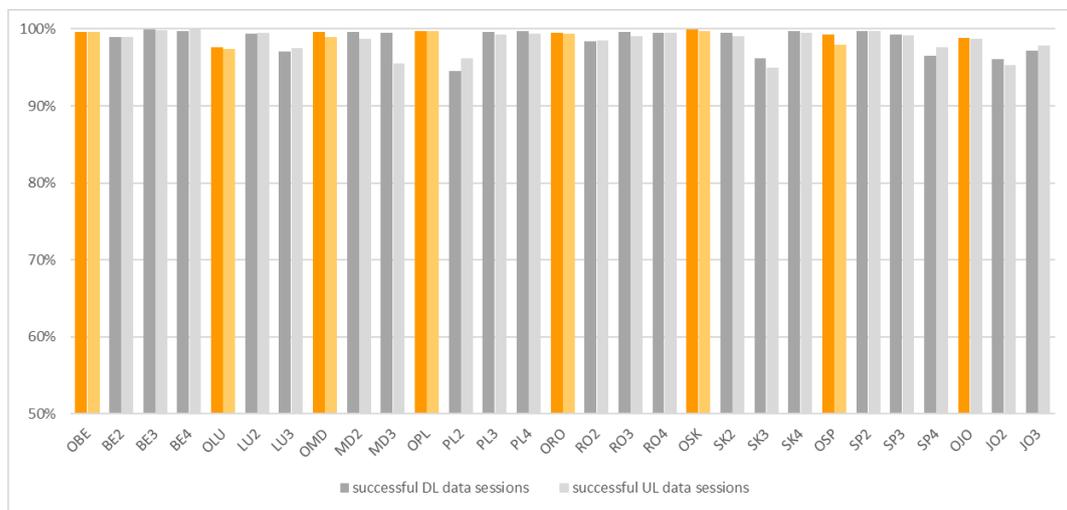


All Orange networks showed a widespread usage of DL LTE 2CA & 3CA & 4CA deployment which ensures network resources maintain a high level of customer experience and keeps excellent levels of the high throughput speeds. However, Orange Slovakia and Poland only

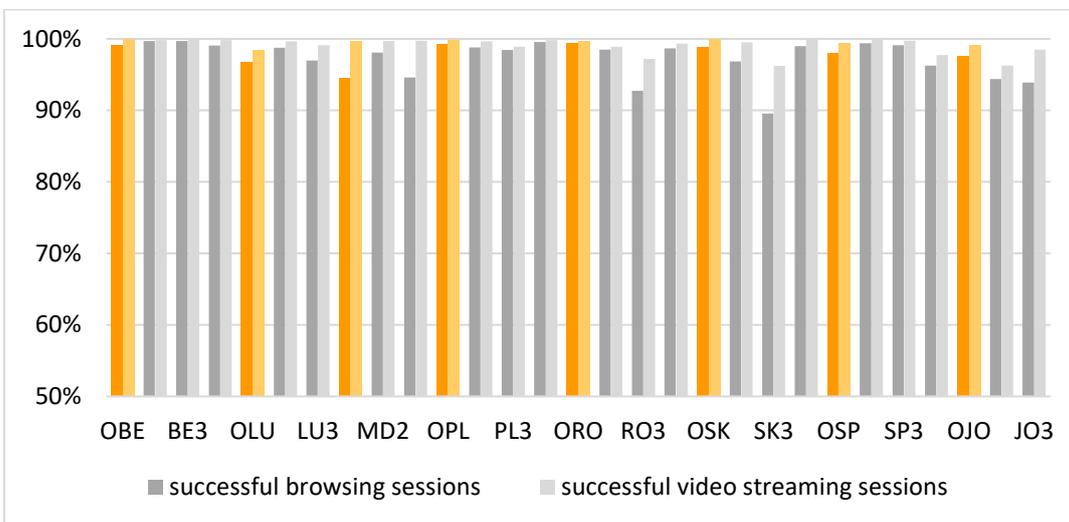
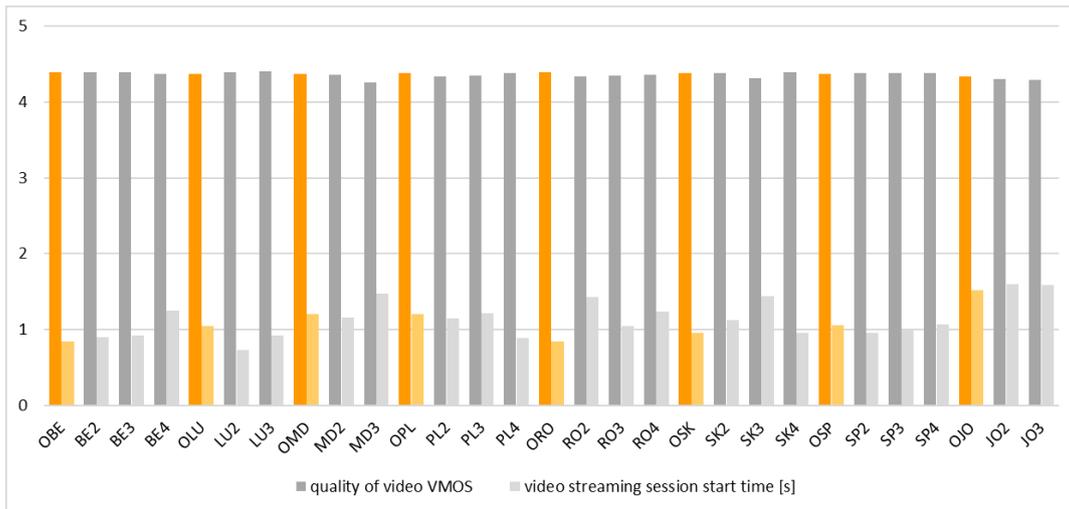
massively use DL LTE 4CA. The bandwidth availability has increased for most of MNOs since 2019 thanks to a wider deployment of LTE CA.

Due to the higher network load, DL throughput performance in 2020 slightly dropped vs 2019 but intensifications of DL LTE CA deployment in a few Orange networks in Poland, Slovakia, Romania ensured necessary network resources. Despite rapidly increased data traffic in 2020 which was driven mostly by the Covid situation, Orange Slovakia was able to manage the data traffic increase well and achieved the best average DL speed performance in tests, better than 101Mb/s.

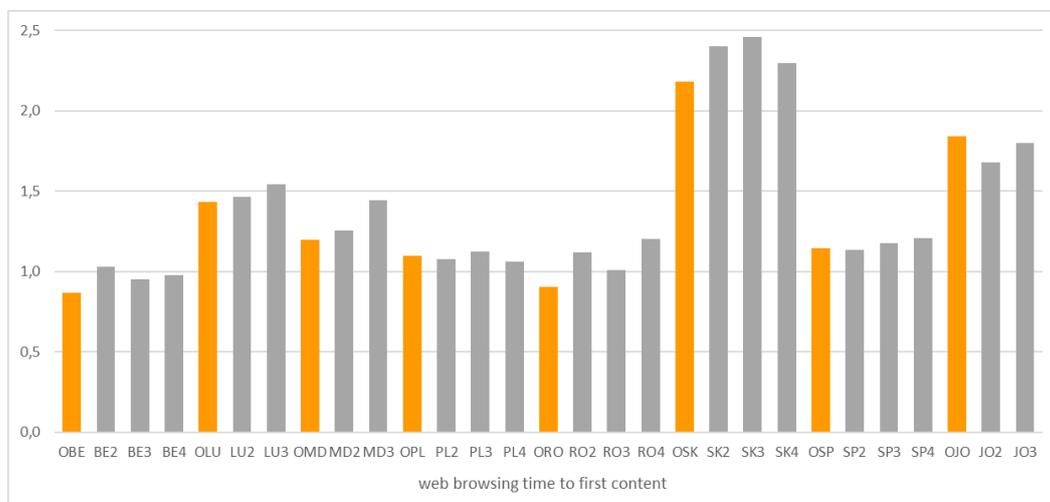
UL throughput performance looks similar to 2019 and Orange Spain, Poland, Romania reported widespread use of UL LTE 2CA.



All Orange networks demonstrate very good Video Quality (VMOS). Video service reliability is somehow limited by LTE accessibility on connection roads.



Live browsing performance has kept to a very good level from the customers' point of view and is additionally boosted in some countries by a TCP acceleration platform which allows to reduce the access time to web content.



The results of the extensive measurements show Orange as the operator achieving the highest overall results for the quality of experience of mobile services in most of the countries measured. We congratulate Orange on its very good results in offering high quality services. We hope that next year's will continuously bring better results in the quality improvement process.

The 2021 project which has just started extends the scope of network testing with 5G measurements. The upcoming campaign will be conducted with the newest Samsung Galaxy S21+ 5G handsets. All the data test will be conducted in a free mode allowing to use the best available technology at the testing locations. This also implies an extension of the analysis provided with testing results. The extended engineering analysis delivered by Systemics-PAB is very well perceived by customers and helps them to undertake valuable actions in the quality battle.

About Systemic-PAB

Systemics-PAB is a recognized European company providing comprehensive surveys and independent measurements of the quality of network services and the end-user experience. Systemics-PAB has been conducting complex projects in multiple countries worldwide for telecom operators, regulators, network equipment providers, lab testing organizations and enterprises for more than 16 years.