



SYSTEMICS PAB
Network Quality Experts

CERTIFICATE

Systemics-PAB Sp. z o.o.

Wolodyjowskiego 46B, 02-724 Warsaw, Poland

hereby certifies that

Orange Romania S.A.

Europe House, Bulevardul Lascăr Catargiu, nr 47-53, Sector 1, Bucuresti, România

Received the title for

THE BEST ROMANIAN MOBILE NETWORK IN THE TEST

This certificate is based on the results of the measurement campaign, which was carried out by Systemics-PAB in November and December 2021. The measurement campaign assessed the quality of experience of mobile voice and data services in Romania. All mobile Network Operators in Romania: Orange Romania S.A. (Orange), RCS & RDS S.A. (Digi), Telekom Romania Mobile Communications S.A. (Telekom) and Vodafone Romania S.A. (Vodafone) were tested. Systemics-PAB performed the benchmarking measurements throughout Romania covering 22 largest cities as measured by population, and national roads across the country. The project have also included testing 5G data networks. The measurements were carried out using Swissqual Smart Benchmarker system equipped with Samsung Galaxy S10 terminals for voice/VoLTE tests and Samsung Galaxy S21+ 5G terminals for data tests. For the coverage assessment Rohde and Schwarz radio scanners were used. Voice tests were done in mobile to mobile mode. The assessment of quality of services was done using international standards and Systemics-PAB expert knowledge.

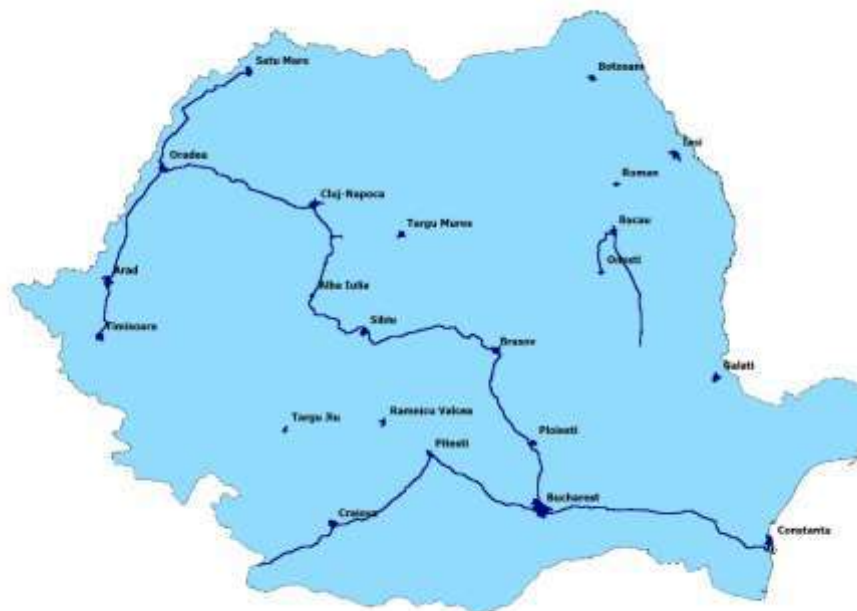
Orange Romania presented very good results for data services achieving highest data speeds in capacity tests and shortest session times for file transfer tests. These results confirms improvements achieved due to the deployment of 5G NR bands in cities and use of widest bandwidth in data services tested.

The results of the measurements gave Orange the best overall score for the quality of experience of mobile telecommunication services in Romania. It entitles us to certify Orange Romania S.A. as the operator with the fastest data services and the highest overall quality of mobile services in the test.

Certificate Date: 04.01.2022


Jan Kondej
Chief Technical Officer

Test Route



Measurement Setup

	Voice/VOLTE	Smartphone
Device	Samsung Galaxy S10 (SM-G973FDS) LTE / HSPA+ DC / HSUPA 5.76 attenuation - 7dB	Samsung Galaxy S21+ (SM-G996B) 5G NR / LTE / HSPA+ DC / HSUPA 5.76 attenuation - 7dB
Test Cases	Mobile-to-Mobile Best available Voice technology: 115 sec call window 85 sec call duration 15 sec call setup time out HTTP Transfer 100kB Data traffic injection (1 test per call window)	Data 5G preferred: APN with default IPv4/IPv6 settings HTTP UL and DL stress test 7s HTTP 5MB UL and 10MB DL fixed file transfer Live Web Browsing 8 pages (http & https) YouTube Streaming
Mobility and Route Types	100% Drive test Big Cities, Small Cities and Connecting Roads	
Samples	~3750 voice calls per Operator	~1850 data sessions per Operator
Dates	23.11.2021 - 21.12.2021	

Scoring Results

Type	Units	Orange	Operator 2	Operator 3	Operator 4
Voice	[%]	99.00%	96.47%	84.45%	58.68%
Data	[%]	94.95%	91.19%	82.79%	77.91%
Overall	[%]	96.57%	93.30%	83.46%	70.22%