Audit Report

South Korea — Seoul, 2023

umlaut
Part of Accenture

Foreword

For the inhabitants of the densely populated Seoul area in South Korea, it is particularly interesting to see how the operators perform in their home city. Nearly 25% of the population in South Korea live in the larger urban area of Seoul. Therefore, for the third time since 2021 we have performed individual analyses for the largest South Korean metropolitan area with 9.6 million inhabitants.

Intro

The leader in mobile benchmarking, umlaut, has analyzed the mobile networks in Seoul, South Korea with regards to 5G mobile network performance.

We measure smartphone data performance based on extensive drivetests.
As the de–facto industry standard, our benchmarking methodology focuses on customer–perceived network quality and covers a wide range of mobile services.

Today, more than 200 mobile networks in more than 120 countries are being evaluated by our unique methodology. It allows a technical analysis that is unprecedented in its level of detail and enables comparisons between the net–work performance and capability of each mobile network. Our benchmarks help network operators to demonstrate how well they are delivering wireless connections to consumers, business users and enterprises and reveals the areas of improvement.

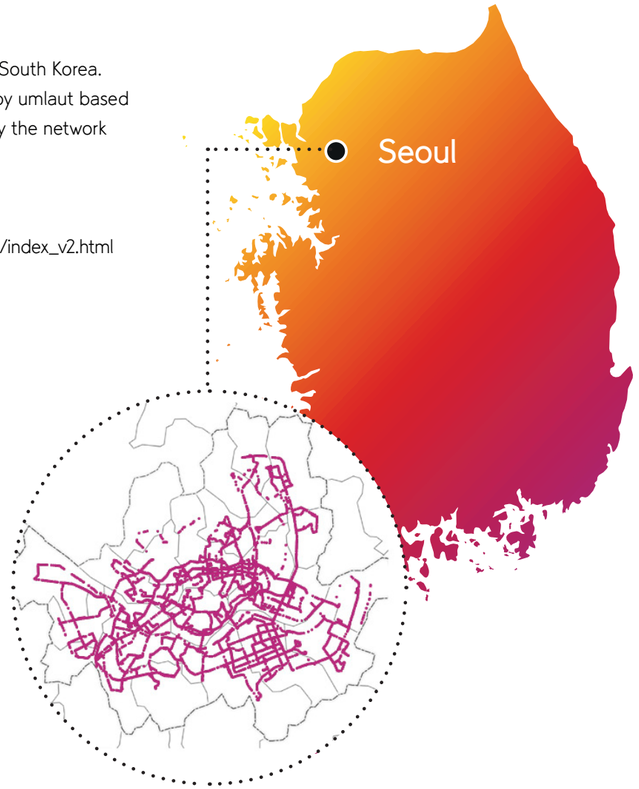
Drivetest	Voice	Data
Device	Samsung Galaxy S23+ 5G SM–S916N | 5G preferred mode	Samsung Galaxy S23+ 5G SM–S916N | 5G preferred mode
Test Cases	Mobile–to–Mobile (M2M) Side1 (5G Preferred) to Side2 (5G Preferred) 105 sec call window 70 sec call duration 15 sec call setup timeout Multi–RAB traffic injection on both sides Generic OTT Voice Channel	Data 5G preferred HTTP DL DataStream 7s HTTP UL DataStream 7s HTTPS 10MB DL fixed file transfer HTTPS 5MB UL fixed file transfer Web Browsing – Kepler E–Gaming | Live web pages 1 YouTube Full HD video ~ 45s 1 YouTube live stream ~ 45s
Mobility and Route Types	100% City Drivetest	
Samples	~ 3850	~ 32,000
Dates	6 measurement days, 12.08.2023 – 19.08.2023	

Testing area

The map shows the total driving area for South Korea.
The routes were independently selected by umlaut based on the official coverage maps provided by the network operators.

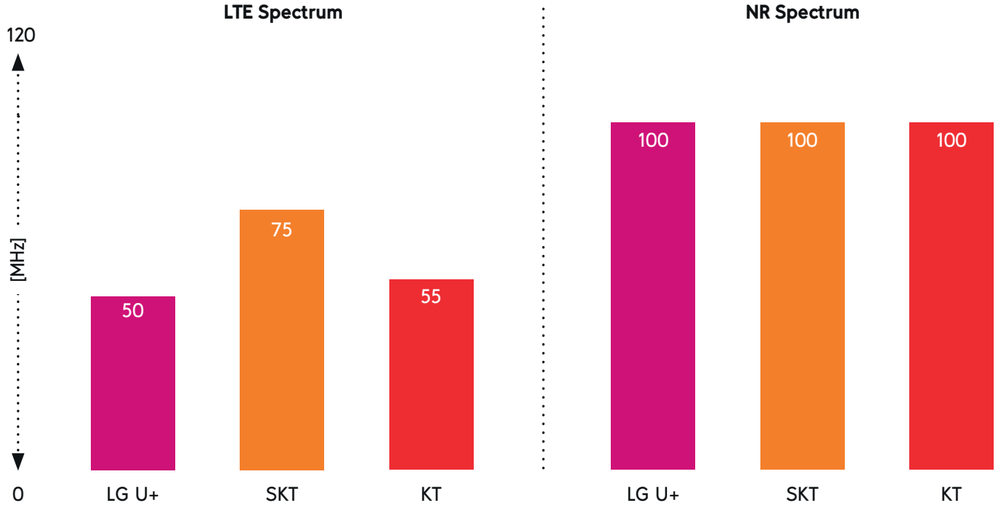
5G Coverage Maps LG U+:
http://coveragemap.uplus.co.kr/EssCvgApp/index_v2.html
5G Coverage Maps KT:
https://nqi.kt.com/KTCVRG/coverage
5G Coverage Maps SKT:
https://sktcoverage.com/

1400 km
measuring distance



Available Frequency Spectrum

For LTE and 5G NR



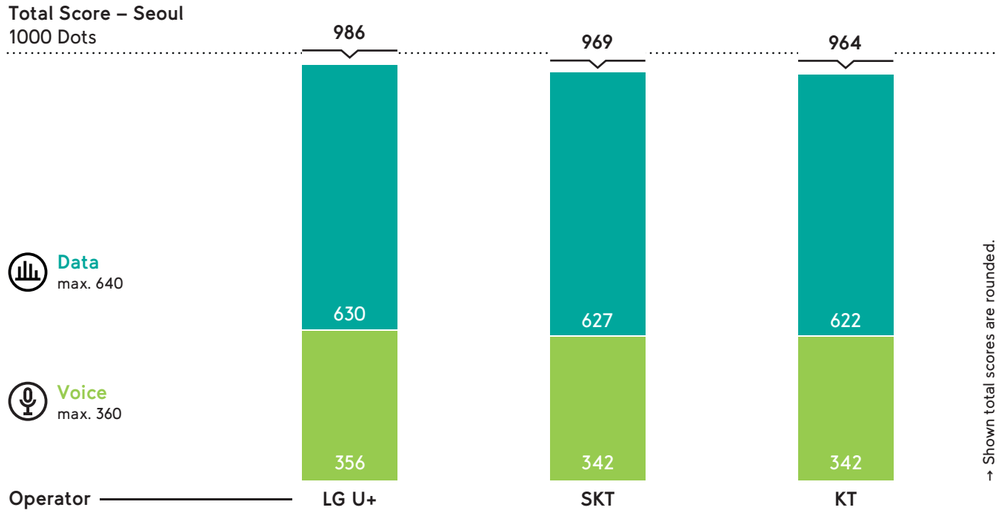
The graph shows the maximum amount of frequency spectrum available for the respective technology, based on all observed File DL use cases. The actual amount of frequency spectrum available for a particular File Download can be (a) a combination of the LTE and NR resources and (b) lower than the maximum owing to shared resources or spectrum availability.

	LTE	NR Cband
LG U+	3CA:50Mhz	100Mhz
SKT	5CA:75Mhz	100Mhz
KT	4CA:55Mhz	100Mhz

The table shows the maximum amount of frequency spectrum and LTE carrier aggregation available per operator, based on all observed File DL use cases.

Total Score

Overall results

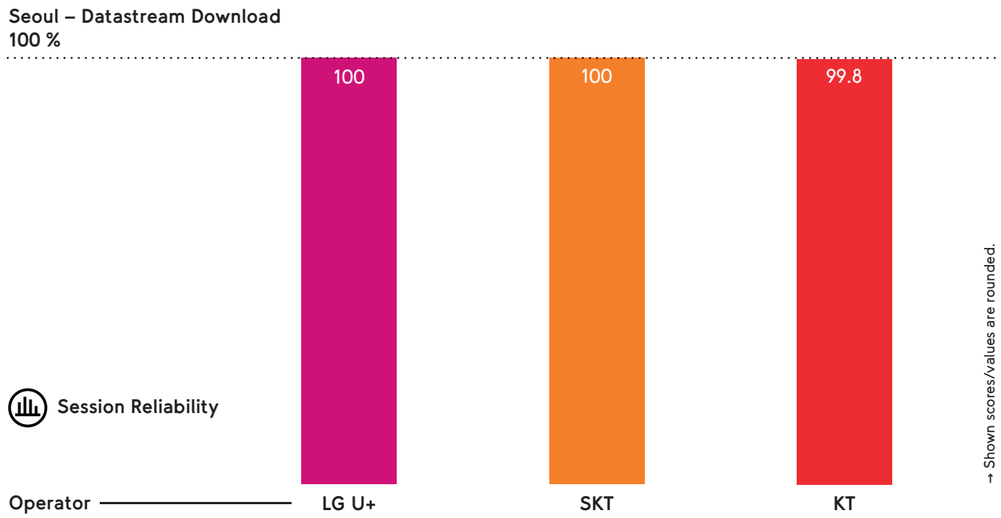


→ Shown total scores are rounded.

Score achieved in Seoul by the networks under test.

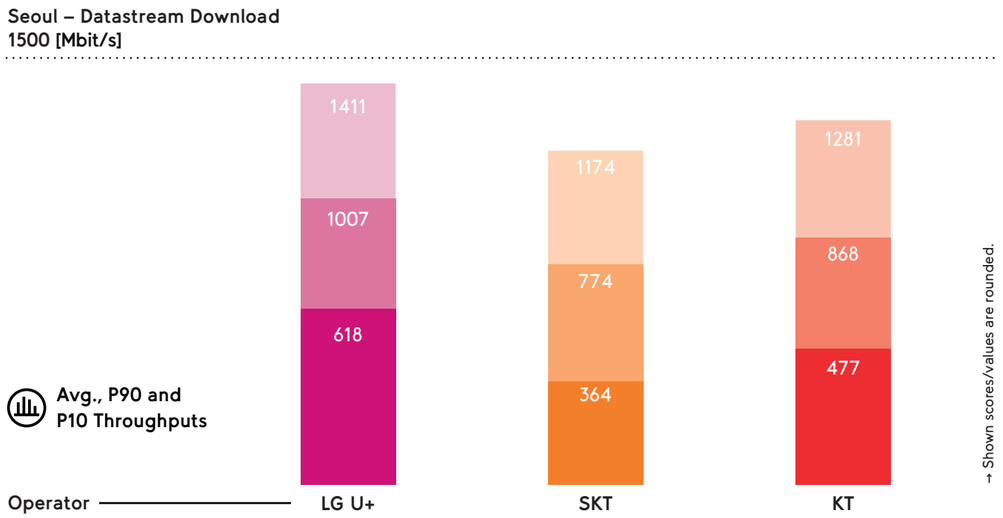
Datastream Download

Session Reliability



The graph shows the Session Reliability measured in Seoul. All data sequences from the umlaut use case are taken into account

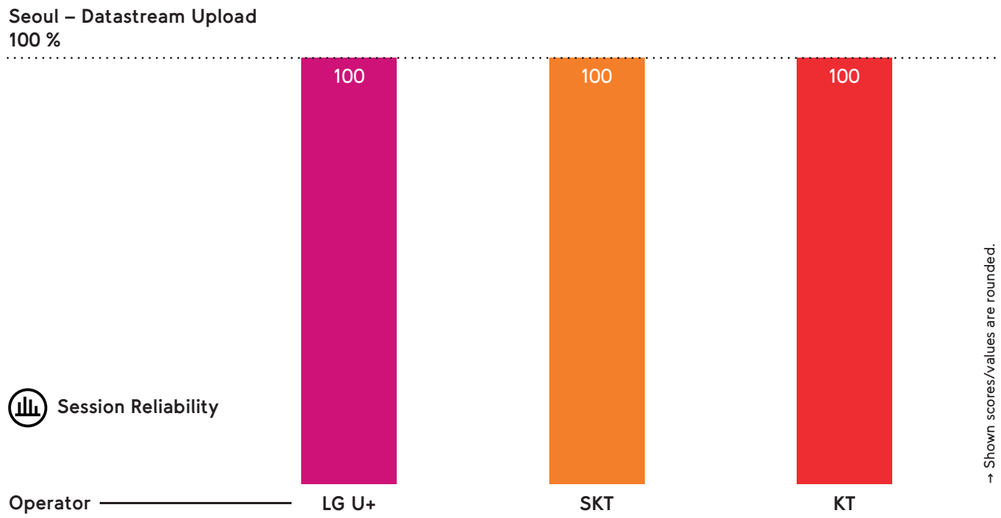
Avg., P90 and P10 Throughputs



The graph shows the qualified data stream 10 % (Mbps, darker shade), the average throughput (lighter shade) and the qualified data stream 90 % (Mbps, lightest shade) measured in Seoul. All data sequences from the umlaut use case are taken into account.

Datastream Upload

Session Reliability



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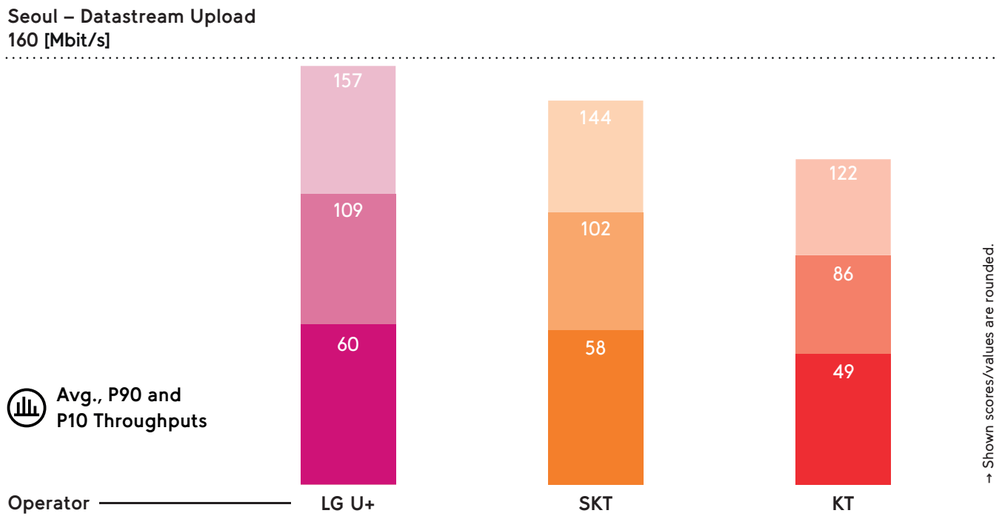
Avg., P90 and P10 Throughputs



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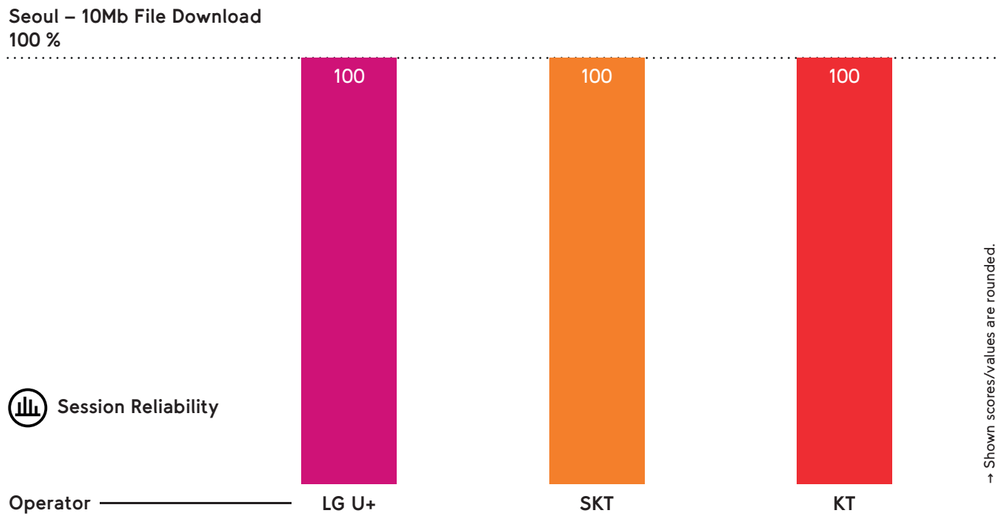
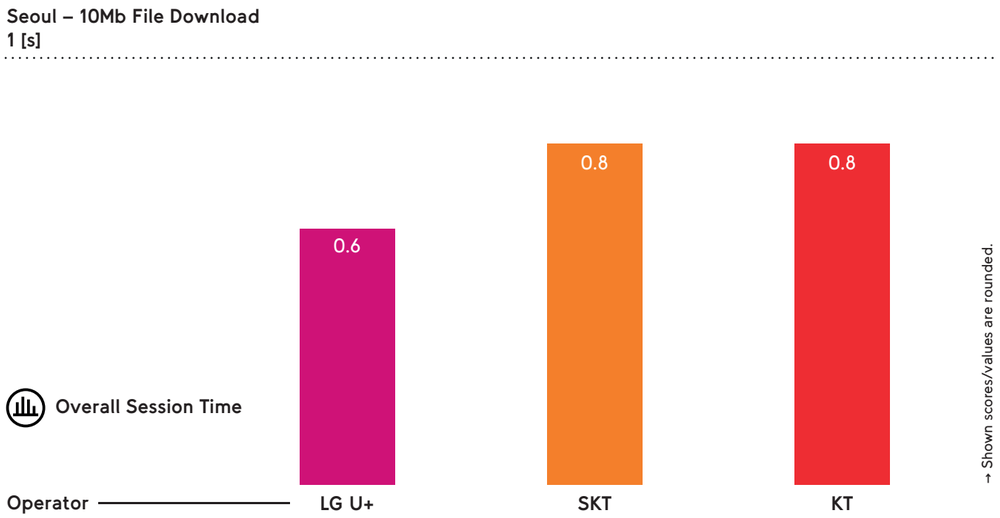
10Mb File Download

Session Reliability



The graph shows the Session Reliability measured in Seoul. All data sequences from the umlaut use case are taken into account.

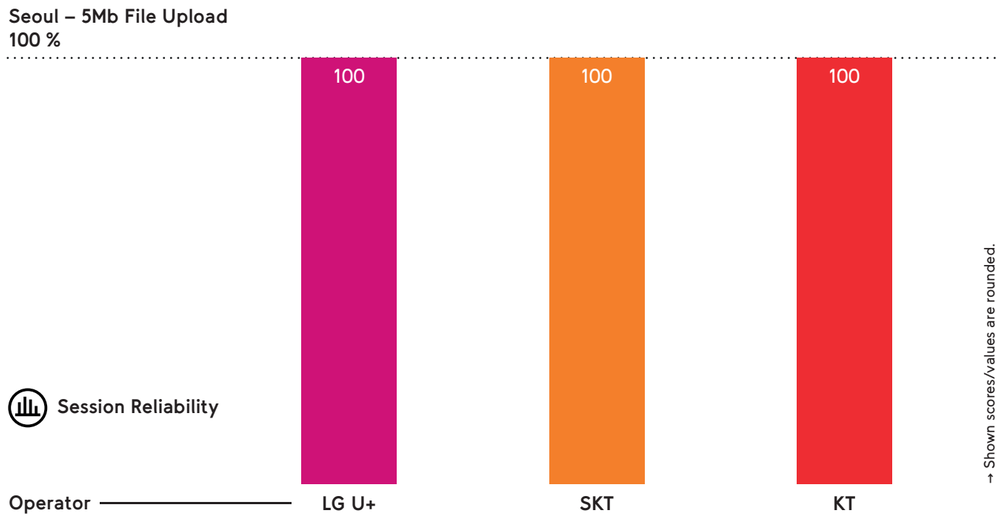
Overall Session Time



The graph shows the Overall Session Time measured in Seoul. All data sequences from the umlaut use case are taken into account.

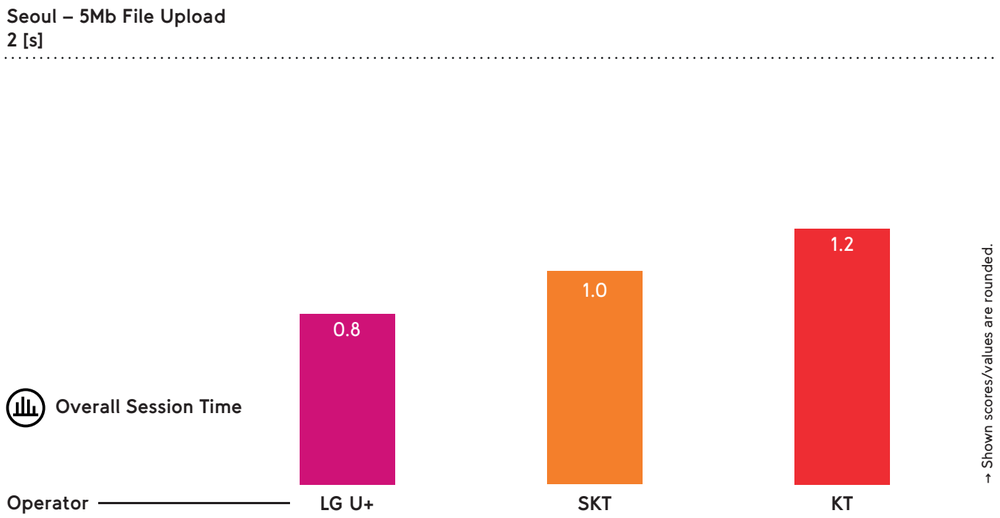
5Mb File Upload

Session Reliability



The graph shows the Session Reliability measured in Seoul. All data sequences from the umlaut use case are taken into account.

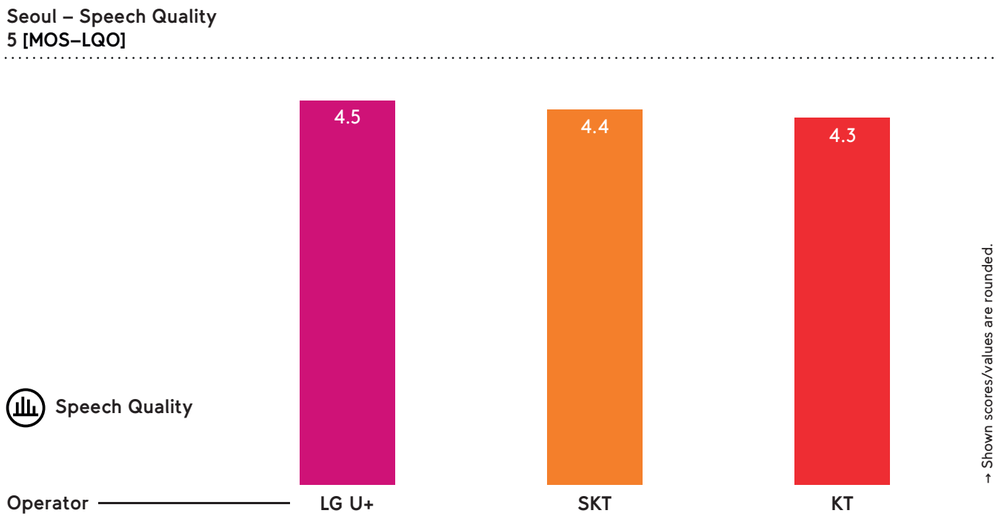
Overall Session Time



The graph shows the Overall Session Time measured in Seoul. All data sequences from the umlaut use case are taken into account.

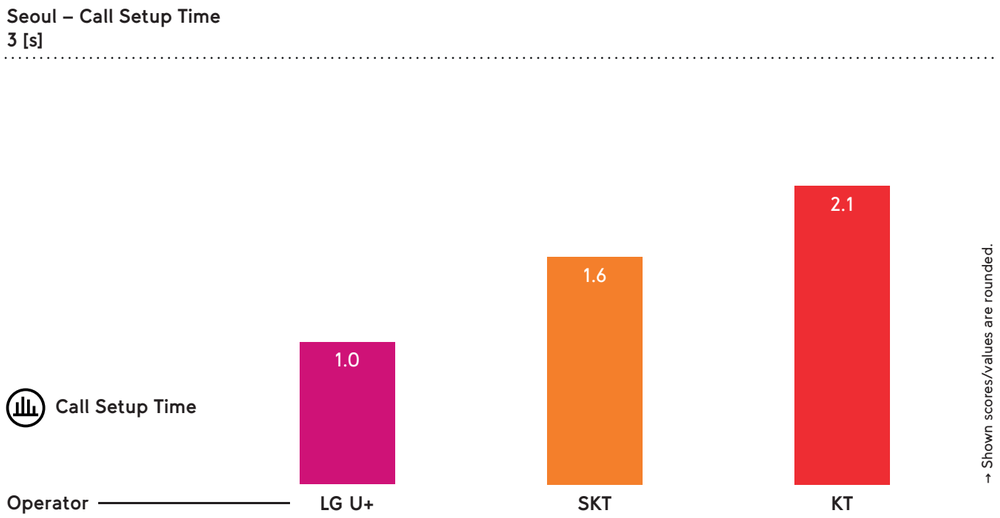
Voice

Speech Quality



The graph shows the Speech Quality measured in Seoul. All data sequences from the umlaut use case are taken into account.

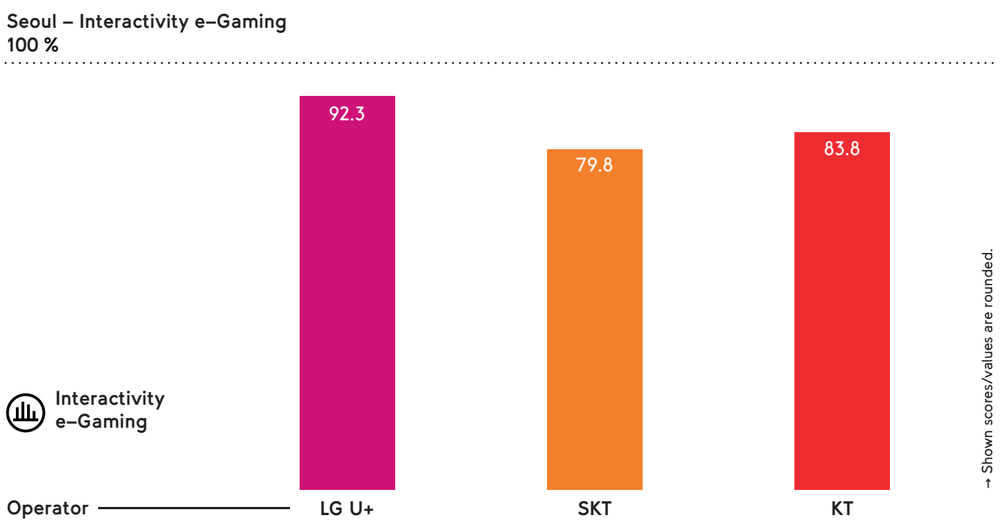
Call Setup Time



The graph shows the Call Setup Time measured in Seoul. All data sequences from the umlaut use case are taken into account.

Interactivity

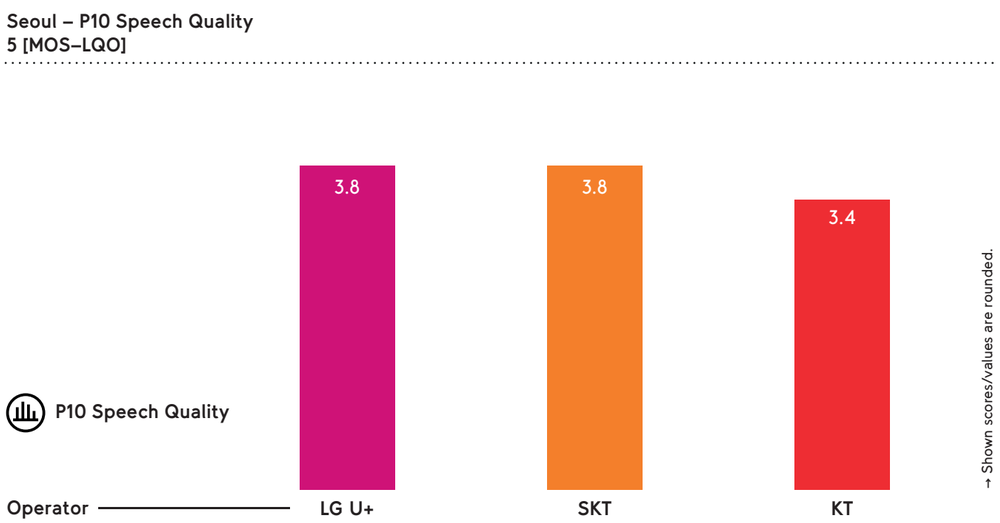
Interactivity e–Gaming Score



The graph shows the Interactivity e–Gaming Score measured in Seoul. All data sequences from the umlaut use case are taken into account.

Conversational App

P10 Speech Quality



The graph shows the Conversational App P10 Speech Quality measured in Seoul. All data sequences from the umlaut use case are taken into account.

KPI overview

Data

Seoul	KPI Name	Unit	LG	SKT	KT
HTTP Web Page DL Smartphone	Qualifier	[%]	99.9	99.9	100.0
	Overall Session Time	[s]	1.1	1.2	1.3
HTTP 10MB DL Smartphone	Qualifier	[%]	100.0	100.0	100.0
	Overall Session Time	[s]	0.6	0.8	0.8
	90% faster than	[Mbit/s]	134.8	85.9	165.7
	10% faster than	[Mbit/s]	317.5	239.5	308.5
HTTP 5MB UL Smartphone	Qualifier	[%]	100.0	100.0	100.0
	Average Session Time	[s]	0.8	1.0	1.2
	90% faster than	[Mbit/s]	40.7	40.2	36.2
	10% faster than	[kbit/s]	95.0	80.5	80.5
HTTP DL FDTT	Qualifier	[%]	100.0	100.0	99.8
	10% faster than	[Mbit/s]	1410.7	1174.0	1281.2
	faster than 5 Mbit/s	[%]	100.0	99.9	100.0
	faster than 20 Mbit/s	[%]	100.0	98.9	99.6
HTTP UL FDTT	Qualifier	[%]	100.0	100.0	100.0
	10% faster than	[Mbit/s]	157.4	144.2	122.1
	faster than 5 Mbit/s	[%]	100.0	100.0	99.6
	faster than 20 Mbit/s	[%]	100.0	99.8	99.4
YouTube	Qualifier	[%]	100.0	100.0	99.8
	Start Time	[s]	2.0	2.1	2.0
	AVG Resolution	[p]	1076.3	1076.8	1076.3
YouTube Live Smartphone	Qualifier	[%]	100.0	99.9	99.8
	Start Time	[s]	2.6	2.7	2.6
	AVG Resolution	[p]	1079.9	1079.8	1079.9
Interactivity	Qualifier	[%]	99.9	99.6	99.5
	Interactivity e-Gaming	[%]	92.3	79.8	83.8
Conversational App	Qualifier	[%]	99.9	99.9	99.8
	P10 Speech Quality	[MOS-LQO]	3.8	3.8	3.4

Achieved values of all networks under test in each of the relevant Data Key Performance Indicators (KPIs) in Seoul from all collected test samples.

Voice

Voice	Service Group	Unit	LG	SKT	KT
Seoul	Qualifier	[%]	99.9	99.5	99.6
	Call Setup Time (P90)	[s]	1.0	1.6	2.1
	Speech Quality (P10)	[MOS-LQO]	4.5	4.4	4.3
	Multirab connectivity	[%]	100.0	100.0	100.0

Achieved values of all networks under test in each of the relevant Voice Key Performance Indicators (KPIs) for Seoul.

Key takeaways

- The overall network performance in Seoul is outstanding for all operators.
- LG U+ achieves the highest umlaut score in Seoul.
- The 5G network shows a high availability of more than 99% for SKT, KT and LG U+.
- The user–perceived download speed rate reaches from nearly 1.1 Gbit/s up to 1.4 Gbit/s for at least 10% of the samples in Seoul.
- The voice service availability is more than 99% for SKT, KT and LG U+.
- The Voice user experienced speech quality (MOS) reach to 4.3 for 90% of the samples in Seoul.

umlaut – Part of Accenture
umlaut communications GmbH
Am Kraftversorgungsturm 3 · 52070 Aachen · Germany

Hakan Ekmen · Global Networks Lead, Comms Industry
cell +49 151 571 33 235 · hakan.ekmen@accenture.com

www.umlaut.com