best in test

For adding something on top in Sweden and reaching an overall score of 971 dots in mobile network benchmarking survey we proudly award this certificate to

Telia Sweden

Score 971 out of 1000 in Total
Score 267 out of 270 in Voice Services
Score 469 out of 480 in Data Services
Score 235 out of 250 in Crowdsourced Quality

Hakan Ekmen

Hakan Ekmen
Global Networks Lead, Comms Industry

Best in Test 11 24

umlaut
Part of **Accenture**

Measurement Overview

Measurement setup

umlaut tested and measured the performance of its voice and data services on smartphones in comparison to other 5G/LTE mobile radio networks in metropolitan and rural areas of Sweden.

The audit was done as a performance benchmark performed by umlaut between 31.10.2024 and 27.11.2024 in cities and towns as well as on connection roads.

Dedicated measurements have been executed as drive tests outdoors using a Samsung Galaxy S23+.

All data measurements have been performed in 5G preferred mode. Voice measurements have been done in 5G/5G preferred mode on both sides, while call origin has been alternated.

In addition crowdsourced performance data has been collected and evaluated between CW25 2024 and CW48 2024.

The following pages provide a comparative overview about the performance results observed for the different tested service types.

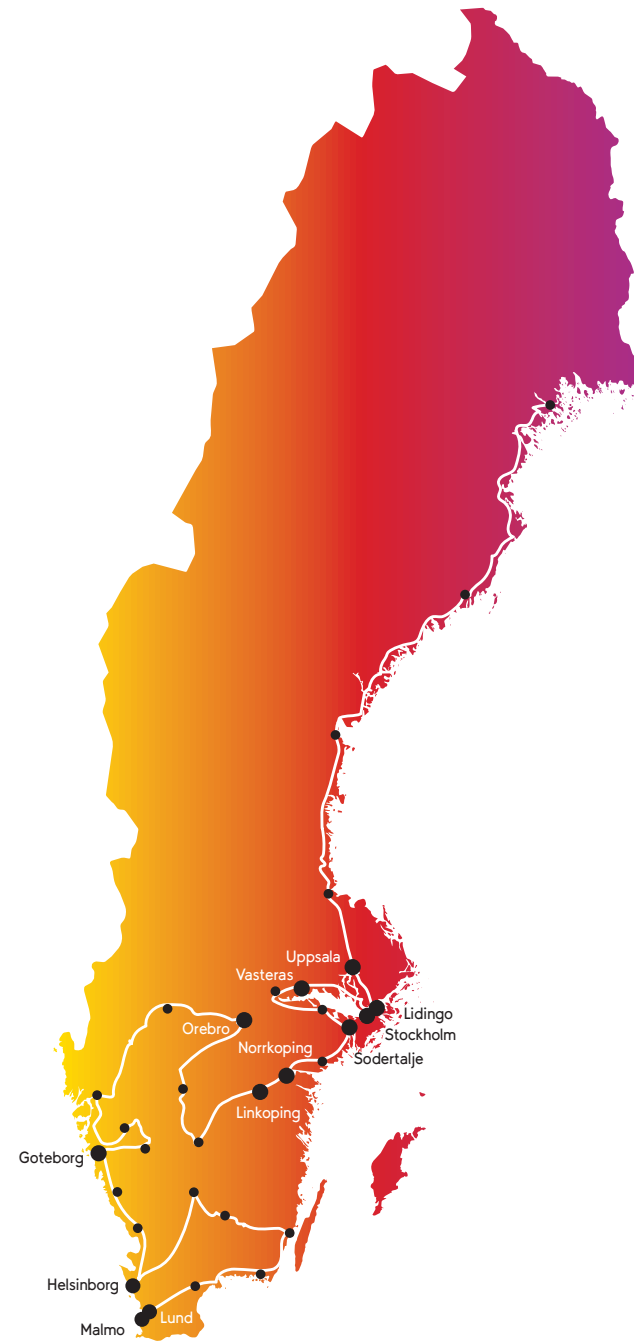| Drivetest	Voice	Conversational apps	Data
Device	Samsung Galaxy S23+	Samsung Galaxy S23+	Samsung Galaxy S23+
Test Cases	Mobile–to–Mobile (M2M) Side1 (VoLTE, 5G pref.) to Side2 (VoLTE, 5G pref.) 105 sec call window 70 sec call duration 15 sec call setup timeout Multi–RAB traffic injection on both sides	Mobile–to–Mobile (M2M) Side1 (VoLTE, 5G pref.) to Side2 (VoLTE, 5G pref.) 105 sec call window 70 sec call duration 15 sec call setup timeout	Data 5G preferred HTTP DL datastream 7s HTTP UL datastream 7s HTTP 10MB DL fixed file transfer HTTP 5MB UL fixed file transfer Web Browsing – Kepler ETSI Ref. Page 8 Live web pages 2 YouTube videos ~ 45s (Full HD and Live Full HD) Interactivity eGaming, Video Chat HD
Mobility and Route Types	100% Drivetest ~54% in Cities, ~24% in Towns and ~22% on Roads		
Samples	20,494	181,059	
Dates	23 measurement days 31.10.2024 – 27.11.2024		
Crowd Data Assessment	24 weeks CW25 2024 – CW48 2024		

Testing areas

Drive route

~ 46 %
of population measured

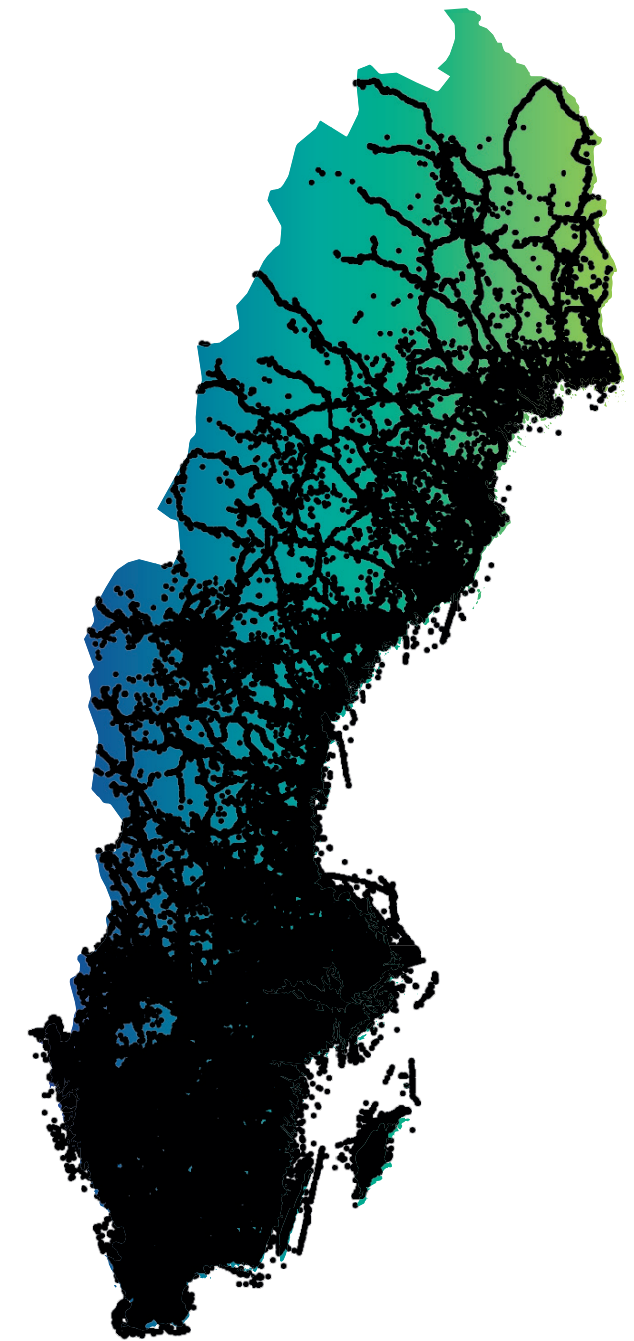**10,453 km**
measuring distance

Crowdsourcing based test area

98.3 %
of the 'built–up area' covered

97.0 %
of the 'Population area' covered

136,772 km²
size of tested area

Claims

Best in test
Telia Sweden

Best in data
Telia Sweden

Best in voice
Telia Sweden

Best in Reliability
Telia Sweden

Best in crowd–sourced quality
Telia Sweden

Methodology

The leader in mobile benchmarking, umlaut, has analyzed the mobile networks of Sweden with regards to mobile network performance. We measure smartphone voice and data performance based on extensive drivetests – from major metropolitan areas to smaller cities and connection roads.

We objectively define the routes and test methodology and publish the results through certificates or public benchmark reports. In addition crowdsourced performance data has been collected and evaluated.

As the de–facto industry standard, our benchmarking methodology focuses on customer–experienced 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 scoring methodology.

It allows a technical analysis that is unprecedented in its level of detail and enables comparisons between the network performance and capability of each mobile network. Our public benchmarks as well as the certificate 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.

Score and breakdown

Telia Sweden achieved the highest overall score among competitors with 971 dots out of 1000.

Total Score
1000 Dots

Crowd
max. 250

Data
max. 480

Voice
max. 270

Operator

→ Shown total scores are rounded.
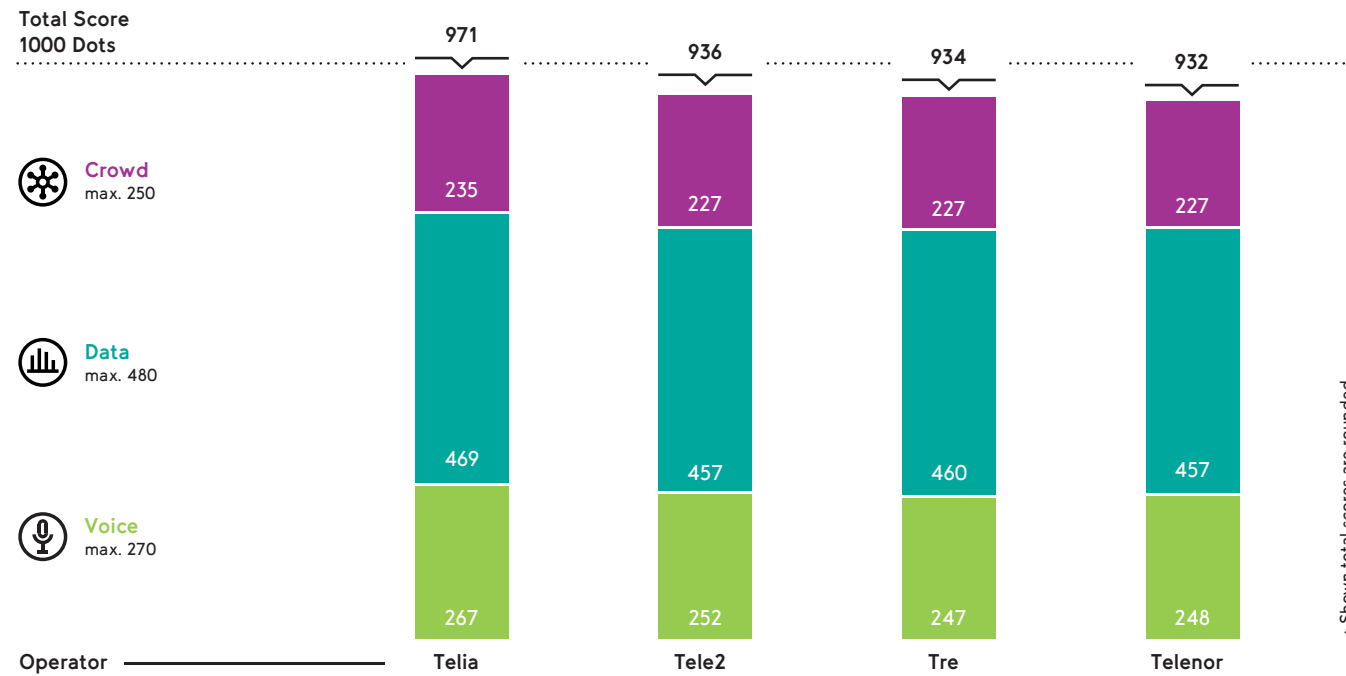
Overall score considering Voice, Data and Crowdsourcing.

Total score

		Telia	Tele2	Tre	Telenor
Voice	max. 270	267	252	247	248
Cities Drivetest	162	99%	94%	91%	92%
Towns Drivetest	54	98%	94%	91%	91%
Roads Drivetest	54	99%	91%	94%	93%
Data	max. 480	469	457	460	457
Cities Drivetest	288	99%	97%	97%	97%
Towns Drivetest	96	98%	97%	95%	97%
Roads Drivetest	96	95%	89%	93%	87%
Crowdsourced Quality	max. 250	236	228	228	227
Broadband Coverage	113	94%	90%	89%	89%
Download Speed	75	95%	93%	93%	93%
Latency	50	92%	88%	90%	90%
Voice	13	98%	97%	98%	95%
Total	1000	971	936	934	932

Shown scores are rounded.

Achieved percentage of the maximum score in each of the different data services.

Data	Service Group	max	Telia	Tele2	Tre	Telenor
Cities	Web Browsing	50,4	100%	99%	99%	99%
	File Download	64,8	100%	98%	98%	98%
	File Upload	64,8	100%	97%	98%	97%
	YouTube	64,8	97%	95%	96%	96%
	OTT	43,2	96%	94%	94%	95%
Towns	Web Browsing	16,8	100%	99%	98%	100%
	File Download	21,6	99%	99%	91%	99%
	File Upload	21,6	99%	97%	96%	97%
	YouTube	21,6	96%	98%	96%	97%
	OTT	14,4	95%	92%	93%	94%
Roads	Web Browsing	16,8	98%	95%	97%	93%
	File Download	21,6	94%	86%	89%	86%
	File Upload	21,6	93%	88%	93%	85%
	YouTube	21,6	97%	88%	93%	84%
	OTT	14,4	92%	87%	93%	92%

Achieved percentage of the maximum score in each of the different crowdsourcing services.

Crowd	Service Group	max	Telia	Tele2	Tre	Telenor
Crowdsourced Quality	Broadband Coverage	113	94%	90%	89%	89%
	Download Speed	75	95%	93%	93%	93%
	Latency	50	92%	88%	90%	90%
	Voice	13	98%	97%	98%	95%

Reliability

Total Score
593 Dots

	583	569	572	564
Consistent UE max. 143	137	135	136	134
Data Reliability max. 288	285	280	283	278
Voice Reliability max. 162	161	154	153	152
Operator	**Telia**	**Tele2**	**Tre**	**Telenor**

↑ Consistent UE = Consistent User Experience (Crowd)
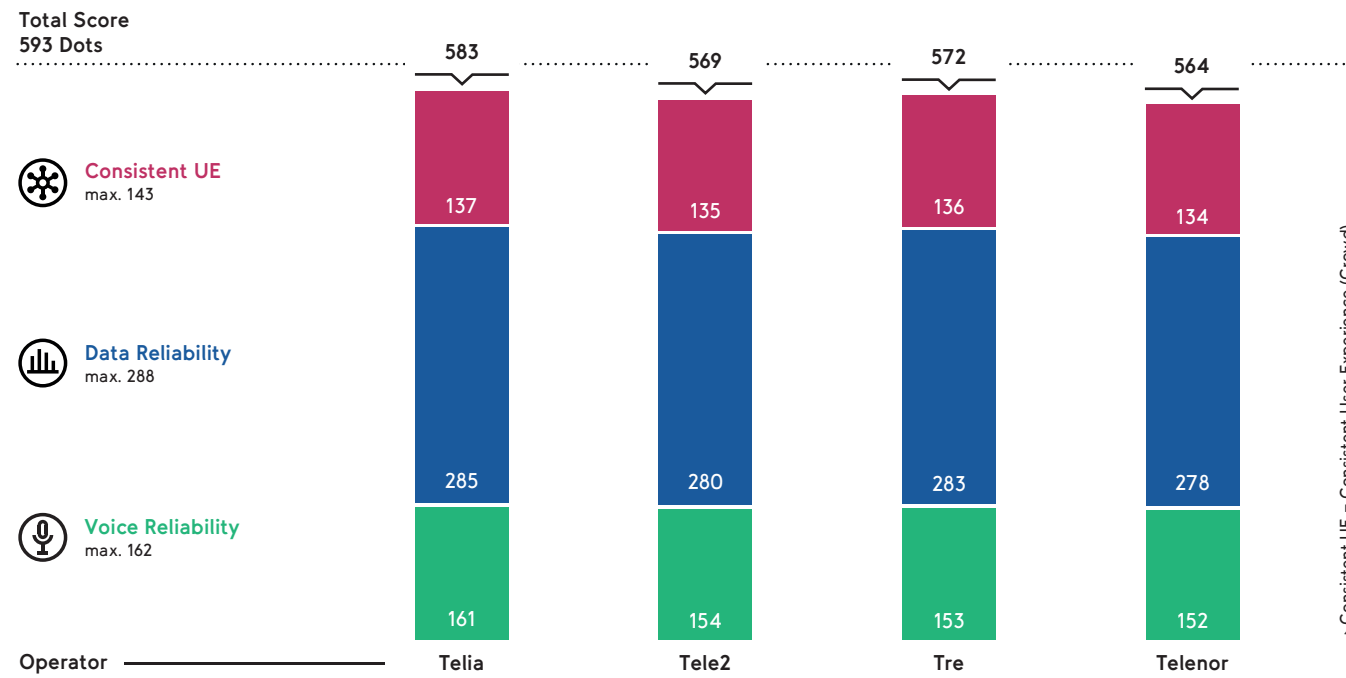
Reliability score considering Voice Reliability, Data Reliability and Consistent UE.

Total score

	Service Group	max	Telia	Tele2	Tre	Telenor
	Voice Reliability	162	99%	95%	95%	94%
Reliability	Data Reliability	288	99%	97%	98%	97%
	Consistent User Experience	143	96%	95%	95%	94%

Score achievement in school grades:
outstanding (≥95%), very good (≥85% and <95%), good (≥75% and ≤85%), satisfactory (≤65% and <75%), sufficient (≤55% and <65%).

Voice KPI overview

Achieved values of all networks under test in each of the relevant Voice Key Performance Indicators (KPIs) for the geographical categories "Cities", "Towns" and "Roads".

Voice	Service Group	Unit	Telia	Tele2	Tre	Telenor
Cities	Qualifier	[%]	100,0	99,6	99,5	99,4
	Call Setup Time (P90)	[s]	0,9	2,5	3,6	2,8
	Speech Quality (P10)	[MOS–LQO]	4,4	4,2	4,3	4,2
Towns	Qualifier	[%]	99,9	99,7	99,4	99,3
	Call Setup Time (P90)	[s]	1,0	2,6	3,5	2,8
	Speech Quality (P10)	[MOS–LQO]	4,4	4,2	4,3	4,2
Roads	Qualifier	[%]	99,9	98,8	99,6	99,2
	Call Setup Time (P90)	[s]	1,0	2,6	3,5	3,0
	Speech Quality (P10)	[MOS–LQO]	4,4	4,2	4,3	4,2

Data Services KPI overview

Achieved values of all networks under test in each of the relevant Data Key Performance Indicators (KPIs) for the geographical category "Cities".

Data Cities	KPI Name	Unit	Telia	Tele2	Tre	Telenor
HTTP Web Page DL Smartphone	Qualifier	[%]	99,9	99,8	99,9	99,9
	Overall Session Time	[s]	0,8	0,9	1,0	1,0
HTTP 10MB DL Smartphone	Qualifier	[%]	99,9	100,0	100,0	100,0
	Overall Session Time	[s]	0,6	0,9	1,0	0,8
	90% faster than	[Mbit/s]	120,8	73,5	50,6	86,2
	10% faster than	[Mbit/s]	415,6	336,1	322,6	357,1
HTTP 5MB UL Smartphone	Qualifier	[%]	100,0	99,9	100,0	99,9
	Average Session Time	[s]	1,0	1,4	1,3	1,4
	90% faster than	[Mbit/s]	27,6	17,0	19,0	18,2
	10% faster than	[Mbit/s]	107,0	95,5	87,8	94,2
HTTP DL FDTT	Qualifier	[%]	100,0	99,9	99,9	99,8
	10% faster than	[Mbit/s]	1098,9	777,1	742,1	930,9
	faster than 20 Mbit/s	[%]	99,8	97,1	97,8	97,9
	faster than 100 Mbit/s	[%]	95,5	91,0	85,9	92,7
HTTP UL FDTT	Qualifier	[%]	100,0	99,9	100,0	99,9
	10% faster than	[Mbit/s]	160,3	131,8	121,1	132,4
	faster than 2 Mbit/s	[%]	99,9	99,6	99,9	99,8
	faster than 5 Mbit/s	[%]	99,7	98,7	99,4	98,4
YouTube	Qualifier	[%]	99,9	99,6	99,8	99,9
	Start Time	[s]	1,4	1,5	1,6	1,5
	AVG Resolution	[p]	1079,8	1080,0	1079,7	1080,0
YouTube Live Smartphone	Qualifier	[%]	99,8	99,5	99,8	99,6
	Start Time	[s]	2,1	2,2	2,3	2,2
	AVG Resolution	[p]	1079,7	1079,1	1079,9	1079,5
Interactivity EGaming	Qualifier	[%]	98,8	99,2	98,0	99,1
	Interactivity EGaming	[%]	86,0	79,8	83,9	83,3
Interactivity Videochat	Qualifier	[%]	98,6	95,7	95,5	97,0
	Interactivity Videochat	[%]	92,1	88,2	90,2	91,2
Conversational App	Qualifier	[%]	99,9	100,0	100,0	99,9
	Speech Quality (P10)	[MOS–LQO]	4,1	3,9	4,0	3,9

Data Services KPI overview

Achieved values of all networks under test in each of the relevant Data Key Performance Indicators (KPIs) for the geogra–phical category "Towns".

Data Towns	KPI Name	Unit	Telia	Tele2	Tre	Telenor
HTTP Web Page DL Smartphone	Qualifier	[%]	100,0	99,9	99,8	99,9
	Overall Session Time	[s]	0,9	1,0	1,2	1,0
HTTP 10MB DL Smartphone	Qualifier	[%]	100,0	100,0	100,0	100,0
	Overall Session Time	[s]	0,7	0,8	2,0	0,8
	90% faster than	[Mbit/s]	100,3	86,9	21,4	95,0
	10% faster than	[Mbit/s]	362,3	307,7	217,4	326,1
HTTP 5MB UL Smartphone	Qualifier	[%]	100,0	100,0	100,0	100,0
	Average Session Time	[s]	1,2	1,7	1,8	1,7
	90% faster than	[Mbit/s]	23,3	12,9	13,0	12,9
	10% faster than	[Mbit/s]	97,6	83,9	65,2	81,3
HTTP DL FDTT	Qualifier	[%]	100,0	100,0	100,0	99,9
	10% faster than	[Mbit/s]	1025,0	735,5	533,7	852,3
	faster than 20 Mbit/s	[%]	98,5	98,0	94,6	98,9
	faster than 100 Mbit/s	[%]	92,1	92,3	50,4	93,5
HTTP UL FDTT	Qualifier	[%]	100,0	100,0	100,0	100,0
	10% faster than	[Mbit/s]	153,9	111,8	88,2	117,5
	faster than 2 Mbit/s	[%]	100,0	99,7	99,7	99,7
	faster than 5 Mbit/s	[%]	99,7	98,8	98,0	98,9
YouTube	Qualifier	[%]	99,6	100,0	99,9	99,9
	Start Time	[s]	1,5	1,6	1,9	1,6
	AVG Resolution	[p]	1079,7	1079,4	1080,0	1080,0
YouTube Live Smartphone	Qualifier	[%]	99,9	100,0	99,7	99,7
	Start Time	[s]	2,2	2,3	2,5	2,2
	AVG Resolution	[p]	1078,9	1079,2	1079,8	1079,1
Interactivity EGaming	Qualifier	[%]	98,6	98,8	98,2	99,5
	Interactivity EGaming	[%]	81,0	73,6	78,0	79,2
Interactivity Videochat	Qualifier	[%]	99,1	95,0	95,5	97,5
	Interactivity Videochat	[%]	91,0	87,4	89,4	89,5
Conversational App	Qualifier	[%]	99,8	100,0	100,0	100,0
	Speech Quality (P10)	[MOS–LQO]	4,1	3,9	4,0	3,9

Achieved values of all networks under test in each of the relevant Data Key Performance Indicators (KPIs) for the geogra–phical category "Roads".

Data Roads	KPI Name	Unit	Telia	Tele2	Tre	Telenor
HTTP Web Page DL Smartphone	Qualifier	[%]	99,9	99,2	99,7	98,9
	Overall Session Time	[s]	1,3	1,4	1,3	1,4
HTTP 10MB DL Smartphone	Qualifier	[%]	100,0	99,3	100,0	99,1
	Overall Session Time	[s]	2,1	3,6	2,8	3,2
	90% faster than	[Mbit/s]	16,7	11,7	15,5	12,1
	10% faster than	[Mbit/s]	198,0	203,0	94,8	206,2
HTTP 5MB UL Smartphone	Qualifier	[%]	100,0	99,8	100,0	98,9
	Average Session Time	[s]	2,9	4,0	3,2	4,0
	90% faster than	[Mbit/s]	6,9	4,5	6,1	5,0
	10% faster than	[Mbit/s]	58,1	49,4	51,2	51,2
HTTP DL FDTT	Qualifier	[%]	99,9	99,2	100,0	99,3
	10% faster than	[Mbit/s]	475,2	369,6	126,1	383,2
	faster than 20 Mbit/s	[%]	88,7	77,7	89,7	79,9
	faster than 100 Mbit/s	[%]	64,6	42,4	19,8	44,6
HTTP UL FDTT	Qualifier	[%]	99,8	99,2	100,0	98,7
	10% faster than	[Mbit/s]	83,0	59,9	66,1	62,0
	faster than 2 Mbit/s	[%]	98,3	98,2	98,9	97,3
	faster than 5 Mbit/s	[%]	94,9	89,4	94,0	88,9
YouTube	Qualifier	[%]	99,9	98,2	98,8	96,9
	Start Time	[s]	1,9	2,0	2,0	2,1
	AVG Resolution	[p]	1079,9	1078,8	1080,0	1078,4
YouTube Live Smartphone	Qualifier	[%]	99,7	98,0	99,3	97,5
	Start Time	[s]	2,6	2,8	2,6	2,7
	AVG Resolution	[p]	1078,7	1075,9	1078,0	1072,5
Interactivity EGaming	Qualifier	[%]	97,2	96,7	95,8	97,0
	Interactivity EGaming	[%]	71,5	64,8	77,2	73,1
Interactivity Videochat	Qualifier	[%]	95,9	87,8	93,6	91,3
	Interactivity Videochat	[%]	86,1	86,6	89,9	88,7
Conversational App	Qualifier	[%]	99,9	99,6	99,8	99,8
	Speech Quality (P10)	[MOS–LQO]	3,6	3,6	3,8	3,7

Crowd KPI overview

Achieved values of all networks under test in each of the relevant Crowd Key Performance Indicators (KPIs) for the categories "Broadband Coverage", "Download Speed", "Latency", "Voice Crowd" and "Stability".

Category	KPI name	Unit	Telia	Tele2	Tre	Telenor
Broadband Coverage	Coverage Quality	[%]	99.5	99.1	99.4	98.3
	Coverage Reach	[%]	84.7	75.0	71.2	75.1
	Time on broadband	[%]	99.4	99.0	99.0	98.2
Download Speed	Basic internet class	[%]	97.7	96.3	96.8	96.6
	HD video class	[%]	92.2	89.1	90.3	90.0
	UHD video class	[%]	33.2	29.5	30.8	31.9
Latency	OTT voice class	[%]	98.5	98.3	98.4	98.1
	Gaming class	[%]	92.2	87.0	91.9	90.8
	Egoshooter class	[%]	6.4	2.7	4.2	5.5
Voice	HD voice	[%]	98.3	97.7	98.4	96.5

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

Audit Report

Sweden, 2024

umlaut
Part of Accenture

Intro

umlaut has tested the coverage of the Mobile Networks in Sweden and took a detailed look into the 5G coverage of each operator.

In the nationwide assessment, more than 138.1 square kilometres of Sweden were tested, 98.4% of the urban „built–up area" and 97.1% of the non–urban „built–up area". For the extensive crowdsourcing analysis, 25 thousand users have contributed 275.8 million samples.

Six–month observation period

This crowdsourcing analysis is based on a 24–weeks period from 20.05.2024 to 03.11.2024.

5G Footprint

5G Footprint KPIs — based on area share
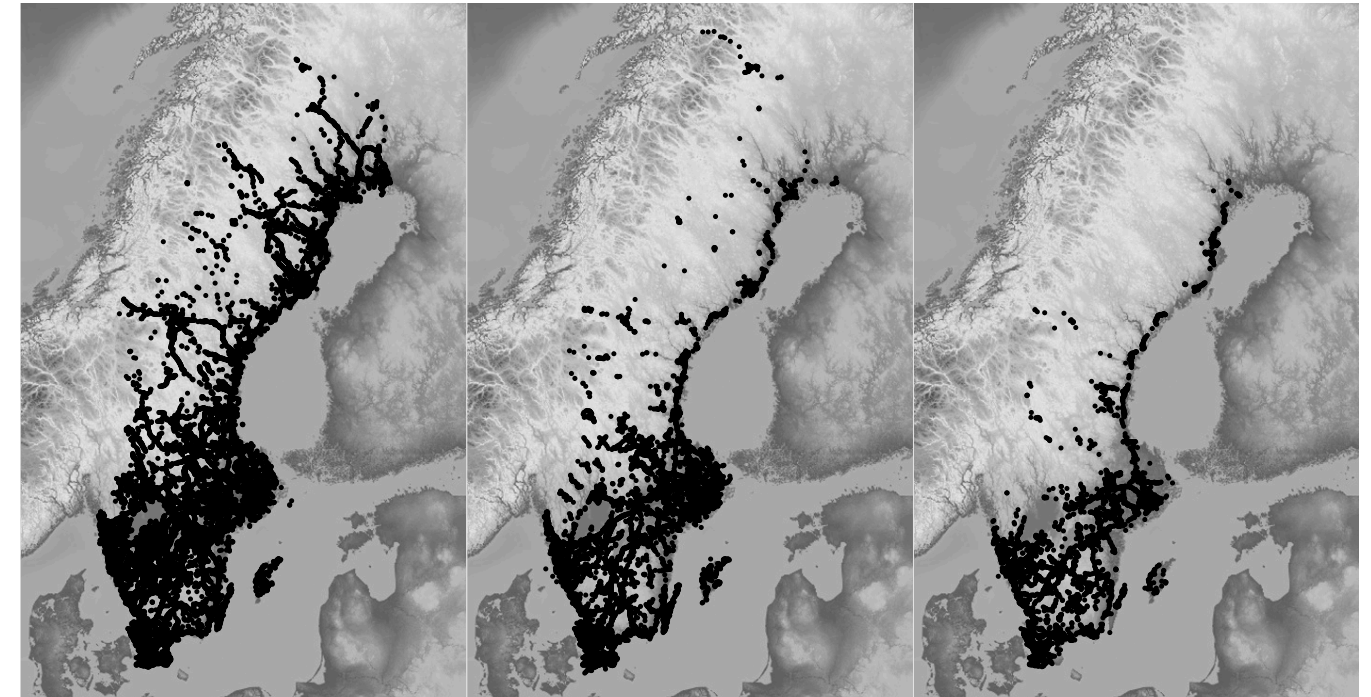
	Telia	Operator 2	Operator 3
% 5G coverage over full footprint (5G Framework coverage reach KPI)	45.6%	24.5%	12.5%

Operators sharing the same network have been merged.

Report facts

275.8 million
samples

**24 weeks,
W21 2024
to W44 2024**
Data collection
time period

**25.0 thousand overall
providing samples**
Users

138,102 km²
size of tested area

98.4%
of the 'built–up area'
covered

97.1%
of the 'Population area'
covered

Metrics overview and KPI description

The following metrics were collected to assess coverage
and performance

Total Samples Collected:
The total number of samples collected that were valid
for coverage reach KPI.

Number of 2x2 km Tiles:
The total number of 2x2 km quadtiles (zoom level 14)
covered by each operator with data.

Share of 5G Samples:
The total share of 5G measurements over the total
samples collected.

Share of 5G Samples (5G Capable Users):
The total share of 5G measurements over the total
samples collected, filtered for 5G capable users only.

	Telia	Operator 2	Operator 3
Total Samples	35436375	84179338	35670459
Number of Tiles 2x2km	42913	32856	25810
Share of 5G Samples	33,4%	13,3%	16,3%
% 5G coverage over full footprint (5G Framework coverage reach KPI)	45,6%	24,5%	12,5%

Methodology

umlaut score

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 scoring methodology. It allows a technical analysis that is unprecedented in its level of detail – enabling comparisons between the network performance and capability of each mobile network. Our public benchmarks as well as the certificate benchmarks help network operators to demonstrate how well they deliver wireless connections to consumers, business users and enterprises while revealing the areas of improvement.
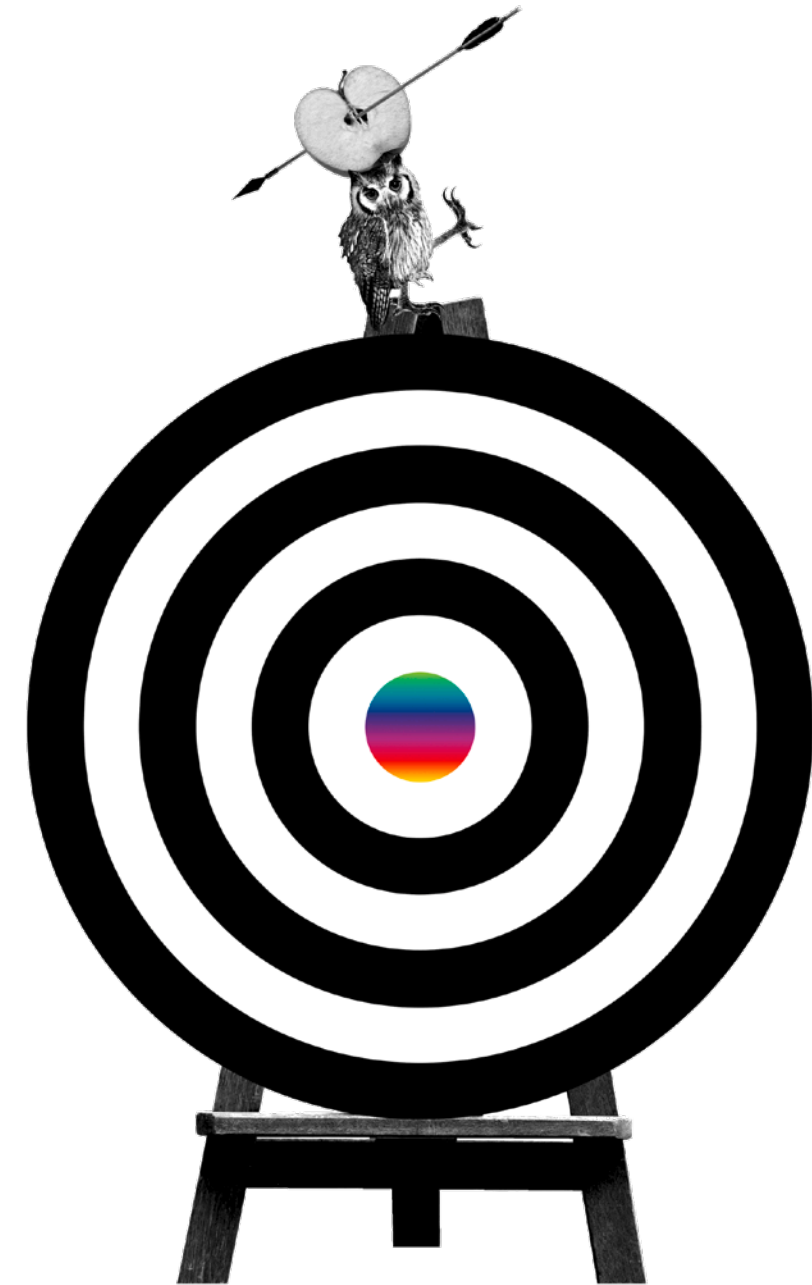
Crowdsourcing

For the collection of crowd data, umlaut has integrated background diagnosis processes into 8000+ diverse Android apps. If one of these applications is installed on the end–user's phone and the user agrees, anonymous data collection takes place 24/7, 365 days a year on this device. Reports are generated for every 15 minutes and daily sent to umlaut's cloud servers. Such reports generate just a small number of bytes per message and do not include any personal user data. The unique crowdsourcing technology allows umlaut to collect data about real–world customer experience in a truly passive way – wherever and whenever customers use their smartphones. By analyzing data according to predefined metrics, umlaut can provide information for the optimization of networks and also show if networks live up to the expectations of their customers.

Key takeaways

Telia shows the highest 5G footprint (coverage) and the highest 5G sample shares.

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

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cell +49 151 571 33 235 · hakan.ekmen@accenture.com

www.umlaut.com