best in test

For adding something on top in Greece and reaching an overall score of 884 dots in mobile network benchmarking survey we proudly award this certificate to

Cosmote Greece

Score 884 out of 1000 in Total
Score 255 out of 270 in Voice Services
Score 398 out of 480 in Data Services
Score 231 out of 250 in Crowdsourced Quality

Hakan Ekmen

Hakan Ekmen
Global Networks Lead, Comms Industry

Best
05 in 23
Test

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 Greece.

The audit was done as a performance benchmark performed by umlaut between: 28.04.2023 and 18.05.2023 in cities and towns as well as on connection roads.

Dedicated measurements have been executed as drive tests outdoors using a Samsung S21+ and a Samsung S22+. 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 CW49 2022 and CW20 2023.

The following pages provide a comparative overview about the performance results observed for the different tested service types.
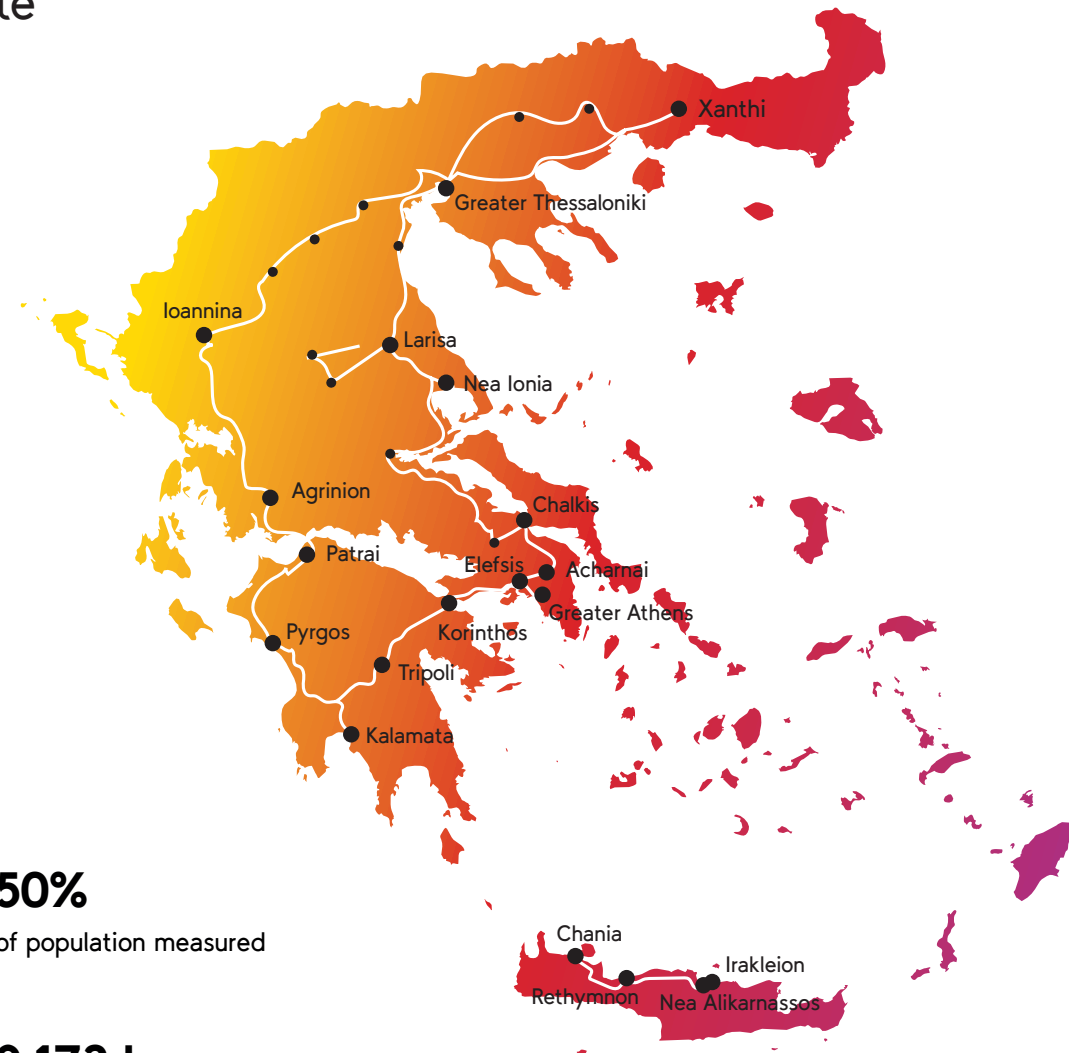
Drivetest	Voice	Data
Device	Samsung Galaxy S21+	Samsung Galaxy S22+
Test Cases	Mobile–to–Mobile (M2M) Side1 (5G preferred) to Side2 (5G preferred) 115 sec call window 70 sec call duration 15 sec call setup timeout Multi–RAB traffic injection on both sides	System 1: Data 5G preferred System 2: Data 5G preferred HTTP DL datastream 7s HTTP UL datastream 7s HTTP 5MB DL fixed file transfer HTTP 2.5MB UL fixed file transfer Web Browsing – Kepler ETSI Ref. Page 9 Live web pages (5 http / 5 https) 2 YouTube HD video ~ 45s 1 YouTube live stream ~ 45s
Mobility and Route Types	Drive test 100% 55% in Cities, 17% in Towns and 28% on Roads	
Samples	~3,530 per Operator	~ 188,714 per Operator
Dates	15 measurement days 28.04.2023 – 18.05.2023	
Crowd Data Assessment	24 weeks CW49 2022 – CW20 2023	

Testıng areas

Drive route

Xanthi

Greater Thessaloniki

Ioannina

Larisa

Nea Ionia

Agrinion

Chalkis

Patrai

Elefsis   Acharnai

Greater Athens

Pyrgos

Korinthos

Tripoli

Kalamata

Chania

Irakleion

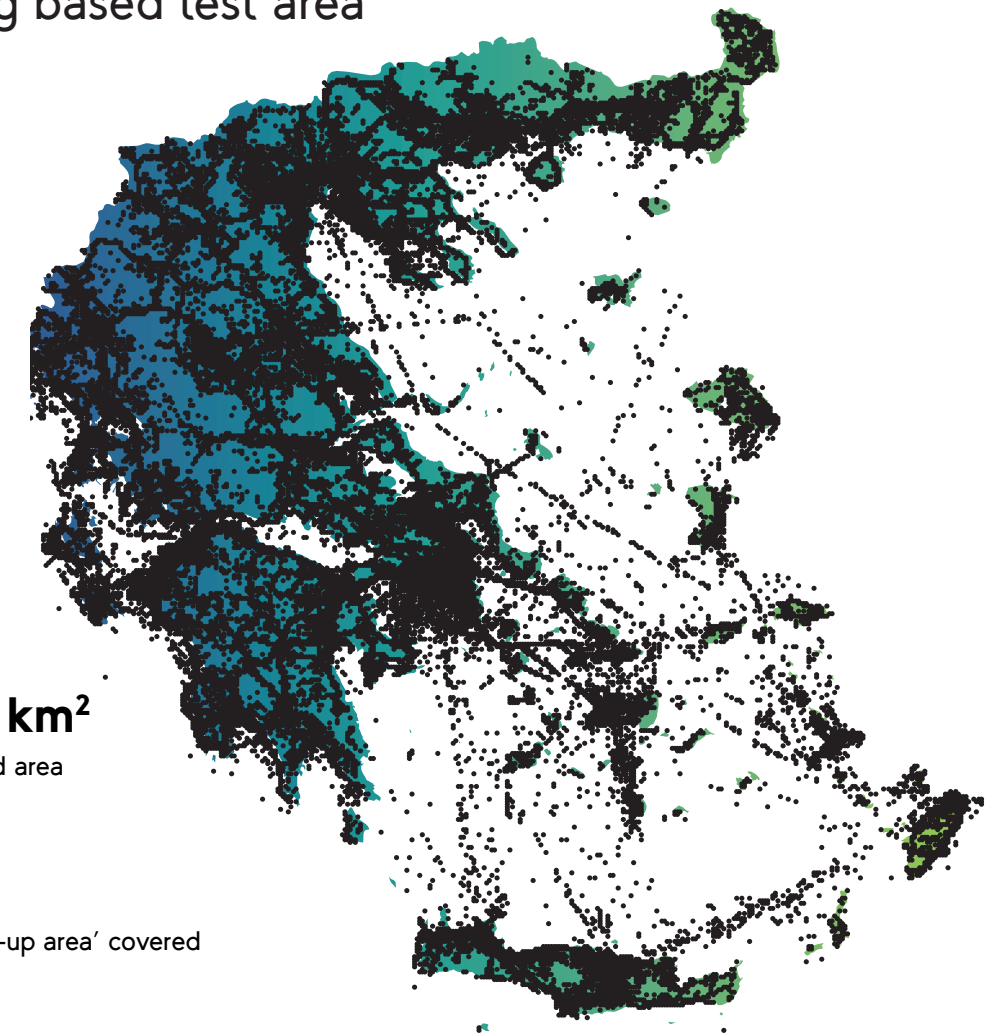Rethymnon   Nea Alikarnassos

50%
of population measured

9,172 km
measuring distance

Crowdsourcing based test area

89,167 km²
size of tested area

92.1%
of the 'build–up area' covered

96.8%
of the 'Population area' covered

Claims

	Best in test
	Cosmote Greece

	Best in data
	Cosmote Greece

	Best in voice
	Cosmote Greece

	Best in Reliability
	Cosmote Greece

	Best in crowd–sourced quality
	Cosmote Greece

Methodology

The leader in mobile benchmarking, umlaut, has analyzed the mobile networks of Greece 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 perfor–mance data has been collected and evaluated.

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 unpre–cedented 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 demon–strate how well they are delivering wireless connections to consumers, business users and enterprises and reveals the areas of improvement.

Score and breakdown

Cosmote Greece achieved the highest overall score among competitors with 884 dots out of 1000.

Total Score
1000 Dots

Crowd
max. 250

Data
max. 480

Voice
max. 270

Operator

	Cosmote	Nova	Vodafone
884	231 / 398 / 255		
789		217 / 342 / 230	
785			214 / 350 / 221
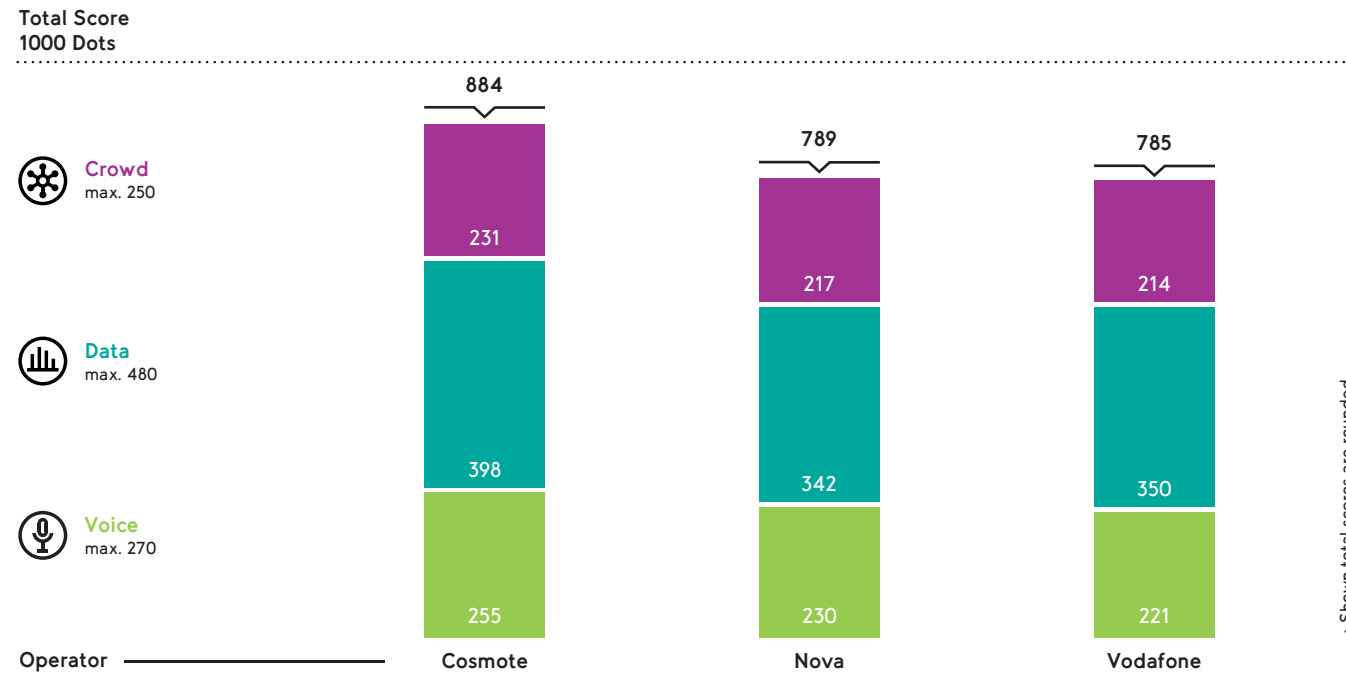
↑ Shown total scores are rounded.

Overall score considering Voice, Data and Crowdsourcing.

Total score

		Cosmote	Nova	Vodafone
Voice	max. 270	255	230	221
Cities Drivetest	162	94%	84%	83%
Towns Drivetest	54	97%	89%	80%
Roads Drivetest	54	93%	83%	82%
Data	max. 480	398	342	350
Cities Drivetest	288	82%	74%	72%
Towns Drivetest	96	79%	66%	72%
Roads Drivetest	96	87%	69%	75%
Crowdsourced Quality	max. 250	231	217	214
Broadband Coverage	100	95%	89%	89%
Download Speed	50	89%	88%	88%
Latency	50	92%	88%	85%
Voice	13	92%	84%	79%
Download Speed Active	13	89%	65%	58%
Upload Speed Active	13	91%	79%	90%
Stability	13	94%	90%	88%
Total	1000	884	789	785

Shown scores are rounded.

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

Data	Service Group	max	Cosmote	Nova	Vodafone
Cities	Web Browsing	64,8	94%	81%	86%
	File Download	64,8	91%	69%	71%
	File Upload	64,8	79%	70%	74%
	YouTube	64,8	75%	77%	60%
	OTT	28,8	64%	68%	68%
Towns	Web Browsing	21,6	93%	79%	85%
	File Download	21,6	90%	62%	63%
	File Upload	21,6	72%	66%	68%
	YouTube	21,6	67%	61%	77%
	OTT	9,6	67%	62%	65%
Roads	Web Browsing	21,6	95%	76%	91%
	File Download	21,6	95%	63%	70%
	File Upload	21,6	84%	70%	72%
	YouTube	21,6	88%	70%	72%
	OTT	9,6	61%	60%	65%

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

Crowd	Service Group	max	Cosmote	Nova	Vodafone
Crowdsourced Quality	Broadband Coverage	100	95%	89%	89%
	DL Speed	50	89%	88%	88%
	Latency	50	92%	88%	85%
	Voice	13	92%	84%	79%
	DL Speed Active	13	89%	65%	58%
	UL Speed Active	13	91%	79%	90%
	Stability	13	94%	90%	88%

Reliability

**Total Score
493 Dots**

Total Score 493 Dots

Consistent UE
max. 123

Data Reliability
max. 222

Voice Reliability
max. 148

Operator — Cosmote | Nova | Vodafone

441 → Cosmote (113 / 189 / 139)
409 → Nova (109 / 179 / 121)
392 → Vodafone (108 / 165 / 119)

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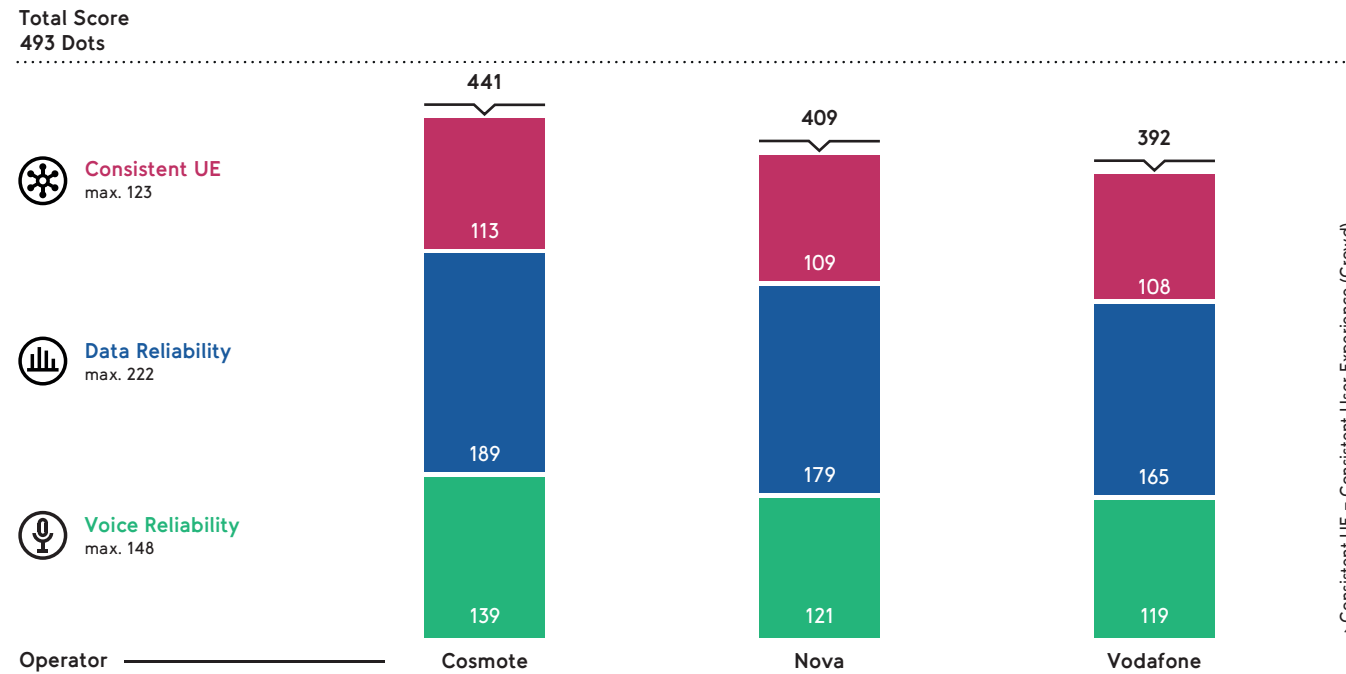
Reliability score considering Voice Reliability, Data Reliability and Consistent UE.

Total score

	Service Group	max	Cosmote	Nova	Vodafone
Reliability	Voice Reliability	149	93%	81%	80%
	Data Reliability	222	85%	81%	75%
	Consistent User Experience	123	92%	89%	88%

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	Cosmote	Nova	Vodafone
Cities	Qualifier	[%]	99,3	98,0	98,3
	Call Setup Time (P90)	[s]	1,0	1,8	1,8
	Speech Quality (P10)	[MOS–LQO]	4,3	3,8	3,7
	Multirab connectivity	[%]	98,6	99,2	95,9
Towns	Qualifier	[%]	99,6	98,6	97,3
	Call Setup Time (P90)	[s]	1,0	1,7	1,7
	Speech Quality (P10)	[MOS–LQO]	4,3	3,9	3,8
	Multirab connectivity	[%]	99,3	99,3	98,3
Roads	Qualifier	[%]	98,4	96,5	96,1
	Call Setup Time (P90)	[s]	1,0	1,8	1,6
	Speech Quality (P10)	[MOS–LQO]	4,2	3,5	3,5
	Multirab connectivity	[%]	99,0	98,4	96,8

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 "Cities".

Data Cities	KPI Name	Unit	Cosmote	Nova	Vodafone
HTTP Web Page DL Smartphone	Qualifier	[%]	99,3	98,5	98,0
	Overall Session Time	[s]	1,4	2,1	1,6
HTTP 10MB DL Smartphone	Qualifier	[%]	99,9	99,4	99,0
	Overall Session Time	[s]	2,3	5,2	4,0
	90% faster than	[Mbit/s]	23,5	6,9	10,0
	10% faster than	[Mbit/s]	240,7	130,0	149,0
HTTP 5MB UL Smartphone	Qualifier	[%]	99,5	99,3	99,0
	Average Session Time	[s]	4,0	5,1	4,0
	90% faster than	[Mbit/s]	4,9	4,1	5,2
	10% faster than	[Mbit/s]	66,9	46,8	68,6
HTTP DL FDTT	Qualifier	[%]	99,0	98,9	98,3
	10% faster than	[Mbit/s]	578,3	181,4	332,2
	faster than 20 Mbit/s	[%]	94,0	80,1	79,6
	faster than 100 Mbit/s	[%]	73,0	23,6	32,5
HTTP UL FDTT	Qualifier	[%]	98,0	98,0	97,0
	10% faster than	[Mbit/s]	94,3	74,0	104,3
	faster than 2 Mbit/s	[%]	96,9	94,4	96,2
	faster than 5 Mbit/s	[%]	90,3	84,4	89,5
YouTube	Qualifier	[%]	93,9	96,9	94,3
	Start Time	[s]	2,2	2,7	2,3
	Time to full resolution	[s]	9,8	10,2	9,9
YouTube Live Smartphone	Qualifier	[%]	97,0	95,2	91,5
	Start Time	[s]	3,6	3,7	3,6
	Time to full resolution	[s]	8,3	8,5	8,4
YouTube 4K Smartphone	Qualifier	[%]	91,3	92,7	85,1
	Start Time	[s]	2,5	2,7	2,3
	Time to full resolution	[s]	10,7	10,7	10,0
Interactivity	Interactivity egaming	[%]	26,3	30,9	38,4
Conversational App	Qualifier	[%]	99,7	99,9	99,2
	Speech Quality (P10)	[MOS–LQO]	3,2	3,3	2,7

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	Cosmote	Nova	Vodafone
HTTP Web Page DL Smartphone	Qualifier	[%]	99,3	98,5	97,9
	Overall Session Time	[s]	1,4	2,2	1,6
HTTP 10MB DL Smartphone	Qualifier	[%]	99,8	98,8	98,2
	Overall Session Time	[s]	2,3	5,9	5,1
	90% faster than	[Mbit/s]	18,2	5,6	6,8
	10% faster than	[Mbit/s]	232,8	114,4	142,2
HTTP 5MB UL Smartphone	Qualifier	[%]	99,2	99,6	99,8
	Average Session Time	[s]	5,0	6,2	5,3
	90% faster than	[Mbit/s]	4,3	3,2	3,3
	10% faster than	[Mbit/s]	66,0	37,7	50,6
HTTP DL FDTT	Qualifier	[%]	99,6	98,8	98,2
	10% faster than	[Mbit/s]	643,2	120,6	243,2
	faster than 20 Mbit/s	[%]	90,0	71,0	72,9
	faster than 100 Mbit/s	[%]	70,1	16,1	28,9
HTTP UL FDTT	Qualifier	[%]	97,5	98,6	97,6
	10% faster than	[Mbit/s]	92,4	48,9	68,8
	faster than 2 Mbit/s	[%]	95,4	92,7	93,3
	faster than 5 Mbit/s	[%]	89,1	81,4	82,2
YouTube	Qualifier	[%]	92,6	93,5	96,1
	Start Time	[s]	2,8	2,8	2,2
	Time to full resolution	[s]	9,9	10,3	9,6
YouTube Live Smartphone	Qualifier	[%]	95,8	91,8	95,7
	Start Time	[s]	3,7	4,0	3,8
	Time to full resolution	[s]	8,1	8,3	8,0
YouTube 4K Smartphone	Qualifier	[%]	88,0	89,6	90,5
	Start Time	[s]	2,6	2,7	2,4
	Time to full resolution	[s]	10,4	11,1	9,9
Interactivity	Interactivity egaming	[%]	29,8	22,9	33,4
Conversational App	Qualifier	[%]	100,0	100,0	98,3
	Speech Quality (P10)	[MOS–LQO]	3,4	3,2	2,9

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	Cosmote	Nova	Vodafone
HTTP Web Page DL Smartphone	Qualifier	[%]	99,0	96,1	97,5
	Overall Session Time	[s]	1,5	2,4	1,7
HTTP 10MB DL Smartphone	Qualifier	[%]	99,6	97,1	98,1
	Overall Session Time	[s]	2,2	9,5	7,3
	90% faster than	[Mbit/s]	21,7	3,9	4,3
	10% faster than	[Mbit/s]	151,9	68,3	84,7
HTTP 5MB UL Smartphone	Qualifier	[%]	99,5	97,8	97,7
	Average Session Time	[s]	4,1	7,1	5,6
	90% faster than	[Mbit/s]	4,5	2,7	3,4
	10% faster than	[Mbit/s]	60,3	26,0	38,6
HTTP DL FDTT	Qualifier	[%]	99,5	97,3	98,1
	10% faster than	[Mbit/s]	314,1	80,9	108,6
	faster than 20 Mbit/s	[%]	92,3	50,5	61,3
	faster than 100 Mbit/s	[%]	53,0	6,7	12,3
HTTP UL FDTT	Qualifier	[%]	97,7	96,7	95,7
	10% faster than	[Mbit/s]	84,4	32,2	54,3
	faster than 2 Mbit/s	[%]	94,9	93,8	92,7
	faster than 5 Mbit/s	[%]	88,0	78,6	82,4
YouTube	Qualifier	[%]	97,6	92,2	92,8
	Start Time	[s]	2,5	2,7	2,3
	Time to full resolution	[s]	9,6	10,4	9,9
YouTube Live Smartphone	Qualifier	[%]	96,1	90,8	88,0
	Start Time	[s]	3,7	3,9	3,7
	Time to full resolution	[s]	8,3	8,5	8,2
YouTube 4K Smartphone	Qualifier	[%]	93,7	80,7	84,2
	Start Time	[s]	2,4	2,5	2,2
	Time to full resolution	[s]	10,6	11,5	10,5
Interactivity	Interactivity egaming	[%]	23,7	23,2	33,9
Conversational App	Qualifier	[%]	100,0	99,8	99,4
	Speech Quality (P10)	[MOS–LQO]	3,0	3,0	2,8

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	Cosmote	Nova	Vodafone
Broadband Coverage	Coverage Quality	[%]	98.3	94.2	92.8
	Coverage Reach	[%]	86.0	75.7	81.3
	Time on broadband	[%]	97.3	95.1	95.2
Download Speed	Basic internet class	[%]	93.1	92.8	92.4
	HD video class	[%]	83.2	80.2	78.6
	UHD video class	[%]	30.7	21.7	21.2
Latency	Gaming class	[%]	91.4	83.6	82.0
	OTT voice class	[%]	96.4	95.2	93.6
Voice	HD voice	[%]	96.0	92.0	89.4
Download Speed Active	90% faster than	[Mbit/s]	5.9	4.0	3.0
	10% faster than	[Mbit/s]	149.1	75.0	74.4
	AVG data rate	[Mbit/s]	66.0	34.5	30.8
Upload Speed Active	90% faster than	[Mbit/s]	2.4	1.9	2.4
	10% faster than	[Mbit/s]	47.3	33.5	40.0
	AVG data rate	[Mbit/s]	21.7	14.9	18.2
Stability	Transaction success	[%]	93.7	89.8	88.0

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