

best in test.

For adding something on top in South Africa and reaching an overall score of 821 dots in mobile network benchmarking survey we proudly award this certificate to

MTN South Africa

Score 821 out of 1000 in Total
Score 227 out of 270 in Voice Services
Score 376 out of 480 in Data Services
Score 218 out of 250 in Crowdsourced Quality



Hakan Ekmen
Chief Executive Officer Telecommunication





Measurement Overview

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 South Africa.

The audit was done as a performance benchmark performed by umlaut between 26.09. and 30.10.2022 in cities and towns as well as on connection roads.

Dedicated measurements have been executed as drive tests outdoors using a Samsung Galaxy S21+ and Samsung Galaxy 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 CW21 2022 and CW44 2022.

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



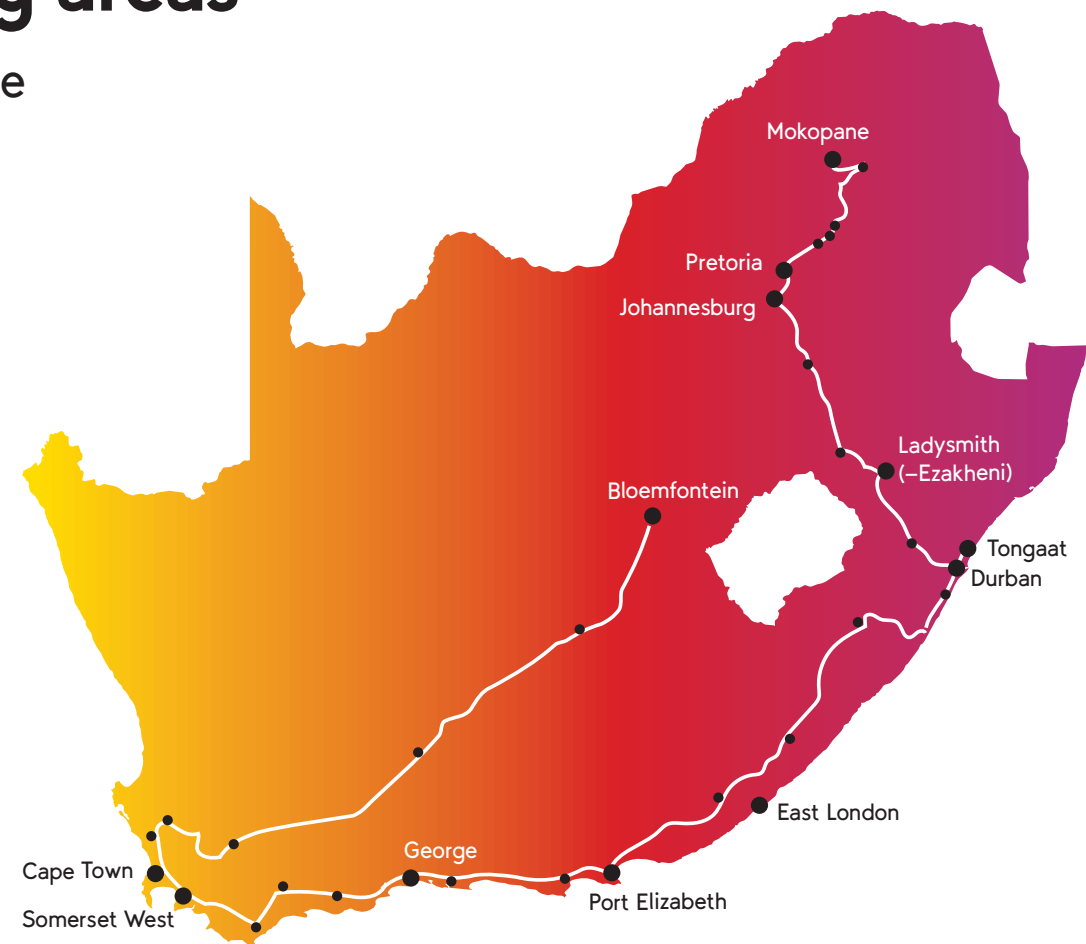
Measurement setup

Drivetest	Voice	Data
Device	Samsung Galaxy S21+ (5G)	Samsung Galaxy S22+ (5G)
Test Cases	Mobile-to-Mobile (M2M) Side1 (4G preferred: Volte) to Side2 (4G preferred: Volte) 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 10MB DL fixed file transfer HTTP 5MB UL fixed file transfer Web Browsing – Kepler ETSI Ref. Page 9 Live web pages (4 International / 5 Local) 1 YouTube HD video ~ 45s 1 YouTube 4K ~45s 1 YouTube live stream ~ 45s eGaming real time 10s traffic pattern
Mobility and Route Types	Drive test 100% 53% in Cities, 13% in Towns and 35% on Roads	
Samples	~ 4960 per Operator	~ 39664 per Operator
Dates	21 measurement days 26.09.2022–30.10.2022	
Crowd Data Assessment	24 weeks CW21 2022 – CW44 2022	



Testing areas

Drive route

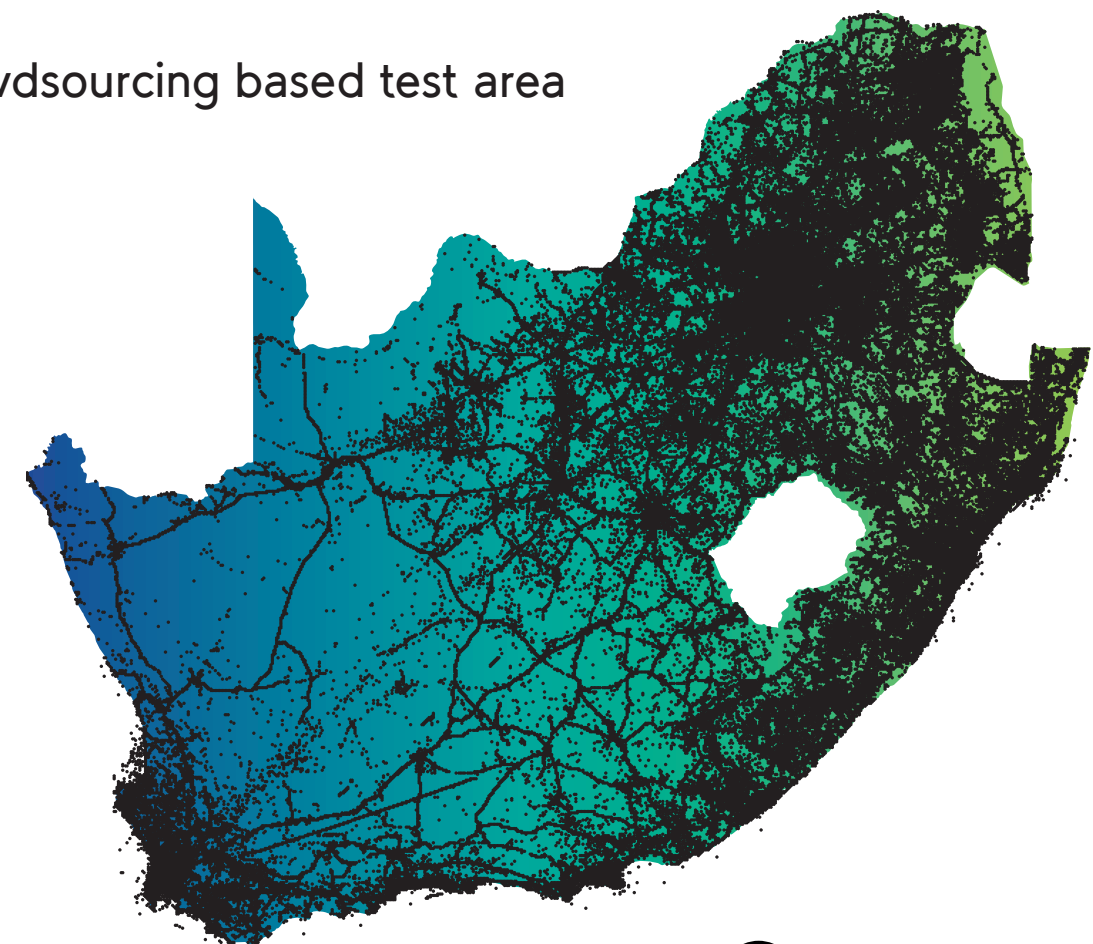


16800 km
measuring distance



51 %
of population measured

Crowdsourcing based test area



93.3 %
of the 'build-up area' covered



407,016 km²
size of tested area



96.9 %
of the 'Population area' covered



Claims




Best in test
MTN South Africa



Best in data
MTN South Africa



Methodology

The leader in mobile benchmarking, umlaut, has analyzed the mobile networks of South Africa with regards to mobile network performance. We measure smartphone voice and data performance based on extensive drive-tests – 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.

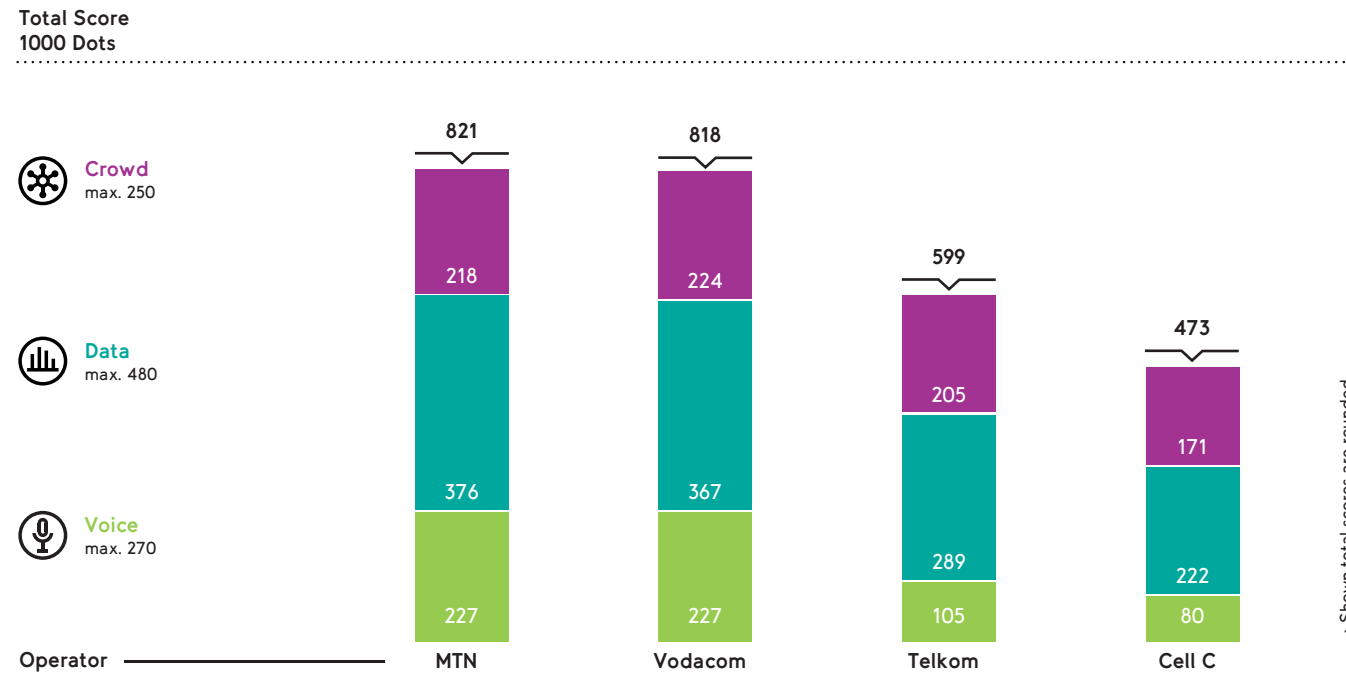
As the de-facto industry standard, our benchmarking methodology focuses on customer-perceived network quality and covers a wide range of mobile services. Today, more than 200 mobile networks in more than 120 countries are being evaluated by our unique scoring

methodology. It allows a technical analysis that is unprecedented in its level of detail 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

MTN achieved the highest overall score among competitors with 821 dots out of 1000.



→ Shown total scores are rounded.

Overall score considering Voice, Data and Crowdsourcing.

Total score

		MTN	Vodacom	Telkom	Cell C
Voice	max. 270	227	227	105	80
Cities Drivetest	162	90%	86%	42%	29%
Towns Drivetest	54	88%	86%	46%	36%
Roads Drivetest	54	64%	77%	23%	24%
Data	max. 480	376	367	289	222
Cities Drivetest	288	85%	83%	60%	53%
Towns Drivetest	96	68%	65%	63%	32%
Roads Drivetest	96	69%	69%	57%	39%
Crowdsourced Quality	max. 250	218	224	205	171
Broadband Coverage	100	91%	95%	90%	78%
Download Speed	50	89%	90%	89%	77%
Latency	50	85%	90%	79%	70%
Voice	13	79%	89%	85%	0%
Download Speed Active	13	71%	63%	25%	32%
Upload Speed Active	13	80%	74%	45%	55%
Stability	13	85%	88%	89%	71%
Total	1000	821	818	599	473

Shown scores are rounded.



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

Data	Service Group	max	MTN	Vodacom	Telkom	Cell C
Cities	Web Browsing	64,8	81%	83%	62%	54%
	File Download	64,8	90%	83%	53%	47%
	File Upload	64,8	86%	76%	57%	47%
	YouTube	64,8	82%	89%	62%	54%
	OTT	28,8	87%	82%	77%	77%
Towns	Web Browsing	21,6	60%	65%	64%	24%
	File Download	21,6	73%	67%	64%	12%
	File Upload	21,6	62%	50%	57%	29%
	YouTube	21,6	68%	70%	59%	47%
	OTT	9,6	88%	81%	79%	69%
Roads	Web Browsing	21,6	70%	73%	59%	38%
	File Download	21,6	78%	77%	61%	41%
	File Upload	21,6	49%	48%	46%	19%
	YouTube	21,6	70%	75%	56%	47%
	OTT	9,6	86%	77%	75%	66%

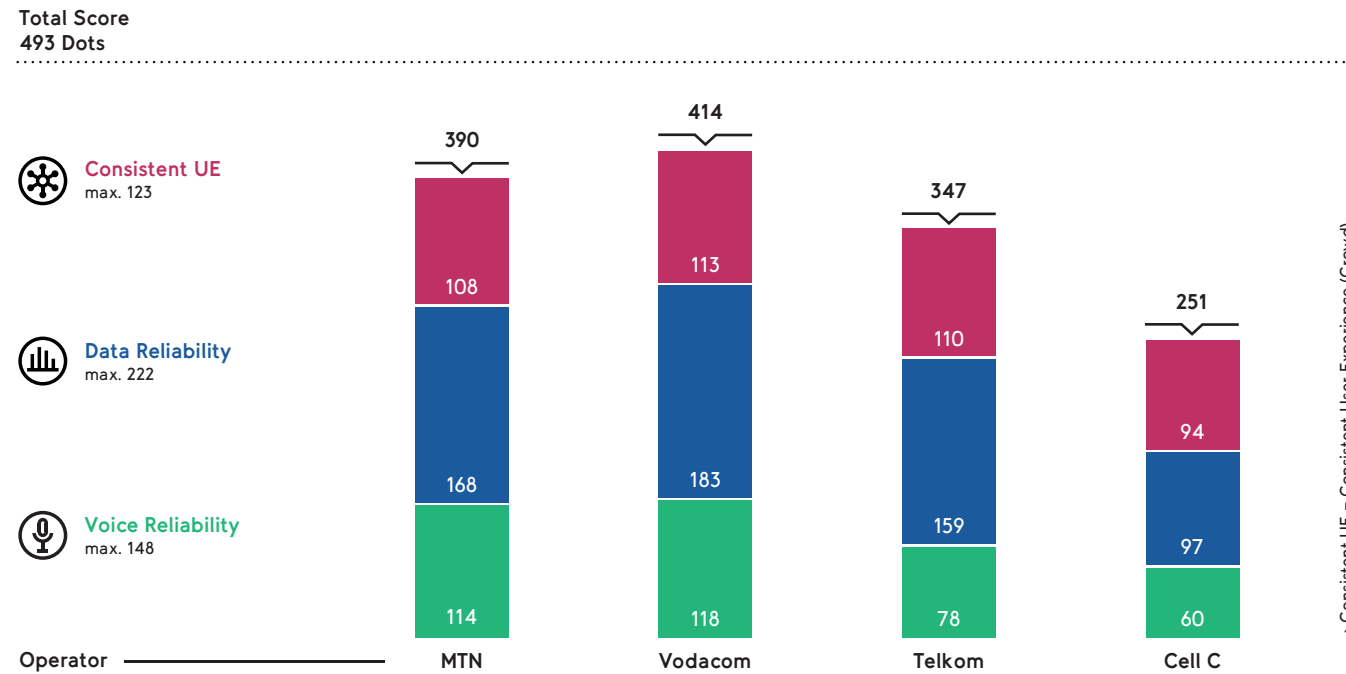


Achieved percentage of the maximum score in each of the different crowdsourcing services.

Crowd	Service Group	max	MTN	Vodacom	Telkom	Cell C
Crowdsourced Quality	Broadband Coverage	100	91%	95%	90%	78%
	DL Speed	50	89%	90%	89%	77%
	Latency	50	85%	90%	79%	70%
	Voice	13	79%	89%	85%	0%
	DL Speed Active	13	71%	63%	25%	32%
	UL Speed Active	13	80%	74%	45%	55%
	Stability	13	85%	88%	89%	71%



Reliability



Reliability score considering Voice Reliability, Data Reliability and Consistent UE.

Total score

	Service Group	max	MTN	Vodacom	Telkom	Cell C
Reliability	Voice Reliability	148	77%	80%	52%	40%
	Data Reliability	222	76%	82%	72%	44%
	Consistent User Experience	123	88%	92%	90%	77%

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	MTN	Vodacom	Telkom	Cell C
Cities	Qualifier	[%]	98,5	98,4	95,9	94,1
	Call Setup Time (P90)	[s]	1,4	1,6	6,8	7,9
	Speech Quality (P10)	[MOS-LQO]	4,0	3,6	2,6	2,4
	Multirab connectivity	[%]	99,7	99,3	87,9	77,6
Towns	Qualifier	[%]	98,6	98,0	95,9	94,9
	Call Setup Time (P90)	[s]	1,4	1,7	5,6	7,7
	Speech Quality (P10)	[MOS-LQO]	4,1	4,0	2,9	2,6
	Multirab connectivity	[%]	96,9	99,7	94,3	75,5
Roads	Qualifier	[%]	89,8	93,8	86,5	87,3
	Call Setup Time (P90)	[s]	1,6	1,7	7,3	8,1
	Speech Quality (P10)	[MOS-LQO]	3,8	3,8	2,6	2,5
	Multirab connectivity	[%]	96,7	98,3	80,8	63,2



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	MTN	Vodacom	Telkom	Cell C
HTTP Web Page DL Smartphone	Qualifier	[%]	98,5	99,3	97,3	95,5
	Overall Session Time	[s]	2,1	2,2	2,8	2,7
HTTP 10MB DL Smartphone	Qualifier	[%]	99,5	99,7	97,2	97,5
	Overall Session Time	[s]	1,8	2,6	8,1	6,9
	90% faster than	[Mbit/s]	28,9	16,3	5,4	5,3
	10% faster than	[Mbit/s]	203,1	190,5	40,7	49,8
HTTP 5MB UL Smartphone	Qualifier	[%]	99,4	99,9	99,5	97,7
	Average Session Time	[s]	2,6	4,9	6,7	7,4
	90% faster than	[Mbit/s]	8,9	4,0	3,3	2,6
	10% faster than	[Mbit/s]	58,4	33,4	22,7	25,6
HTTP DL FDTT	Qualifier	[%]	99,3	99,2	99,2	97,3
	10% faster than	[Mbit/s]	394,4	347,0	64,3	57,0
	faster than 20 Mbit/s	[%]	95,7	89,5	59,3	61,5
	faster than 100 Mbit/s	[%]	69,0	44,5	2,0	0,1
HTTP UL FDTT	Qualifier	[%]	99,0	99,5	97,9	95,9
	10% faster than	[Mbit/s]	73,0	38,7	20,0	28,1
	faster than 2 Mbit/s	[%]	98,6	96,4	92,1	91,6
	faster than 5 Mbit/s	[%]	96,5	86,3	74,0	74,7
YouTube	Qualifier	[%]	97,7	98,5	94,1	92,5
	Start Time	[s]	2,8	2,2	2,4	2,5
	AVG Resolution	[p]	8,4	8,2	8,7	8,8
YouTube Live Smartphone	Qualifier	[%]	96,3	98,1	95,0	92,5
	Start Time	[s]	3,6	3,6	3,8	3,7
	AVG Resolution	[p]	7,6	7,4	7,2	7,4
YouTube 4K Smartphone	Qualifier	[%]	91,9	91,5	65,9	67,7
	Start Time	[s]	2,7	2,2	2,5	2,4
	AVG Resolution	[p]	9,0	8,8	9,2	9,0
Interactivity	Interactivity egaming	[%]	70,8	58,7	43,2	42,5
Voice OTT	Qualifier	[%]	99,9	99,5	99,7	99,8
	Speech Quality (P10)	[MOS-LQO]	2,7	2,7	3,4	3,4



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 "Towns".

Data Towns	KPI Name	Unit	MTN	Vodacom	Telkom	Cell C
HTTP Web Page DL Smartphone	Qualifier	[%]	95,2	96,7	97,5	87,8
	Overall Session Time	[s]	2,3	2,4	2,7	2,9
HTTP 10MB DL Smartphone	Qualifier	[%]	97,0	98,4	99,3	88,7
	Overall Session Time	[s]	2,6	4,1	6,8	8,5
	90% faster than	[Mbit/s]	26,0	11,8	9,4	4,2
	10% faster than	[Mbit/s]	152,4	103,5	55,9	59,5
HTTP 5MB UL Smartphone	Qualifier	[%]	96,7	97,3	99,1	95,0
	Average Session Time	[s]	3,9	6,6	6,4	7,4
	90% faster than	[Mbit/s]	5,1	2,9	3,2	2,8
HTTP DL FDTT	Qualifier	[%]	97,0	97,9	99,3	89,4
	10% faster than	[Mbit/s]	277,1	131,3	78,7	64,5
	faster than 20 Mbit/s	[%]	94,5	85,7	75,0	57,5
HTTP UL FDTT	Qualifier	[%]	95,4	94,7	97,7	90,9
	10% faster than	[Mbit/s]	57,2	27,3	26,0	34,9
	faster than 2 Mbit/s	[%]	97,4	96,4	91,1	92,9
	faster than 5 Mbit/s	[%]	91,9	84,1	79,8	76,9
YouTube	Qualifier	[%]	94,1	93,9	93,5	88,0
	Start Time	[s]	2,2	2,2	2,3	2,7
	AVG Resolution	[p]	8,5	8,2	8,5	8,7
YouTube Live Smartphone	Qualifier	[%]	92,2	95,1	93,9	87,3
	Start Time	[s]	3,8	3,7	4,0	3,9
	AVG Resolution	[p]	7,4	7,3	7,2	7,1
YouTube 4K Smartphone	Qualifier	[%]	91,4	86,2	66,0	59,1
	Start Time	[s]	2,4	2,2	2,3	2,7
	AVG Resolution	[p]	9,0	9,0	8,4	8,8
Interactivity	Interactivity egaming	[%]	59,5	53,0	44,3	32,9
Voice OTT	Qualifier	[%]	100,0	99,7	99,7	100,0
	Speech Quality (P10)	[MOS-LQO]	3,3	2,9	3,5	3,3



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

Data Roads	KPI Name	Unit	MTN	Vodacom	Telkom	Cell C
HTTP Web Page DL Smartphone	Qualifier	[%]	93,2	94,4	92,0	82,7
	Overall Session Time	[s]	2,5	2,4	3,0	3,2
HTTP 10MB DL Smartphone	Qualifier	[%]	94,6	96,1	95,7	85,3
	Overall Session Time	[s]	4,2	4,1	7,7	10,0
	90% faster than	[Mbit/s]	9,1	9,8	6,1	3,4
	10% faster than	[Mbit/s]	118,1	105,9	70,5	45,6
HTTP 5MB UL Smartphone	Qualifier	[%]	93,3	94,5	94,2	86,7
	Average Session Time	[s]	8,0	9,3	8,7	11,3
	90% faster than	[Mbit/s]	1,7	1,7	2,0	1,5
HTTP DL FDTT	Qualifier	[%]	95,1	95,7	94,7	87,3
	10% faster than	[Mbit/s]	171,3	126,3	88,6	51,6
	faster than 20 Mbit/s	[%]	84,6	83,1	51,1	51,7
HTTP UL FDTT	Qualifier	[%]	90,8	91,4	91,1	82,7
	10% faster than	[Mbit/s]	45,9	24,3	24,2	21,3
	faster than 2 Mbit/s	[%]	87,8	88,1	87,1	83,1
	faster than 5 Mbit/s	[%]	77,1	71,1	68,5	65,9
YouTube	Qualifier	[%]	92,3	93,4	88,1	79,9
	Start Time	[s]	2,6	2,2	2,5	2,7
	AVG Resolution	[p]	8,3	8,1	8,4	8,7
YouTube Live Smartphone	Qualifier	[%]	86,5	89,5	86,3	80,9
	Start Time	[s]	3,8	3,8	3,8	3,8
	AVG Resolution	[p]	7,3	7,2	7,1	7,2
YouTube 4K Smartphone	Qualifier	[%]	82,1	81,3	54,9	48,9
	Start Time	[s]	2,6	2,2	2,4	2,7
	AVG Resolution	[p]	8,8	8,7	9,2	8,7
Interactivity	Interactivity egaming	[%]	57,7	52,9	40,5	31,0
Voice OTT	Qualifier	[%]	99,2	99,4	99,2	99,9
	Speech Quality (P10)	[MOS-LQO]	3,3	2,5	3,4	3,1



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	MTN	Vodacom	Telkom	Cell C
Broadband Coverage	Coverage Quality	[%]	93.9	96.2	92.4	85.7
	Coverage Reach	[%]	89.1	92.6	79.3	79.9
	Time on broadband	[%]	95.8	97.6	97.1	87.7
Download Speed	Basic internet class	[%]	93.2	94.5	94.7	88.2
	HD video class	[%]	77.9	79.6	76.3	65.7
	UHD video class	[%]	25.4	25.3	14.9	16.7
Latency	Gaming class	[%]	83.1	86.3	74.6	68.9
	OTT voice class	[%]	93.5	96.1	92.8	89.6
Voice	HD voice	[%]	89.5	94.4	92.4	1.8
Download Speed Active	10% faster than	[Mbit/s]	4.1	3.8	1.7	2.3
	90% faster than	[Mbit/s]	100.3	72.7	27.8	29.6
	AVG data rate	[Mbit/s]	41.6	31.5	13.8	12.5
Upload Speed Active	10% faster than	[Mbit/s]	1.8	1.9	1.4	1.3
	90% faster than	[Mbit/s]	40.9	23.7	15.6	20.1
	AVG data rate	[Mbit/s]	17.1	12.1	7.4	9.0
Stability	Transaction success	[%]	84.6	88.4	88.8	70.6



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