NET CHECK

BEST
MOBILE
NETWORK

NET CHECK
2024

BOSNIA AND
HERZEGOVINA'S
BEST
MOBILE
NETWORK

BENCHMARK MEASUREMENT OF
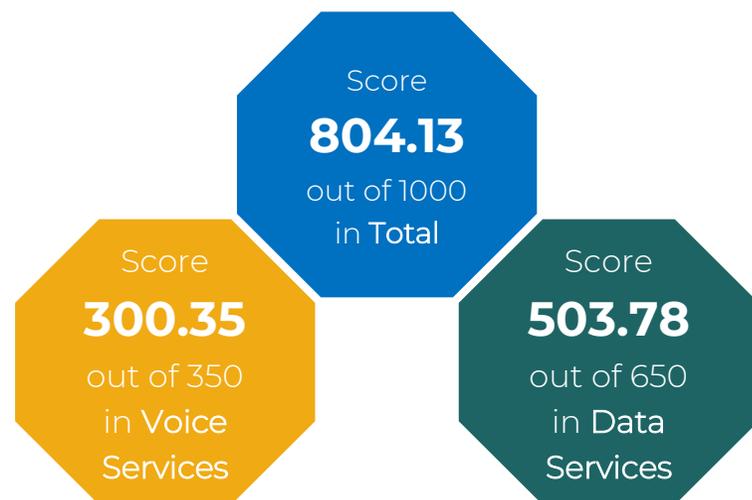MOBILE NETWORKS
IN BOSNIA AND HERZEGOVINA

NOVEMBER 2024

BOSNIA AND HERZEGOVINA'S
BEST MOBILE NETWORK

Mobile networks can be compared in terms of quality through a combined assessment of accessibility, reliability, and quality of typical telecommunication services.

The results of an extensive and complex testing procedure are translated into ranking points and the ranking result reflects the overall end-user experience.

With an overall score of 804.13 points, m:tel achieved the highest score, followed by HT Eronet and then BH Telecom.

Score
804.13
out of 1000
in **Total**

Score
300.35
out of 350
in **Voice Services**

Score
503.78
out of 650
in **Data Services**

Quality
assessment
of modern
communication
networks

BENCHMARKING
METHODOLOGY

NET CHECK pairs engineering expertise with statistically rigorous methodologies in order to collect data on mobile network performance.

The focus is on precise, unbiased and balanced comparison between different mobile networks.

Different levels of service are evaluated, ranging from basic functionality to full technology potentials.

The needed amount of data is obtained through extensive drive testing in numerous cities various in size and along roads connecting them.

The Benchmarking Methodology is updated once a year, staying on top of the industry trends.

350.00 pts
VOICE Overall

1000.00 pts
Ranking Points
OVERALL

650.00 pts
DATA Overall
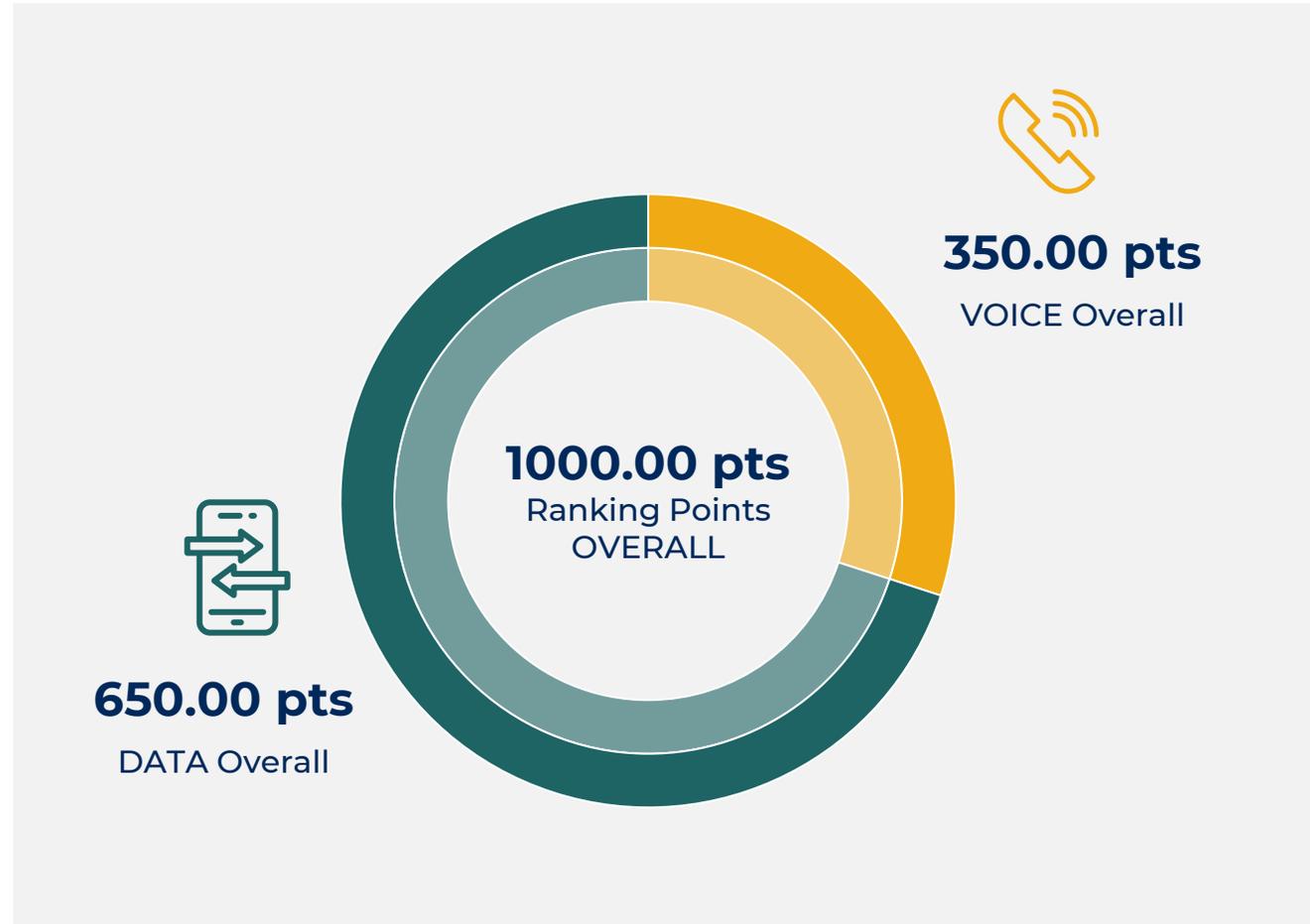
MEASUREMENT
EQUIPMENT

SwissQual Smart Benchmarker produced by the market leader Rohde & Schwarz was used. The measuring equipment was placed in the roof box of a passenger car, executing predefined voice and data service testing sequences.

The mobile phones that are a part of the measuring system were cooled down to avoid overheating due to sun and extensive use.

For all tests current models of Samsung Android smartphones were used.

This approach allows for simultaneous performance measurement off all available mobile networks in the same locations.

NET CHECK places a strong emphasis on utilizing high-quality, cutting-edge measurement technology for all tests

DRIVE TEST ROUTE
& MEASUREMENT SETUP

MEASUREMENT PERIOD: 5th – 30th of NOVEMBER 2024
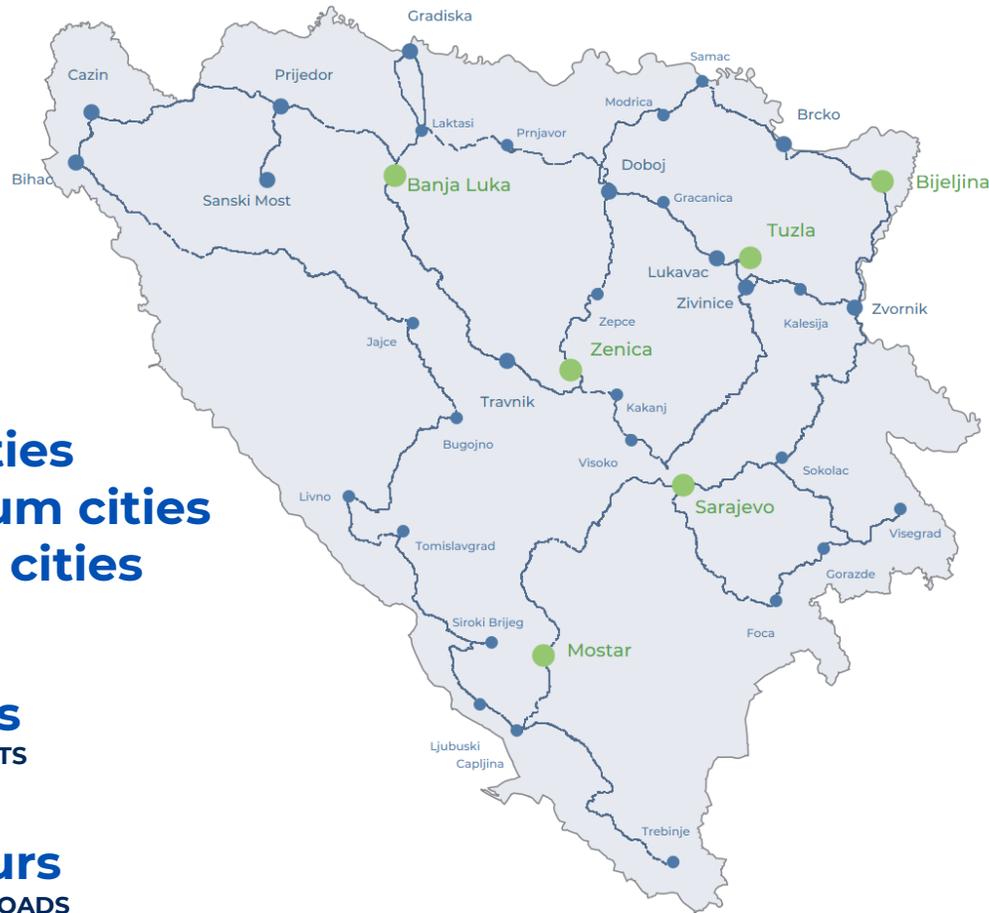
6 big cities
**11 medium cities**
21 small cities
DRIVE TESTS

98 hours
CITY DRIVE TESTS

42.5 hours
CONNECTING ROADS

	VOICE SERVICES	DATA SERVICES
MEASUREMENT DEVICE	Samsung S23+	Samsung S23+
MEASUREMENT EQUIPMENT	SwissQual Smart Benchmarker (Rohde & Schwarz)	SwissQual Smart Benchmarker (Rohde & Schwarz)
MEASUREMENT OBJECTIVE	Cities and Connecting Roads	Cities and Connecting Roads
SAMPLE COUNT	~ 2,700 calls per operator	~ 30,300 tests per operator
TEST CASE SCENARIO	Max Call Setup Time: 30 (s) Call duration: 120 (s) Call window: 155 (s) Call mode: VoLTE preferred Scenario: 1 x WhatsApp Call + 4 x VoLTE preferred (2 x Classic Call + 2 x MultiRAB)	YouTube (livestream HD) Web Browsing (Kepler as static, fokus, klix, mondo, nezavisne, OLX, google, Instagram, and wikipedia as dynamic) Download and Upload tests: • HTTP time based (7s): FDTT DL / FDTT UL • HTTP file based: FDFS DL/ UL (10MB/5MB) Interactivity tests

OVERALL
RESULTS

m:tel is the best ranked operator

HT Eronet took second place

BH Telecom ranked third
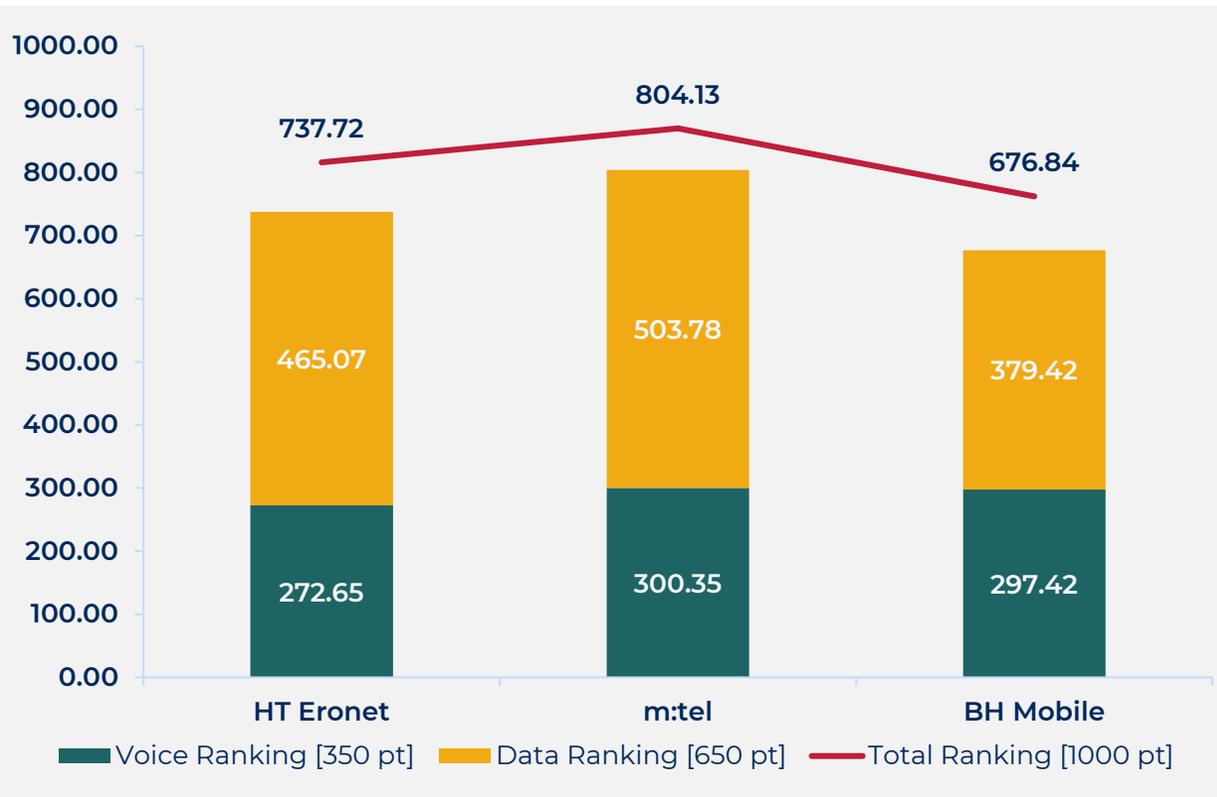
OVERALL RESULTS

804.13 pt

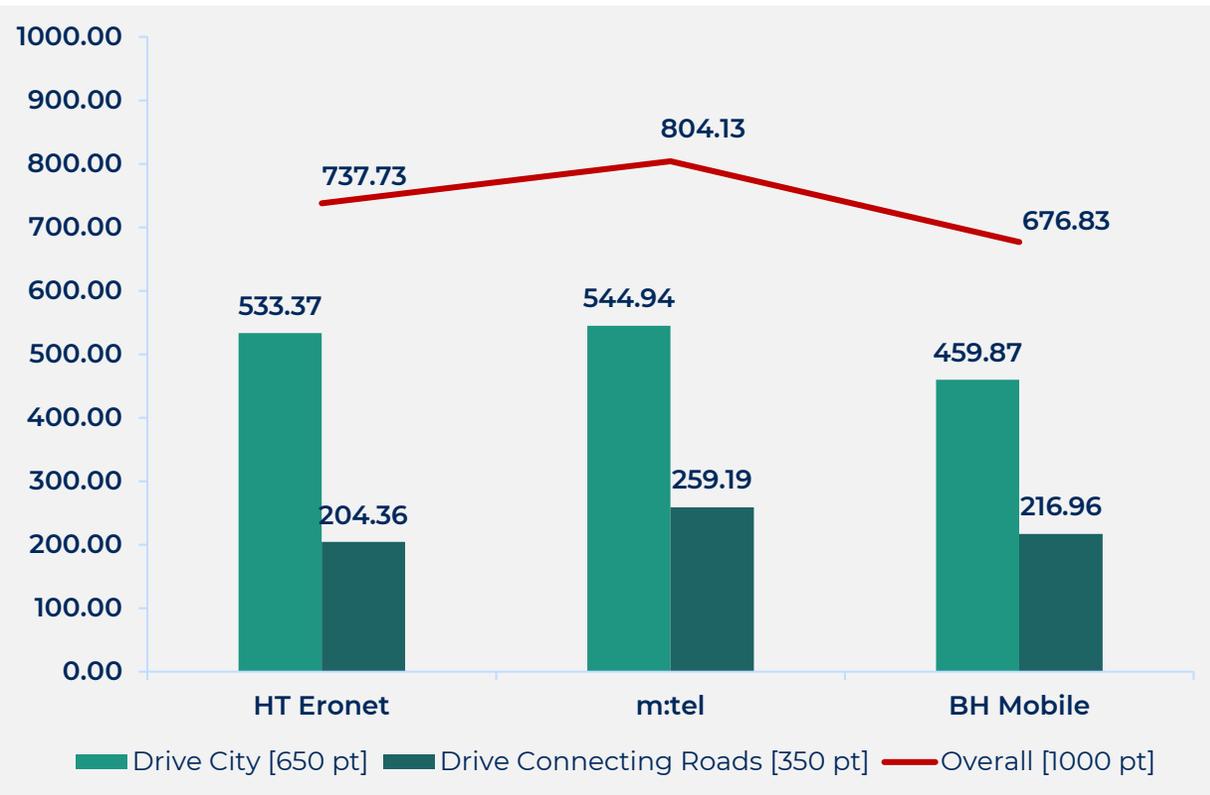
#1: m:tel

m:tel *imate prijatelje!*

RANKING PER MODULE
RESULTS

m:tel is best ranked in the city module as well as on connecting roads

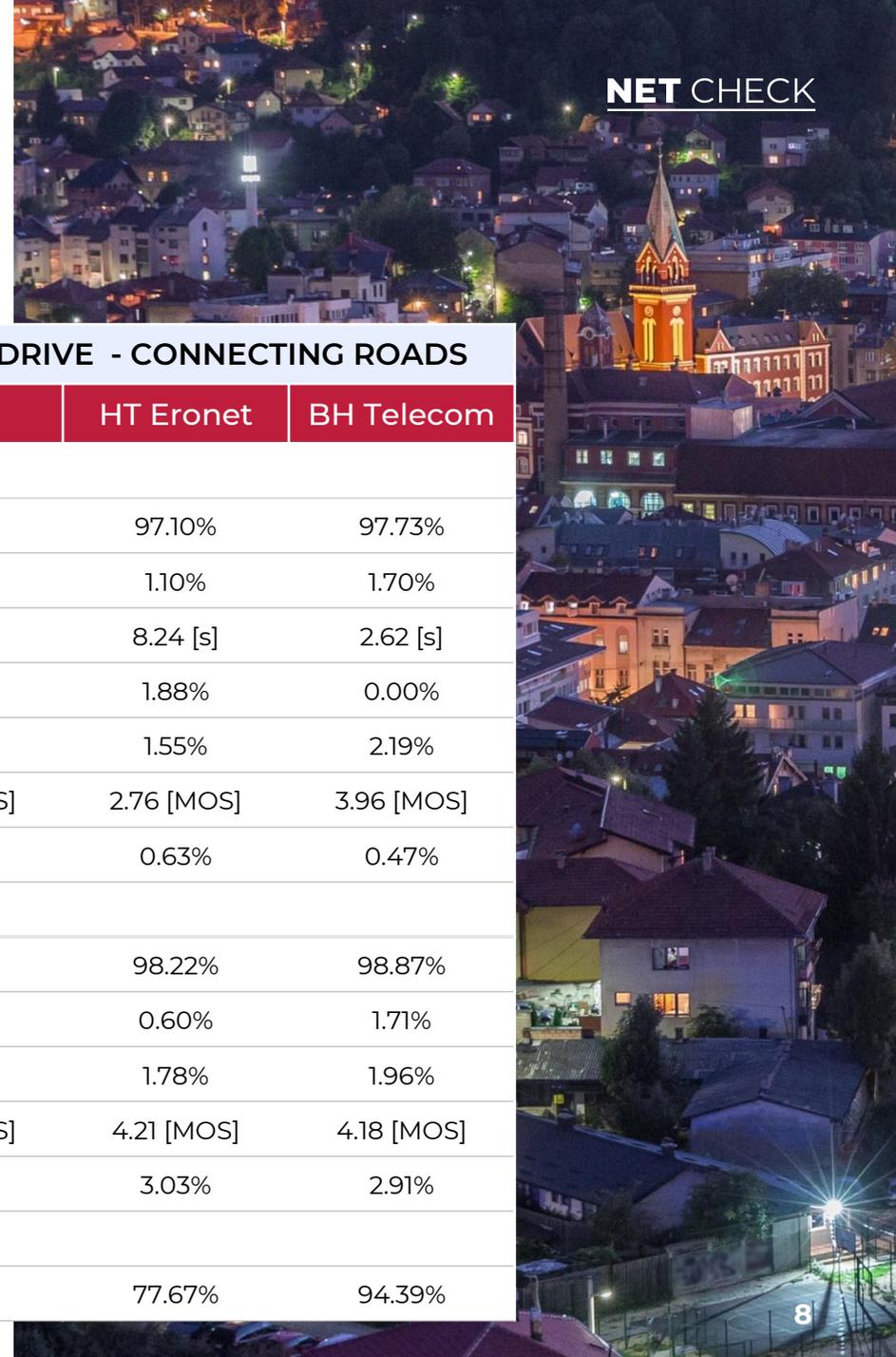Legend: Drive City [650 pt] | Drive Connecting Roads [350 pt] | Overall [1000 pt]

VOICE & DATA
RESULTS

m:tel is the best mobile network in both **voice and data** evaluation

Legend: Voice Ranking [350pt] | Data Ranking [650pt] | Total Ranking [1000pt]
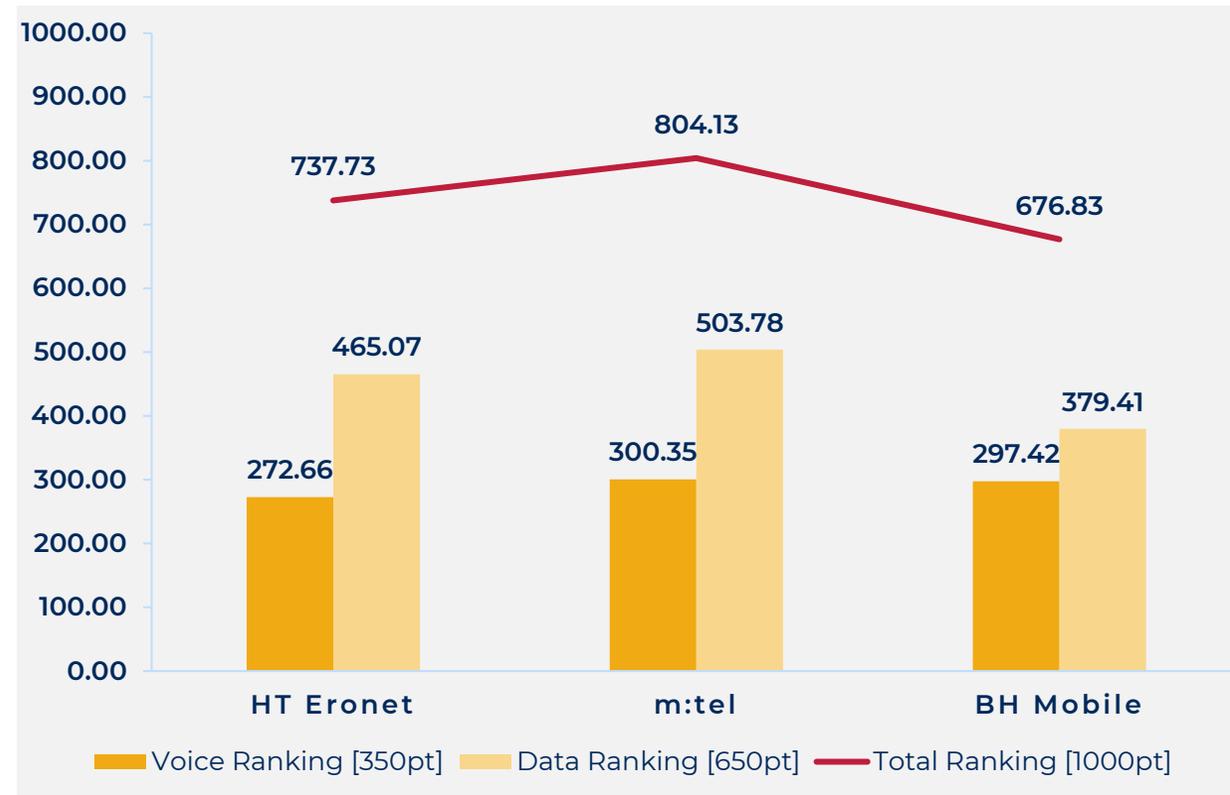
VOICE RESULTS
DETAILS

Ranking Identifiers	DATA DRIVE - CITY			DATA DRIVE - CONNECTING ROADS		
	m:tel	HT Eronet	BH Telecom	m:tel	HT Eronet	BH Telecom
CLASSIC CALLS						
Call Setup Success Ratio	98.92%	99.59%	99.46%	97.86%	97.10%	97.73%
Dropped Call Ratio	0.82%	0.61%	0.07%	1.40%	1.10%	1.70%
AVG Call Setup Time	2.67 [s]	7.83 [s]	2.66 [s]	2.80 [s]	8.24 [s]	2.62 [s]
Call Setup Time > 15 s Ratio	0.00%	2.58%	0.00%	0.31%	1.88%	0.00%
MOS <= 1.6 RATIO	1.14%	0.74%	1.49%	1.73%	1.55%	2.19%
POLQA AVG MOS	4.61 [MOS]	2.75 [MOS]	3.97 [MOS]	4.53 [MOS]	2.76 [MOS]	3.96 [MOS]
Disturbed and Impaired Call Ratio	0.21%	0.20%	0.54%	0.47%	0.63%	0.47%
WHATSAPP CALLS						
Call Setup Success Ratio	100.00%	99.76%	99.06%	99.43%	98.22%	98.87%
Dropped Call Ratio	0.00%	0.24%	0.00%	1.71%	0.60%	1.71%
MOS <= 1.6 RATIO	0.92%	0.24%	0.59%	1.31%	1.78%	1.96%
POLQA AVG MOS	4.25 [MOS]	4.31 [MOS]	4.26 [MOS]	4.25 [MOS]	4.21 [MOS]	4.18 [MOS]
Disturbed and Impaired Call Ratio	0.24%	0.47%	0.24%	2.33%	3.03%	2.91%
MULTI RAB DATA						
Multi RAB Data Success Ratio	99.86%	91.75%	98.29%	98.65%	77.67%	94.39%

DATA RESULTS
DETAILS (1/2)

NET CHECK

Ranking Identifiers	DATA DRIVE - CITY			DATA DRIVE - CONNECTING ROADS		
	m:tel	HT Eronet	BH Telecom	m:tel	HT Eronet	BH Telecom
DOWNLOAD (File Size 10MB)						
FDFS DL Success Ratio (%)	99.34%	98.97%	96.59%	98.85%	94.52%	96.01%
FDFS DL Transfer Time [s]	5.30 [s]	4.05 [s]	7.26 [s]	6.45 [s]	6.48 [s]	8.31 [s]
UPLOAD (File Size 5MB)						
FDFS UL Success Ratio (%)	99.45%	99.40%	99.54%	97.83%	93.33%	97.33%
FDFS UL Transfer Time [s]	2.39 [s]	2.26 [s]	3.62 [s]	4.17 [s]	4.74 [s]	5.44 [s]
DOWNLOAD (Test Duration 7 seconds)						
FDTT DL Throughput > 2Mbps (%)	99.84%	99.15%	95.38%	98.88%	96.17%	97.42%
FDTT DL Throughput > 5Mbps (%)	97.96%	95.03%	87.80%	95.77%	90.63%	88.40%
FDTT DL Throughput > 20Mbps (%)	80.72%	73.64%	52.12%	62.19%	57.65%	42.91%
FDTT DL Throughput > 100Mbps (%)	13.82%	6.39%	0.49%	8.83%	4.75%	0.52%
DL 90 PCTL Data Rate [Mbit/s]	112.48 [Mbit/s]	88.27 [Mbit/s]	54.38 [Mbit/s]	95.03 [Mbit/s]	76.07 [Mbit/s]	40.79 [Mbit/s]

9
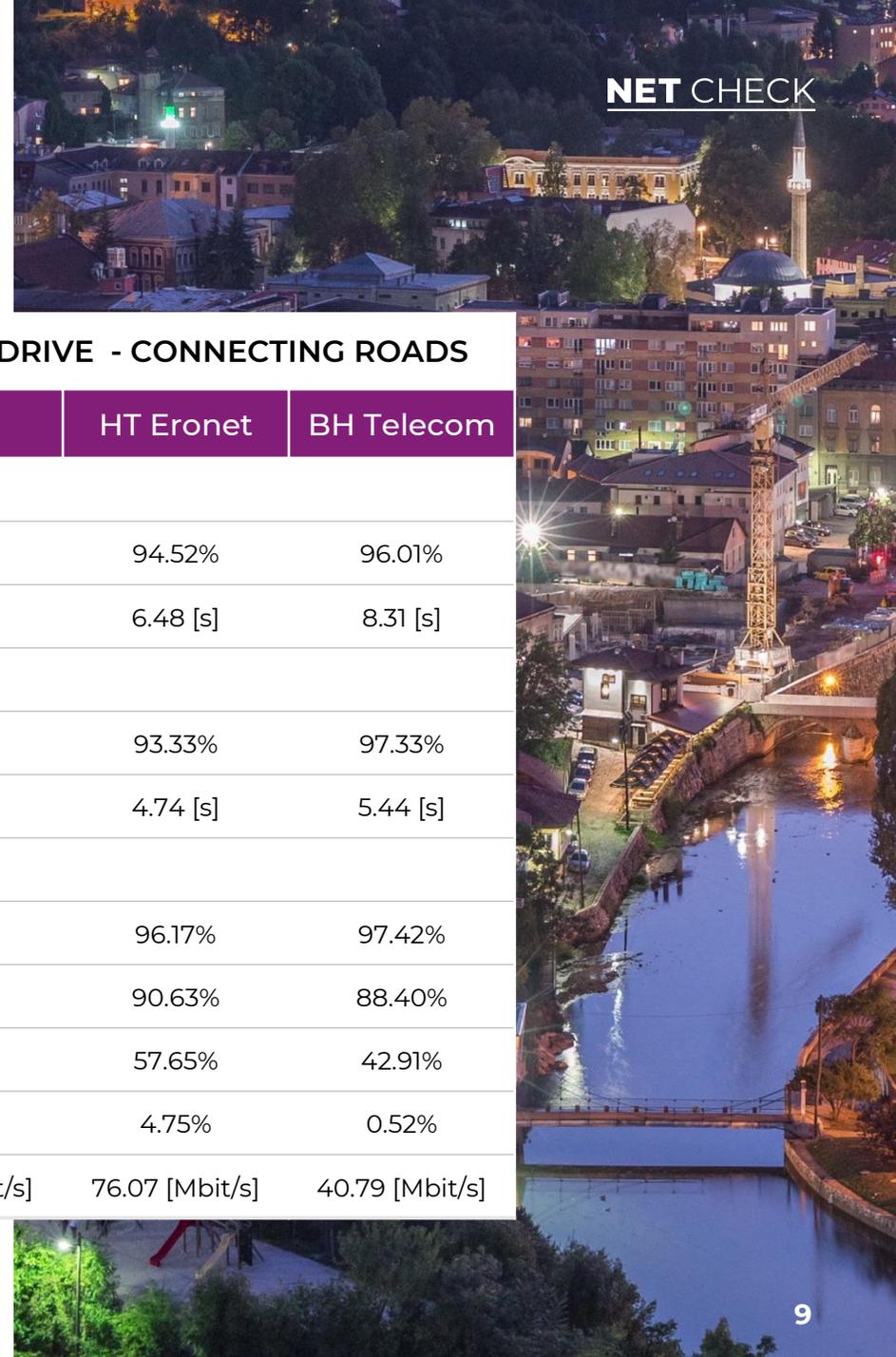
DATA RESULTS
DETAILS (2/2)
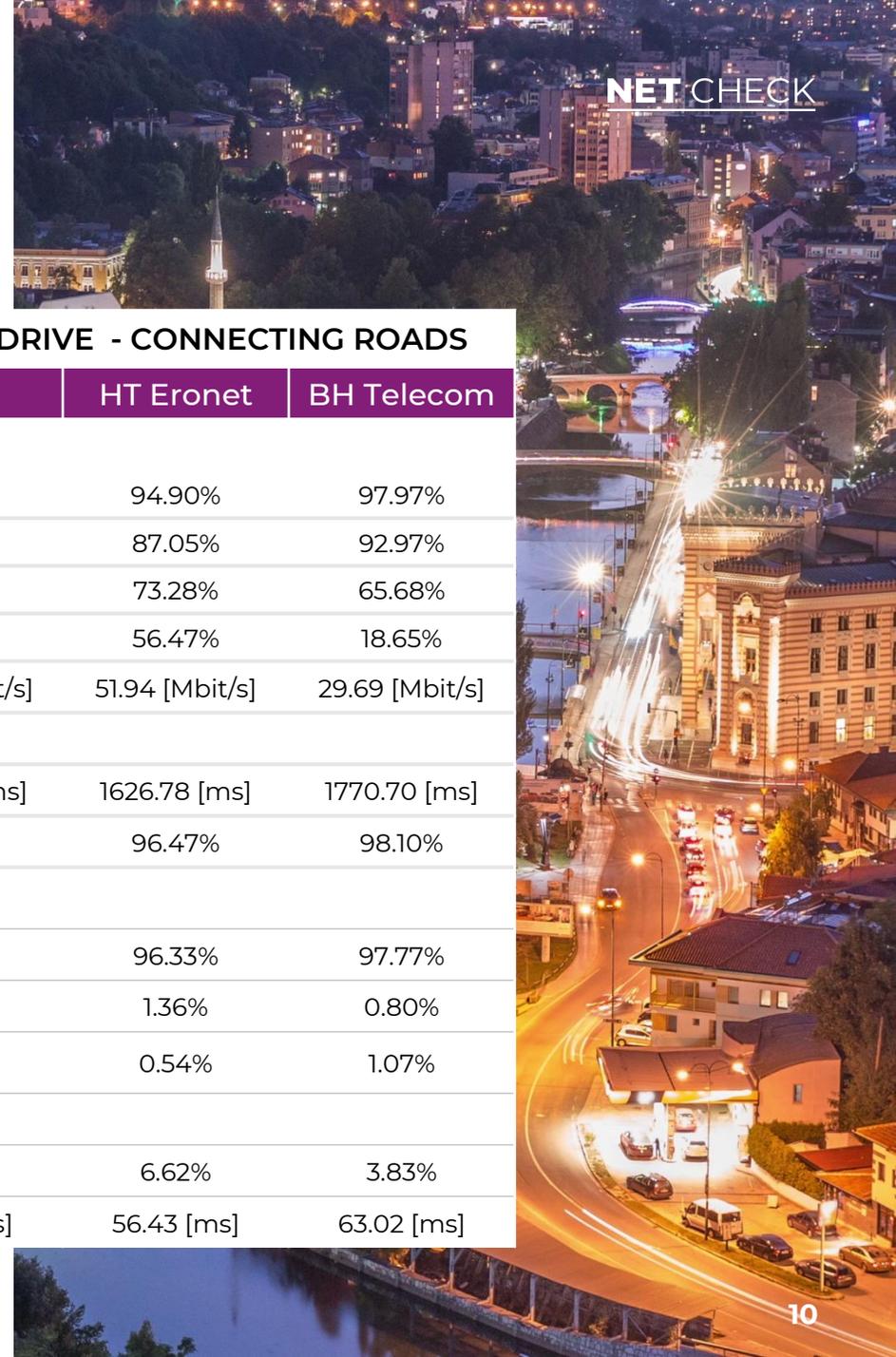
Ranking Identifiers	DATA DRIVE - CITY			DATA DRIVE - CONNECTING ROADS		
	m:tel	HT Eronet	BH Telecom	m:tel	HT Eronet	BH Telecom
UPLOAD (Test Duration 7 seconds)						
FDTT UL Throughput > 1Mbps (%)	99.83%	99.62%	99.02%	97.51%	94.90%	97.97%
FDTT UL Throughput > 3Mbps (%)	98.99%	98.52%	97.70%	93.59%	87.05%	92.97%
FDTT UL Throughput > 10Mbps (%)	93.90%	95.78%	87.54%	79.84%	73.28%	65.68%
FDTT UL Throughput > 20Mbps (%)	80.35%	84.87%	52.47%	57.46%	56.47%	18.65%
UL 90 PCTL Data Rate [Mbit/s]	79.81 [Mbit/s]	61.01 [Mbit/s]	35.12 [Mbit/s]	62.06 [Mbit/s]	51.94 [Mbit/s]	29.69 [Mbit/s]
BROWSING (Web Browsing)						
HTTP Browsing Time to 1MB [s]	1297.06 [ms]	1301.81 [ms]	1665.89 [ms]	1434.64 [ms]	1626.78 [ms]	1770.70 [ms]
HTTP Browsing Success Ratio (%)	99.45%	99.63%	98.82%	99.10%	96.47%	98.10%
VIDEO STREAM (YouTube Live Stream HD)						
Video Stream Success Ratio (%)	99.62%	99.84%	99.04%	99.25%	96.33%	97.77%
Video Stream TTFP >= 10 s Ratio (%)	0.33%	0.38%	0.91%	0.25%	1.36%	0.80%
Video Stream Irritating Experience Ratio (%)	0.05%	0.16%	0.51%	0.63%	0.54%	1.07%
INTERACTIVITY						
Interactivity Packet Error Ratio (%)	3.25%	1.16%	3.52%	5.12%	6.62%	3.83%
Interactivity Median RTT [ms]	57.50 [ms]	55.82 [ms]	64.02 [ms]	57.66 [ms]	56.43 [ms]	63.02 [ms]

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