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الهيئة العامة للاتصالات وتقنية المعلومات

COMMUNICATION & INFORMATION TECHNOLOGY REGULATORY AUTHORITY

Mobile Network Operators Benchmark Report 2025

Radio Coverage Measurement and Benchmarking for Wireless Mobile Services in Kuwait (Phase Two)

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Introduction

The Communications and Information Technology Regulatory Authority (CITRA) is committed to ensuring that mobile communication services across the State of Kuwait meet the highest levels of quality, reliability, and coverage. As part of this mandate, CITRA conducted this nationwide benchmarking campaign to objectively evaluate the performance of mobile networks and support the country's digital transformation goals under Kuwait Vision 2035.

This report presents the findings of the National Mobile Network Benchmarking Campaign – Phase Two, covering extensive measurements taken from 3-Jul-2025 to 2-Oct-2025 across urban and rural areas, highways, islands, and indoor environments. More than 18,000 voice tests and over 250,000 data tests were performed adhering to the internationally recognized European Telecommunications Standards Institute (ETSI), International Telecommunication Union (ITU), and Network Performance Score (NPS) standards and methodologies throughout.

The campaign and analysis were conducted and delivered through the partnership of Rohde & Schwarz and Future Integrated Technologies. The former being an international pioneer since 1933 in test & measurement, secure communications, and spectrum monitoring solutions for critical industries and national regulators, and the latter being a local leader since 1996 in delivering advanced telecommunications, RF engineering, and integrated technology solutions for government, enterprise, and national-scale projects in Kuwait.

The goal of this report is to provide an objective overview of mobile network performance across the State of Kuwait. Through this national assessment, CITRA aims to promote transparency, support ongoing improvements, and ensure that mobile services continue to meet the expectations of users throughout the country.

Disclaimer

The information contained in this report is provided by the Communications and Information Technology Regulatory Authority (CITRA) for general information purposes only. While every effort has been made to ensure that the data presented is accurate at the time of publication, the report is not intended to serve as the basis for any commercial, financial, regulatory, or investment decision, nor should it be construed as a recommendation or endorsement of any specific technology, service, or mobile network.

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Readers should acknowledge that mobile networks are continuously evolving, with operators regularly optimizing, upgrading, and reconfiguring their infrastructure. As a result, network performance may change between the measurement period and the time this report is read.

Standards

To ensure accuracy, neutrality, and international alignment, this benchmarking campaign was conducted in accordance with globally recognized telecommunications measurement standards. These standards define the technical methods, Key Performance Indicators (KPIs), scoring rules, and quality criteria used to assess mobile network performance across voice, data, video, browsing, and latency domains. By adhering to these established frameworks from ETSI and ITU, CITRA guarantees that all measurements and results yielded from this campaign are consistent, comparable, and reflective of best-practice principles adopted by regulators and industry bodies worldwide. The following is a summary of the key standards referenced throughout this assessment.

Scoring Methodology:

Network Performance Score (NPS): A unified scoring framework that combines weighted KPIs across voice, data, video, browsing, coverage, and reliability into one overall mobile network performance score.

Benchmarking Standard:

ETSI TR 103 559: Speech and multimedia Transmission Quality (STQ); Best practices for robust network QoS benchmark testing and scoring

KPIs Standards:

Telephony:

- **ETSI TS 102 250-2:** Speech and multimedia Transmission Quality (STQ); QoS aspects for popular services in mobile networks; Part 2: Definition of Quality of Service parameters and their computation

Speech Quality:

- **ITU-T P.863 'POLQA v3':** Third-generation perceptual speech quality test method standardized as P.863

Video/YouTube:

- **ETSI TR 101 578:** Speech and multimedia Transmission Quality (STQ); QoS aspects of TCP-based video services like YouTube™

Video Quality:

- ITU-T J.343.1: Hybrid-NRe objective perceptual video quality measurement for HDTV and multimedia IP-based video services in the presence of encrypted bitstream data

Data Transfer:

- ETSI TS 102 250-2: Speech and multimedia Transmission Quality (STQ); QoS aspects for popular services in mobile networks; Part 2: Definition of Quality of Service parameters and their computation

Browsing:

- ETSI TS 102 250-2: Speech and multimedia Transmission Quality (STQ); QoS aspects for popular services in mobile networks; Part 2: Definition of Quality of Service parameters and their computation
- ETSI TR 103 733: Speech and multimedia Transmission Quality (STQ); Best practices of testing the performance of web content delivery

Latency & Interactivity:

- ITU-T G.1051: Latency measurement and interactivity scoring under real application data traffic patterns

Methodology and Scored KPIs

To evaluate mobile network performance in a clear, consistent, and internationally aligned manner, the Network Performance Score (NPS) methodology from Rohde & Schwarz was adopted. NPS is an integrated scoring framework that translates complex Quality of Service (QoS) and Quality of Experience (QoE) measurements into a unified, comparable performance index ranging from 0 to 1000 points. The method is fully aligned with ETSI TR 103 559, ensuring that the assessment adheres to current global best-practice benchmarking standards.

NPS combines detailed technical KPIs across voice and data services, reflecting the performance characteristics most relevant to subscribers' everyday experience. The score assigns 40% weight to Voice services and 60% weight to Data services, ensuring a balanced representation of both traditional and modern mobile usage patterns.

To ensure the national score accurately reflects real-world mobile usage in Kuwait, the overall NPS result is further distributed across five geographic categories according to their relative population density and service-usage importance. Urban areas, where the majority of the population reside and mobile demand is highest, contribute 65% of the total score. Rural areas, Indoor locations, and Highways, each essential for nationwide mobility and daily accessibility, contribute 10% each while Islands contribute 5%. These weightings ensure that the final score represents the environments where users rely on mobile services most, while still capturing nationwide service availability.

Below are the KPIs that were used to calculate the overall score according to NPS and a brief explanation of each KPI.

Voice KPIs (40% Weight)

Call Setup Success Ratio (CSSR) (Setup < 30s): Percentage of call attempts that successfully connect within 30 seconds.

Call Drop Ratio (CDR) (90s call duration): Percentage of active calls that disconnect unexpectedly before reaching 90 seconds.

Call Setup Time (CST) Average: Average time it takes for a call to begin ringing after being dialed.

CST > 10s Ratio (Excess Ratio): Percentage of calls that take longer than 10 seconds to set up, indicating slow call establishment.

CST 10th Percentile: Average of the fastest 10% call setup time results.

POLQA MOS Average: Overall average speech-quality score (1–5 scale) based on how clear and natural calls sound.

POLQA MOS 90th Percentile: Speech-quality score for the best 10% of calls, reflecting ideal listening conditions.

POLQA MOS < 1.6 Ratio: Percentage of calls with very poor voice quality (distorted, unclear, or unintelligible).

Data KPIs (60% Weight)

HTTP Throughput & Transfer KPIs

HTTP Success Ratio (Transfer < 40s): Percentage of file transfers completed successfully within 40 seconds.

HTTP Download Throughput Average: Average download speed achieved across all test samples.

HTTP Download Throughput 10th Percentile: Speed in the worst 10% of cases—shows performance under weak or congested conditions.

HTTP Download Throughput 90th Percentile: Speed in the best 10% of cases—shows network capability in optimal conditions.

HTTP Upload Throughput Average: Average upload speed achieved during file transfers.

HTTP Upload Throughput 10th Percentile: Upload speed experienced in the lowest 10% of conditions.

HTTP Upload Throughput 90th Percentile: Upload speed achieved in the best 10% of tests.

Browsing KPIs

Browsing Success Ratio (Duration < 5s): Percentage of web pages that load successfully within 5 seconds.

Browsing Duration Average: Average time taken for the 1st 1MB of a web page to load.

Social Media KPIs

Social Media Success Ratio (Duration < 15s): Percentage of posts/uploads completed successfully within 15 seconds.

Social Media Duration: Average time needed to upload a typical social media file.

Video KPIs

Video Success Ratio (Access < 15s): Percentage of video streams that start successfully within 15 seconds.

Video MOS Average: Average perceptual video-quality score, reflecting clarity, smoothness, and stability.

Video MOS 10th Percentile: Average perceptual video-quality score of the worst 10% results.

Video Time to First Picture Average: Average amount of time it takes for the video to begin playing after pressing "play."

Video Time to First Picture > 10s Ratio: Percentage of video sessions that take more than 10 seconds to start, indicating poor responsiveness.

Excluded KPIs

Ping (Latency)

Indicates the round-trip time for data between the device and server. Lower values mean faster response, but latency is measured separately and not included in NPS.

Table 1 shows the KPIs that contribute to the overall score according to NPS and the used thresholds, assigned weight, and points distribution that were followed in calculating the overall NPS score.

Table 1: Scored KPIs

Test	KPI Name	Threshold		Weighting	Service Weight	Max Points (Urban 65%*)
		Bad	Good			
VOICE	Call Setup Success Ratio (Setup < 30s)	90.0%	100.0%	0.2000	40%	80.0
	Call Drop Ratio (90s call duration)	7.5%	0%	0.2500	40%	100.0
	Call Setup Time Avg	10.0s	3.0s	0.1500	40%	60.0
	CST > 10s Ratio (Excess Ratio)	3.0%	0.0%	0.1000	40%	40.0
	CST 10th Percentile	5.0s	1.0s	0.0500	40%	20.0
	POLQA MOS Avg.	2.5	4.5	0.1000	40%	40.0
	POLQA MOS 90th Percentile	4.0	4.75	0.0500	40%	20.0
	POLQA MOS < 1.6 Ratio	10.0%	0.0%	0.1000	40%	40.0
						400
DATA	HTTP Success Ratio (Transfer < 40s)	80.0%	100.0%	0.0700	60%	42.0
	HTTP DL Throughput Avg.	0	1000 (**)	0.0490	60%	29.4
	HTTP DL Throughput 10th Percentile	0	1000 (**)	0.0630	60%	37.8
	HTTP DL Throughput 90th Percentile	0	1000 (**)	0.0280	60%	16.8
	HTTP UL Throughput Avg.	0	1000 (**)	0.0490	60%	29.4
	HTTP UL Throughput 10th Percentile	0	1000 (**)	0.0630	60%	37.8
	HTTP UL Throughput 90th Percentile	0	1000 (**)	0.0280	60%	16.8
	Browsing Success Ratio (Duration < 5s)	80.0%	100.0%	0.1250	60%	75.0
	Browsing Duration Avg.	3.0s	0.0s	0.1250	60%	75.0
	Social Media Success Ratio (Duration < 15s)	80.0%	100.0%	0.0750	60%	45.0
	Social Media Duration	5.0s	1.0s	0.0450	60%	27.0
	Social Media > 5s Ratio (Excess Ratio)	10.0%	0.0%	0.0300	60%	18.0
	Video Success Ratio (Access < 15s)	80.0%	100.0%	0.1250	60%	75.0
	Video MOS Avg.	3.5	5.0	0.0375	60%	22.5
	Video MOS 10th Percentile	3.0	4.5	0.0250	60%	15.0
	Video Time to First Picture Avg.	5.0s	1.0s	0.0375	60%	22.5
	Video Time to First Picture Avg. > 10s Ratio	10.0%	0.0%	0.0250	60%	15.0
						600
					TOTAL	**1000**

(*) Rural 10%, Highway 10%, Indoor 10%, Island 5%
(**) Throughputs are mapped by a logarithmic function resulting in a number from 0 to 1000

Benchmarking Setup & Configuration

Testing Devices:

- User Equipment (UE): Samsung Galaxy S23+ SM-S916B, Qualcomm SM8550-AC Snapdragon 8 Gen 2 (4 nm), equipped with Rohde & Schwarz QualiPoc, all the used phones were in brand-new condition procured for this campaign.
- RF Scanner: Rohde & Schwarz TSME6

Testing Systems:

- Rohde & Schwarz FreeRider4: a backpack carried for walk-test benchmarking scenarios in indoor locations.
- Rohde & Schwarz BenchMarkerII: a system installed and fixed inside a vehicle for drive-test benchmarking scenarios.

Testing Setup:

- Voice Testing: two UEs – originating UE: A and terminating UE: B – were used per operator in both testing systems. The two UEs performed the test sequence as shown in figure 1.

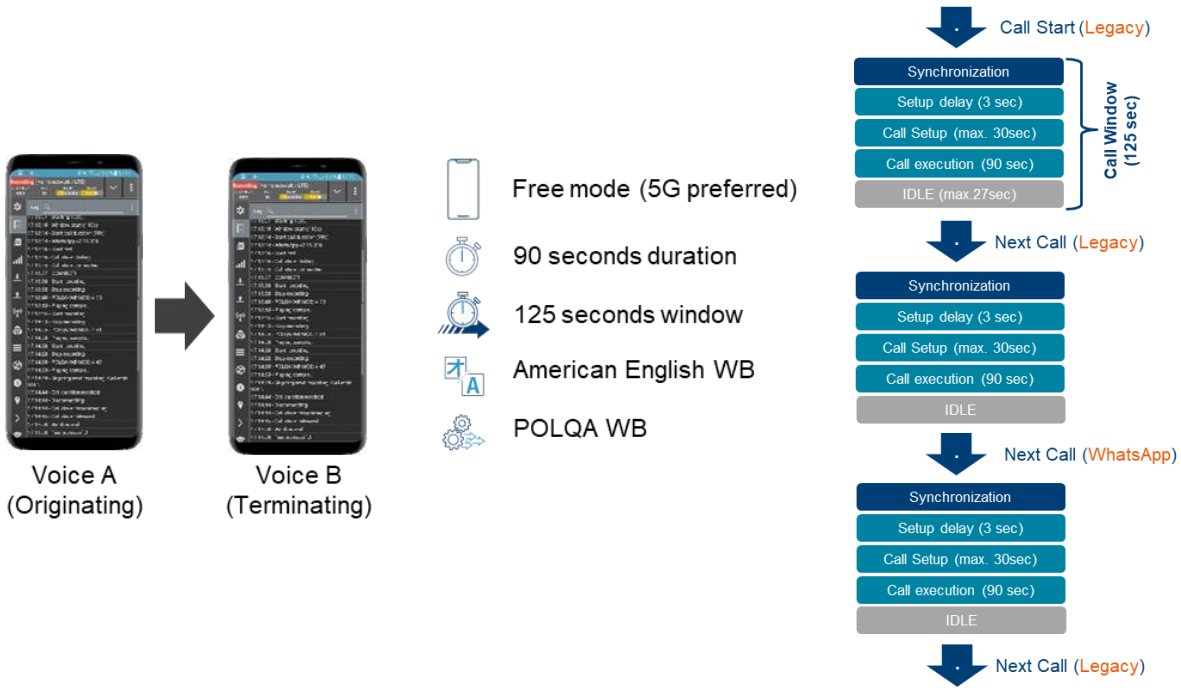

Figure 1: Performed voice testing sequence.

- Data Testing: one UE was used per operator in both systems. The UE performed the test sequence as shown in figure 2.

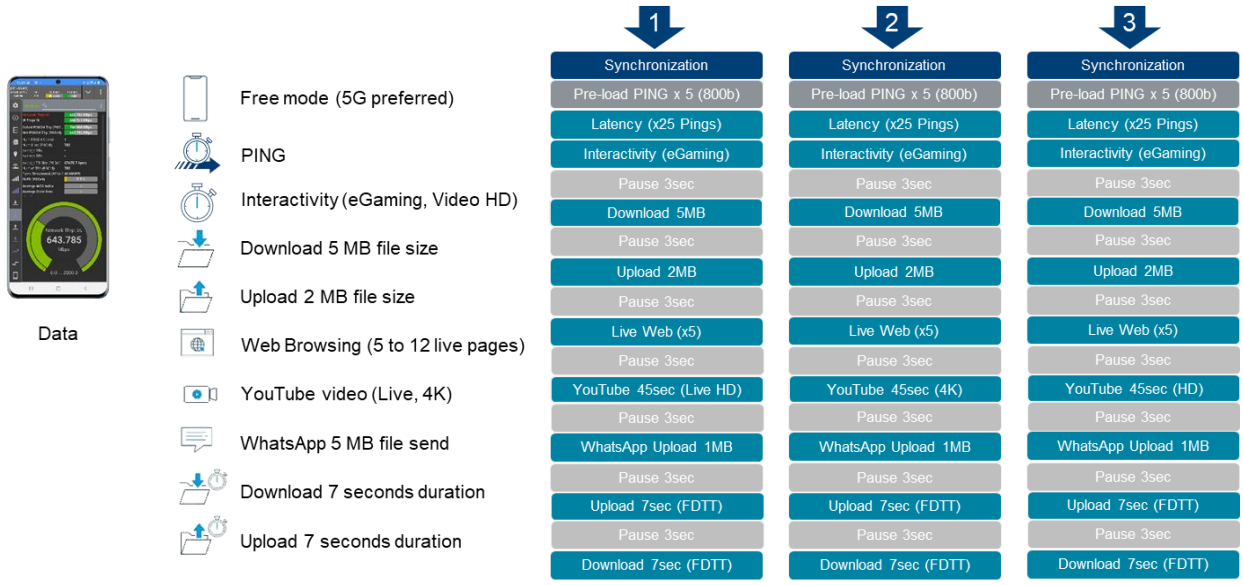

Figure 2: Performed data testing sequence.

Servers Used in Ping Testing:

- Amazon
- Fifa24
- Fortnite
- LOL
- Call of Duty

Dedicated Interactivity Server:

- A dedicated testing server was used locally in Kuwait and hosted by B.Online (Gulfnet Communications Kuwait).

The Used Web Pages for Browsing Services Testing:

- Global:
  - Google.com
  - Wikipedia.org
- Local:
  - Kpay.com.kw
  - Paci.gov.kw
  - Boubyan.bankboubyan.com
  - Moi.gov.kw
  - Kw.opensooq.com

- Myfatoorah.com
- Manpower.gov.kw
- Moh.gov.kw
- Kooora.com

The Used YouTube Videos:

- Livestream: https://www.youtube.com/watch?v=bNyUyrR0PHo
- FHD: https://www.youtube.com/watch?v=7IKCVIX0aTI
- UHD: https://www.youtube.com/watch?v=LXb3EKWsInQ

Key Results

International Position

Compared to the international scores of the mobile network operators in the listed countries that conducted campaigns following the same version of NPS scoring methodology, Kuwait is considered a leader country as all the three mobile network operators in Kuwait achieved overall NPS score over 800 points placing them in the "excellent" performance range, a result matched by only one other country.

Moreover, Kuwait's highest NPS score of 832 points ranks at the very top of global results, surpassed by only a single operator in another country. This places Kuwait among the absolute best-performing mobile markets internationally.

The international comparison and positioning is based on the scores made available and last updated on 2-Nov-2025.

Voice

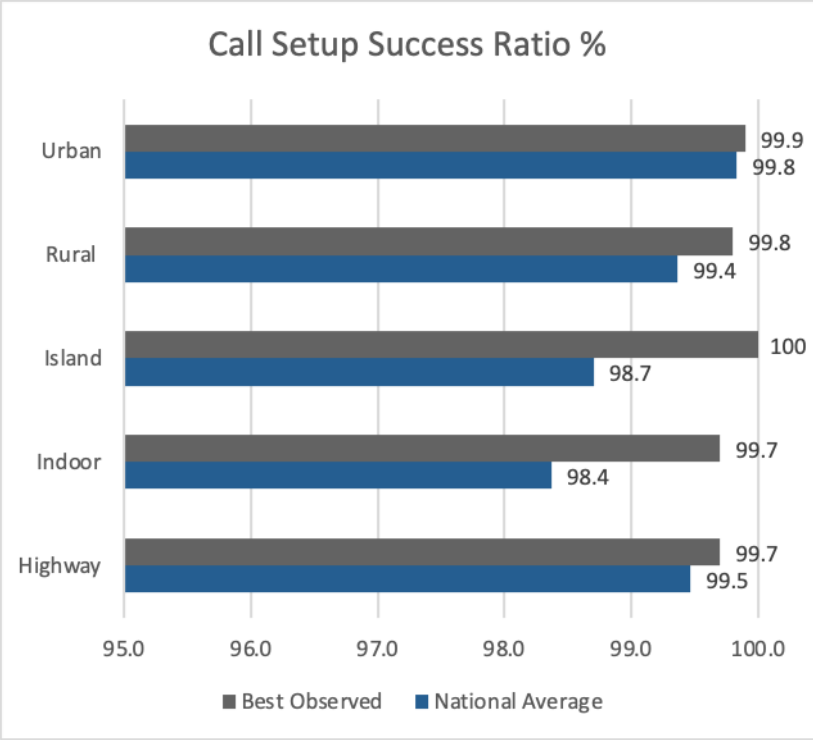

Figure 3: National average and best observed CSSR per category.

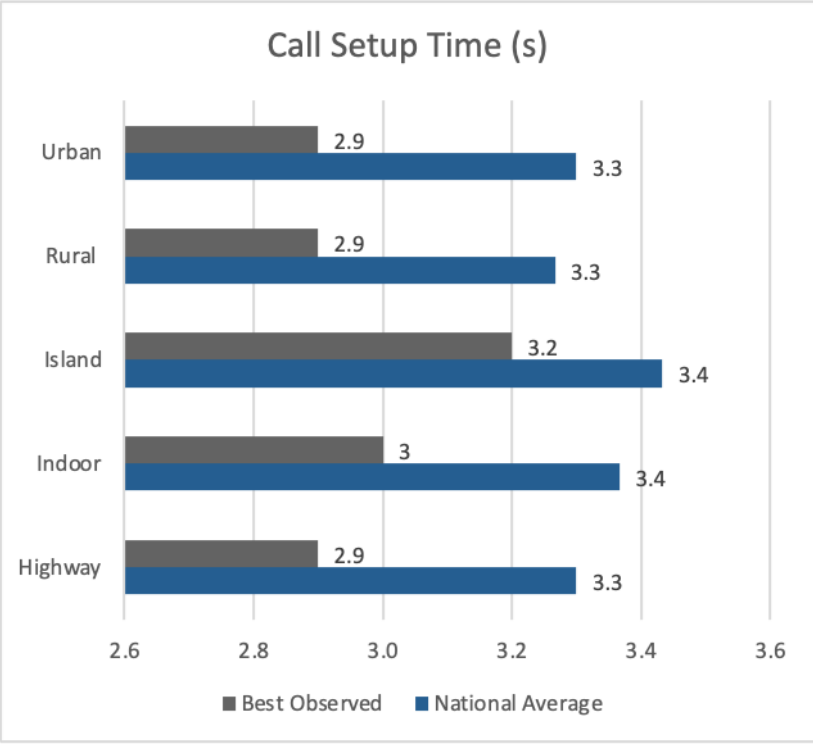

Figure 4: National average and best observed CST per category.

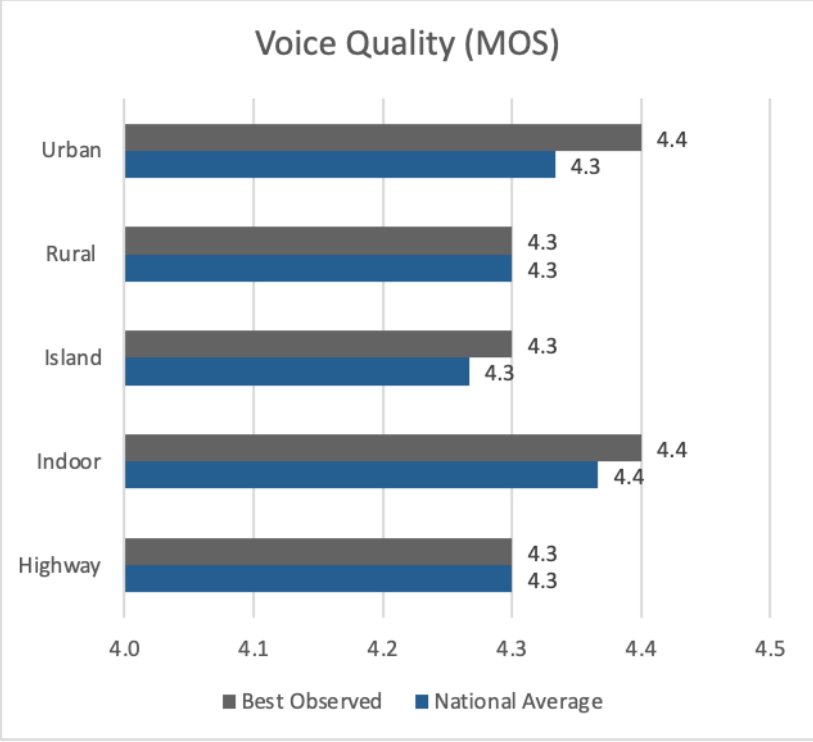

Figure 5: National average and best observed Voice MOS per category.

Data

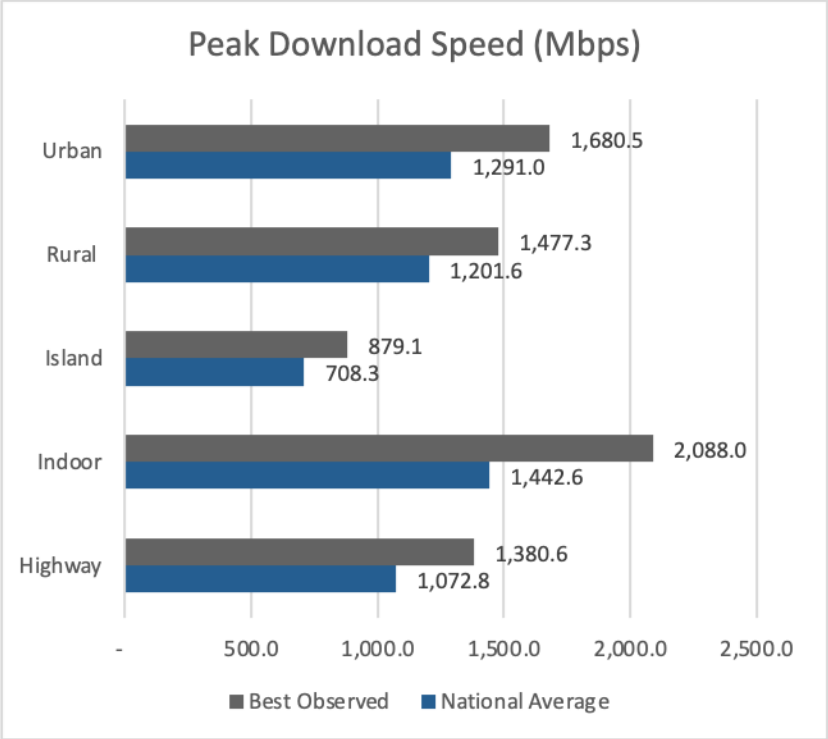

Figure 6: National average and best observed peak (90th perc.) download speed per category.

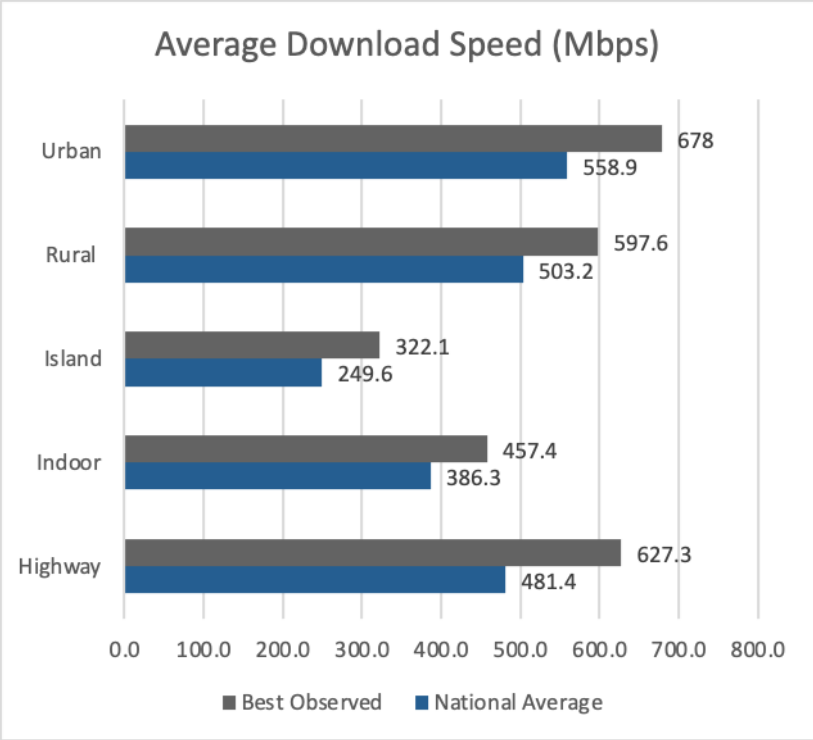

Figure 7: National average and best observed average download speed per category.

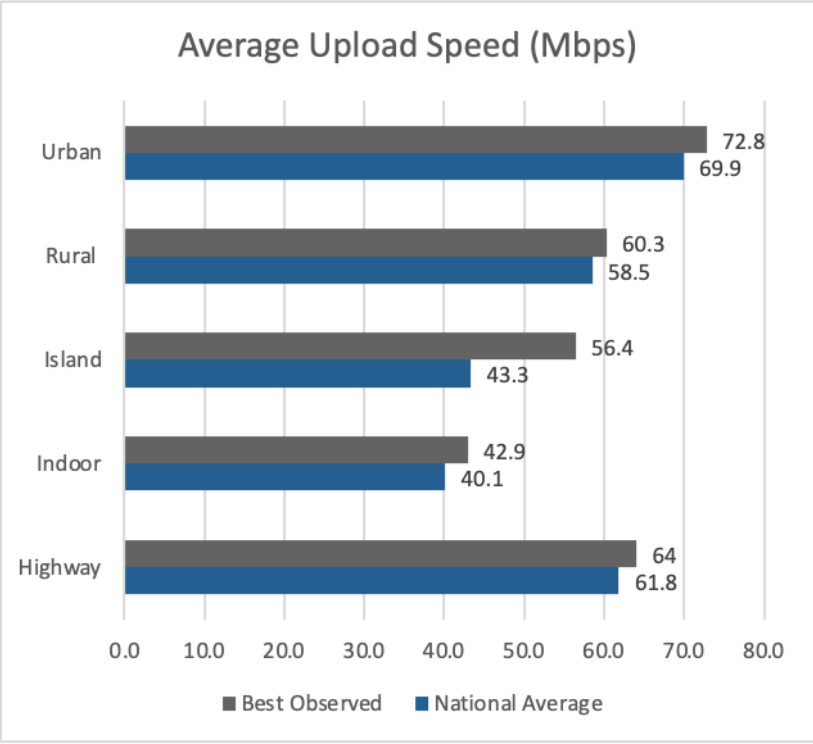

Figure 8: National average and best observed average upload speed per category.

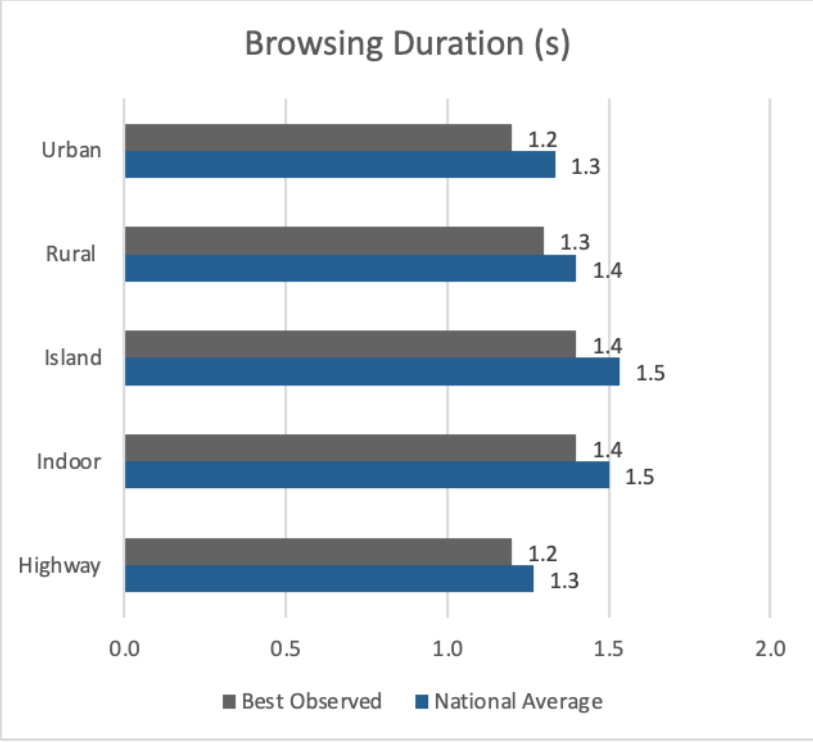

Figure 9: National average and best observed average browsing duration per category.

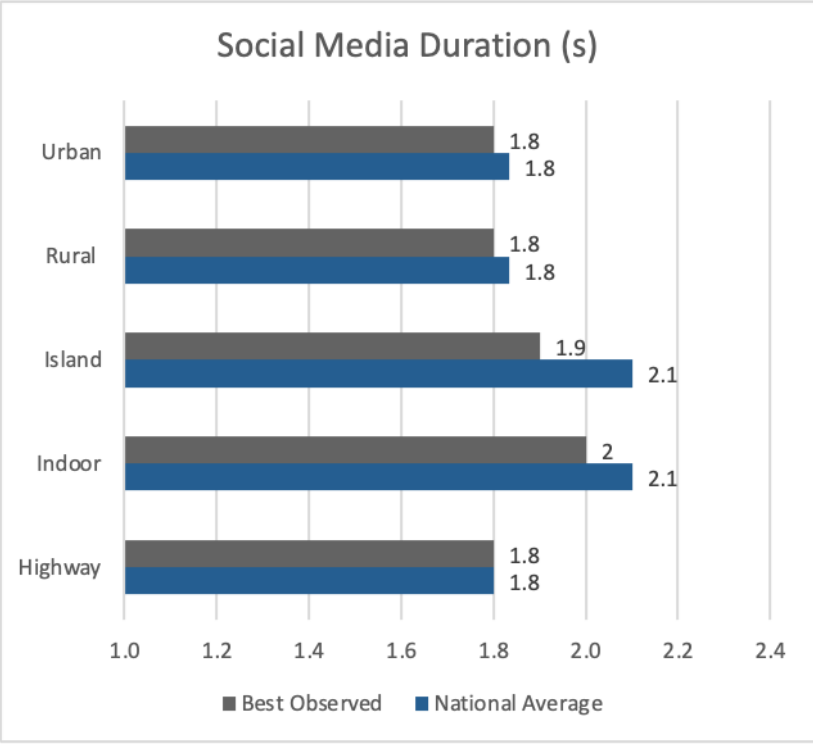

Figure 10: National average and best observed average social media duration per category.

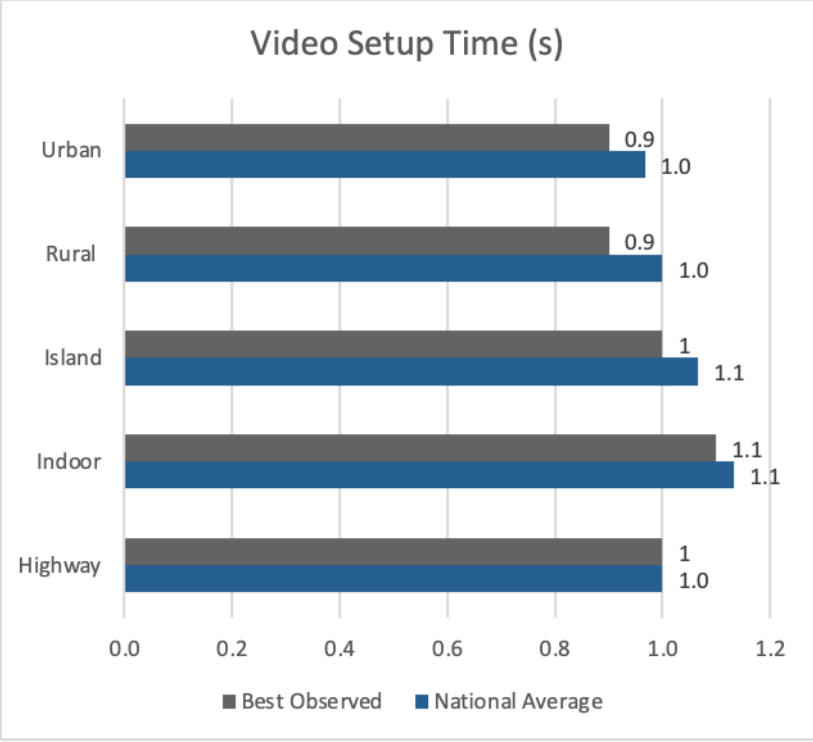

Figure 11: National average and best observed average video setup time per category.

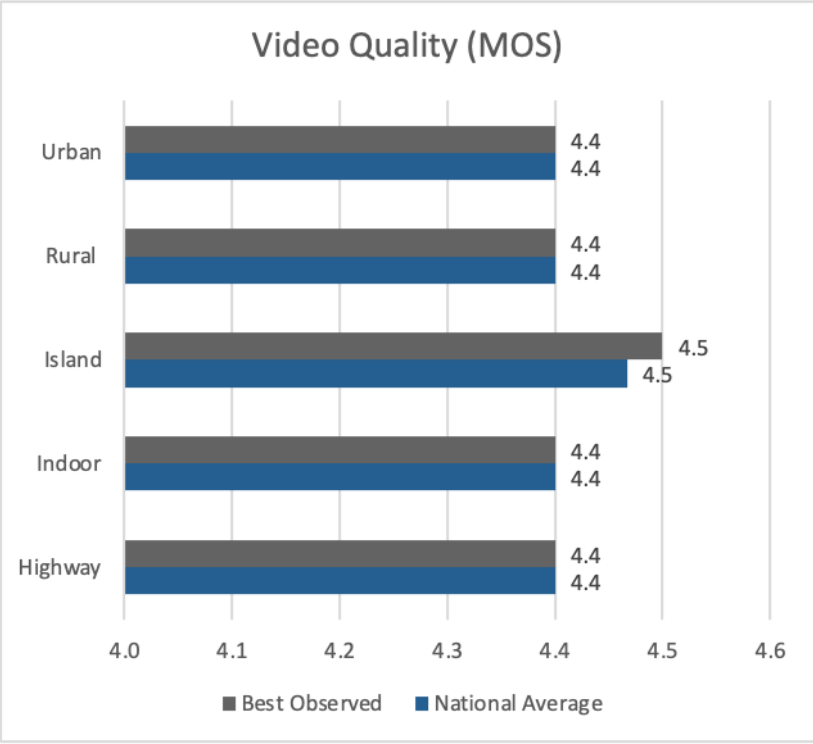

Figure 12: National average and best observed average Video MOS per category.

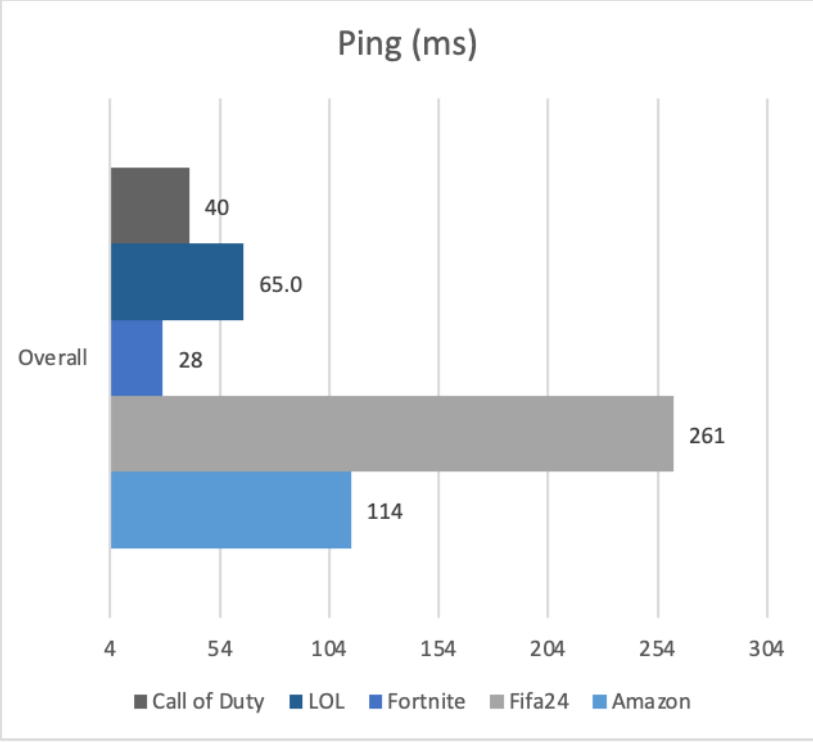

Figure 13: Average ping latency per server.

Coverage

The chart below showcases the nationwide 5G-NR coverage strength of Kuwait's three mobile network operators, presented anonymously. All operators demonstrate exceptionally widespread 5G availability, with "Good" and above coverage levels consistently ranging between 93.87% and 95.67% across the country. This reflects highly robust and reliably accessible 5G footprints across the country.

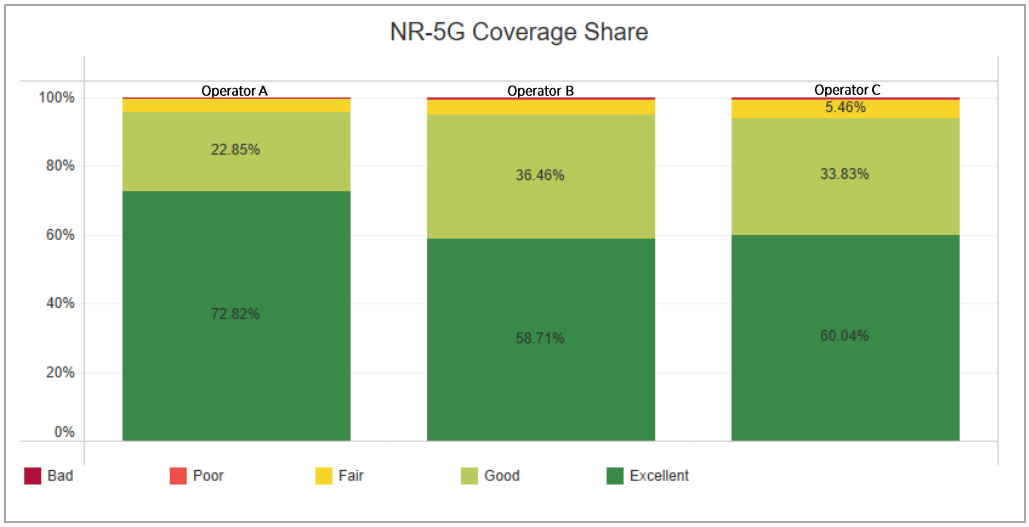

Figure 14: National 5G-NR coverage strength per operator.

The chart below showcases the nationwide LTE coverage strength of Kuwait's three mobile network operators, presented anonymously. All operators demonstrate exceptionally widespread LTE availability, with "Good" and above coverage levels consistently ranging between 96.51% and 99.21% across the country. This reflects highly robust and reliably accessible LTE footprints across the country.

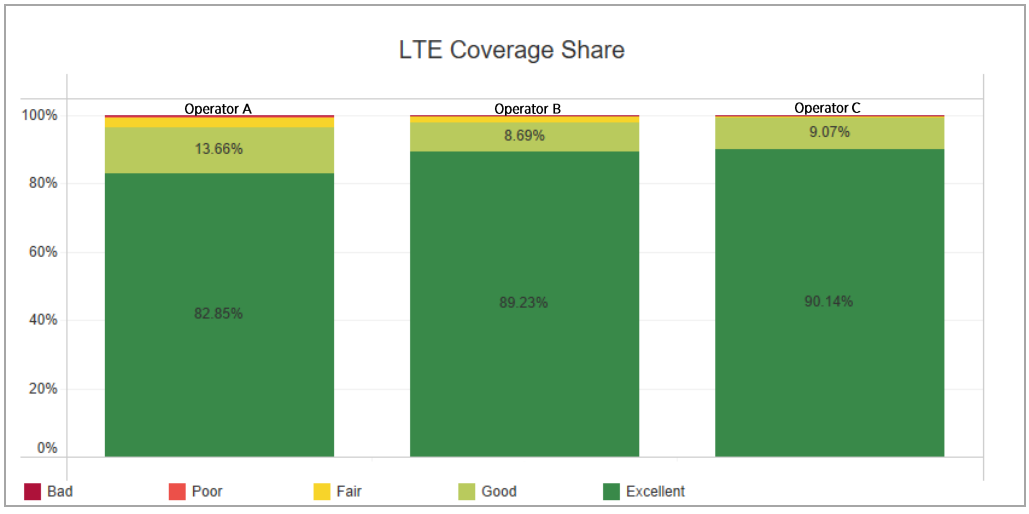

Figure 15: National LTE coverage strength per operator.

Campaign Scope

During this campaign, a total distance of 14,852 Km was driven while covering the urban areas, rural areas, and highways categories. Additionally, throughout the entire campaign, a total of 266,088 samples were collected. The samples are split into 14,148 voice samples and 251,940 data samples.

Further results and KPIs can be accessed on the online map portal. The map portal shows the results from the campaign conducted from 3-Jul-2025 until 2-Oct-2025

Portal: Mobile Coverage! (http://91.140.239.196/)

The scope covered during the campaign is split into 5 categories:

1- Urban Areas: 125 areas that contribute to 65% of the overall score.
2- Rural Areas: 50 areas that contribute to 10% of the overall score.
3- Indoor Locations: 80 locations that contribute to 10% of the overall score.
   a- Public Locations: 50
   b- Private Locations: 30
4- Highways: 21 highways and main roads that contribute to 10% of the overall score.
5- Islands: 8 islands that contribute to 5% of the overall score.

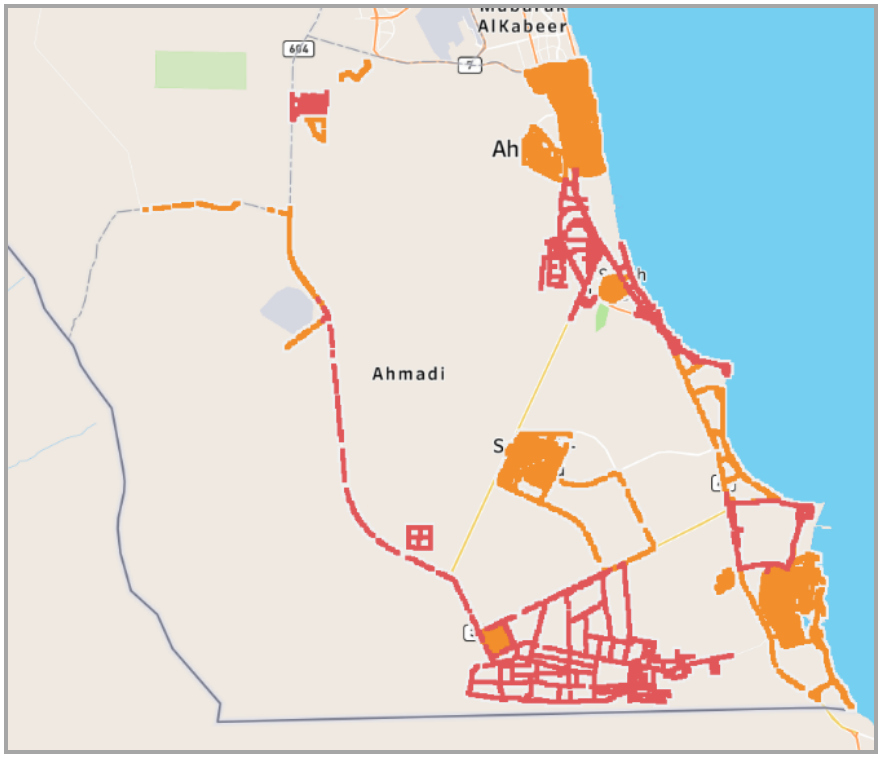

Figure 16: Covered 43 areas in Ahmadi governate.

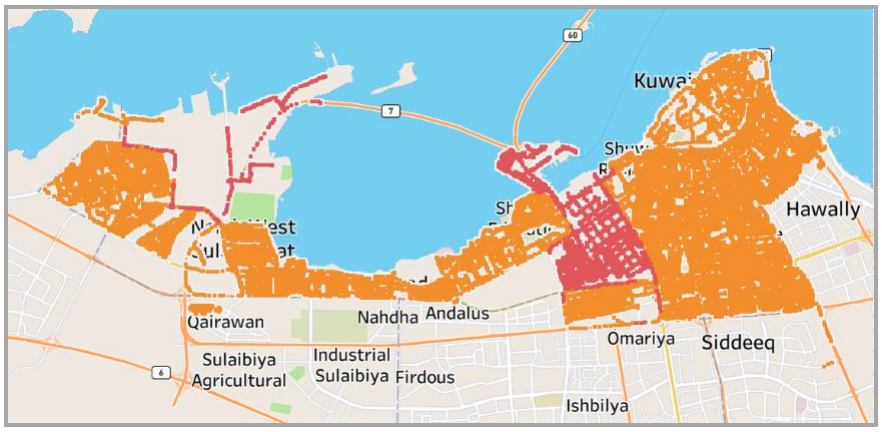

Figure 17: Covered 36 areas in Asma governate.

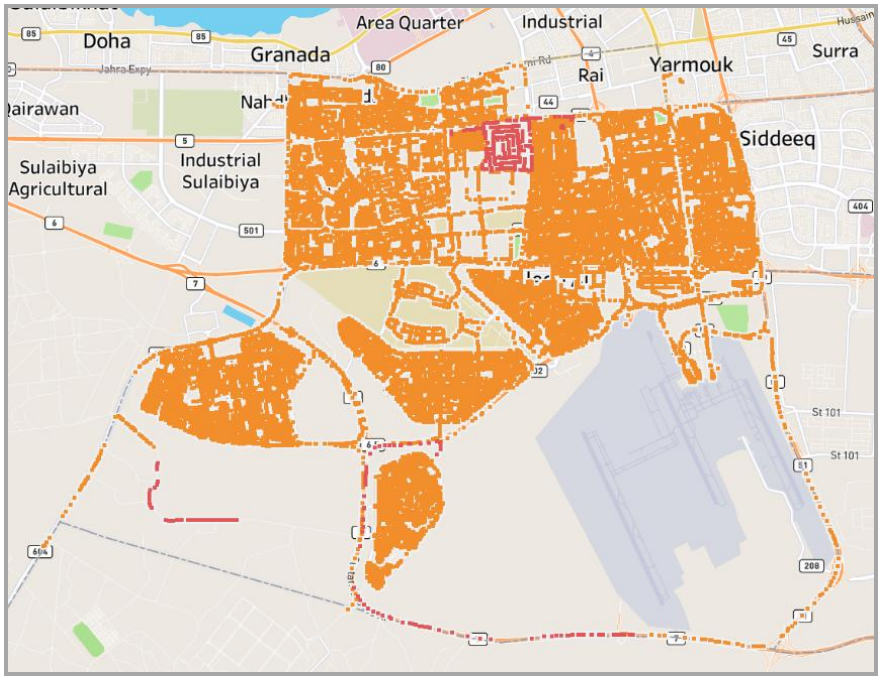

Figure 18: Covered 25 areas in Farwaniya governate.

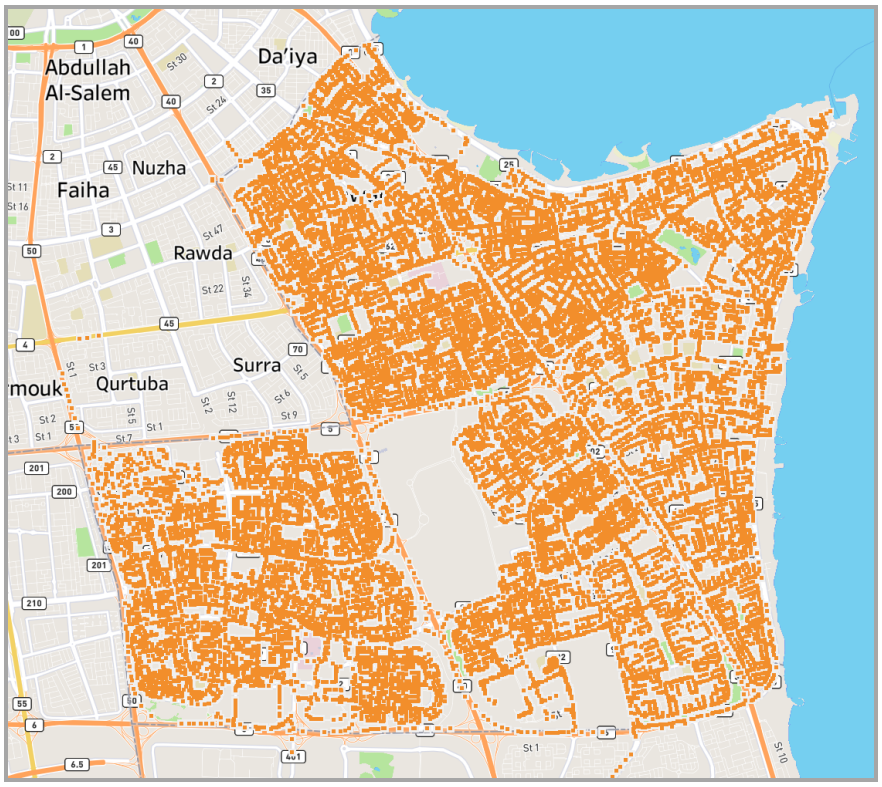

Figure 19: Covered 16 areas in Hawalli governate.

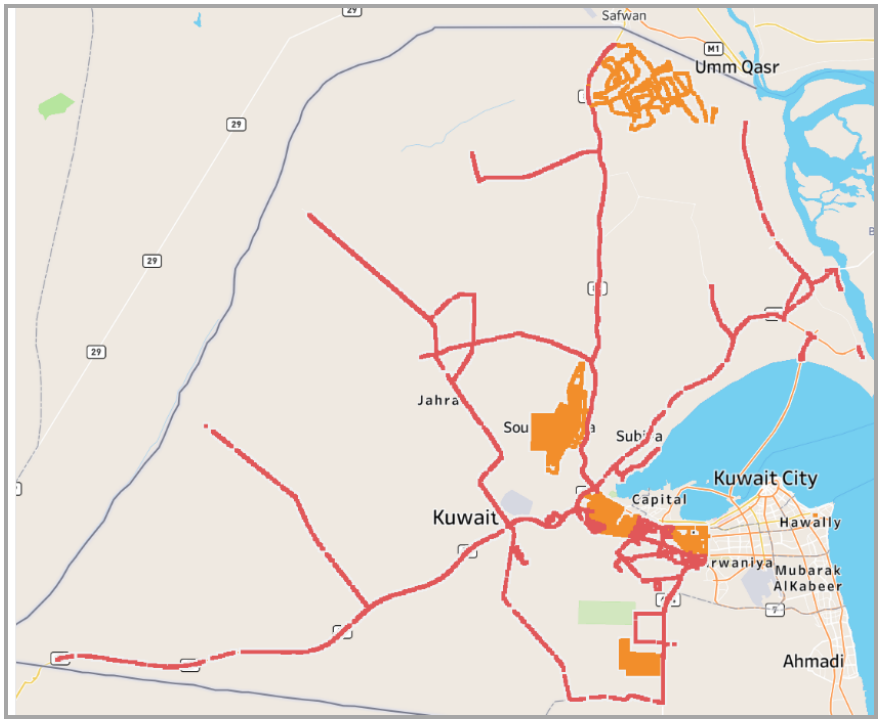

Figure 20: Covered 43 areas in Jahra governate.

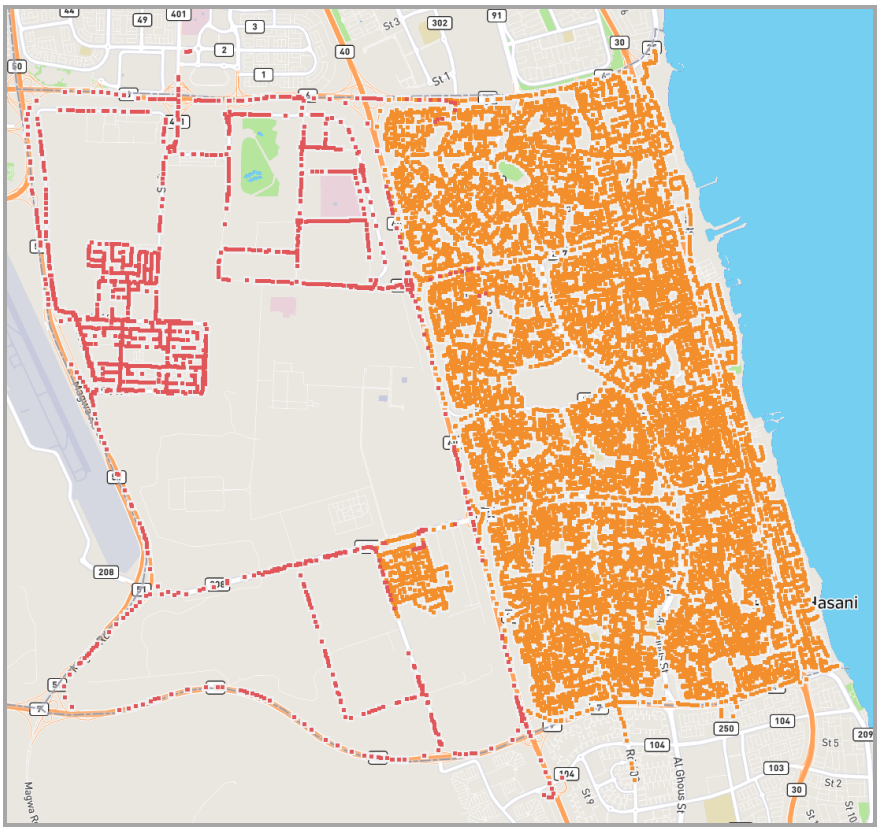

Figure 21: Covered 12 areas in Mubarak Al-Kabeer governate.

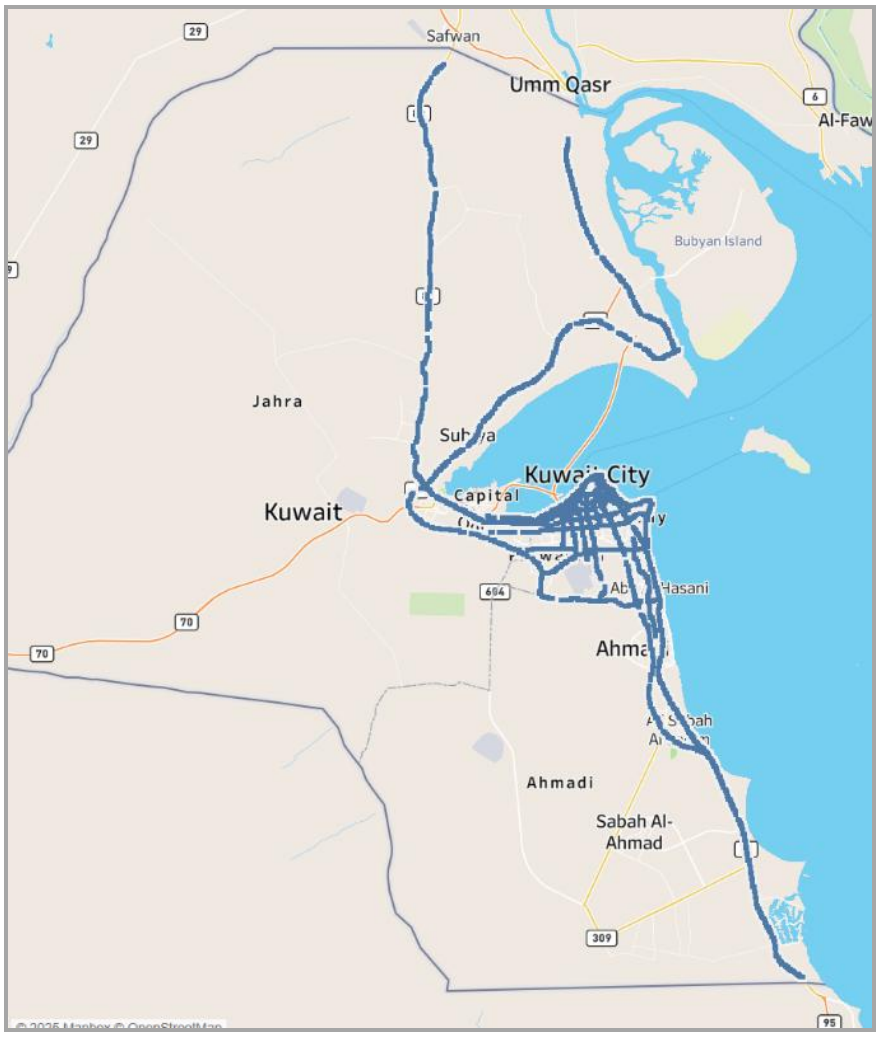

Figure 22: Covered 21 highways and main roads around Kuwait.


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