
Mobile Network Performance in Denmark Benchmark Report

Warsaw, Poland,
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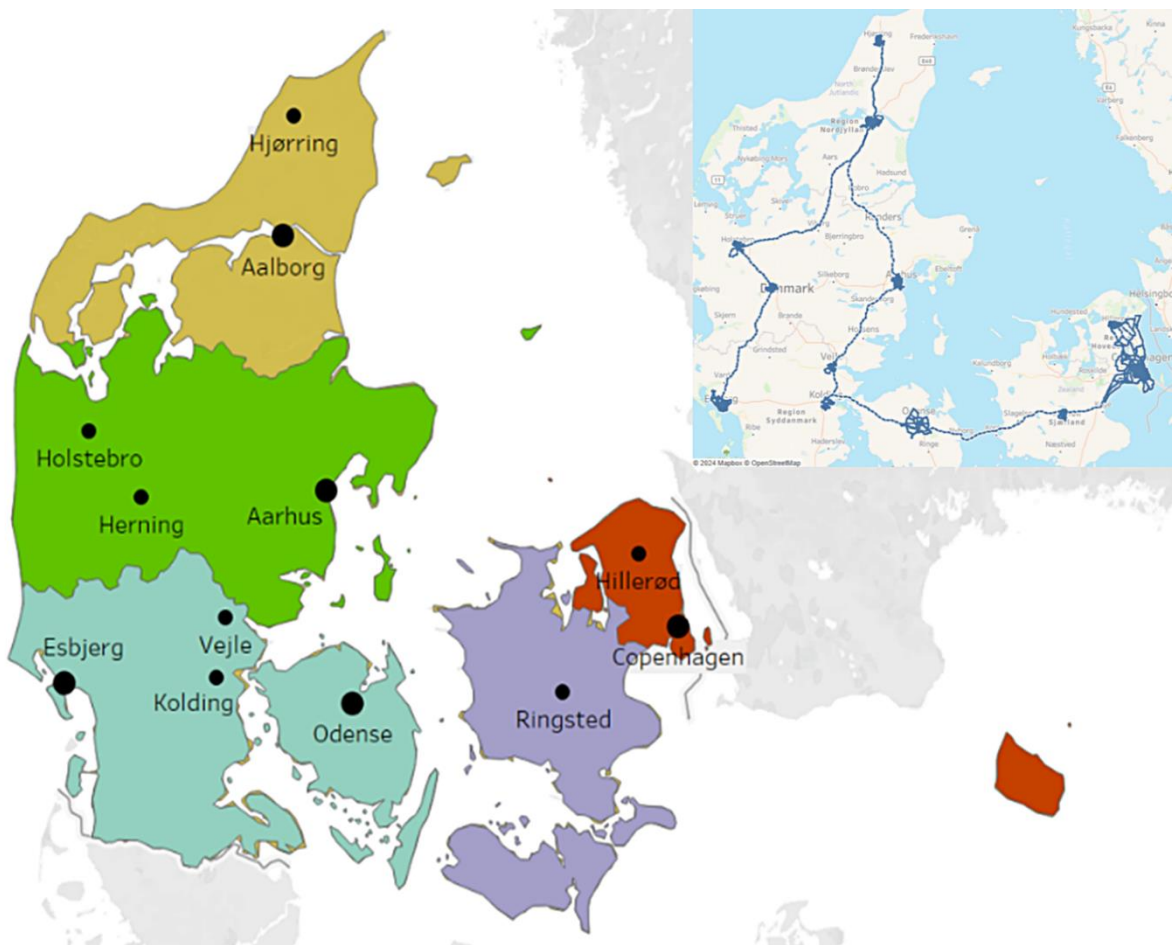
1. Introduction

This report presents a comparative benchmark analysis of mobile network performance across all operators in Denmark. The benchmarking methodology follows industry best practices like ETSI Technical Report TR103 559, incorporating standardized test scenarios for voice and data services across multiple radio access technologies (2G, 3G, 4G, and 5G). The objective of this benchmark is to evaluate network quality, service reliability, and overall user experience in a controlled measurement environment.

2. Test Scope

The primary goal of the benchmarking campaign was to evaluate key performance indicators (KPIs) for voice and data services in Denmark's mobile networks. The benchmarking drive-test covered a total distance of approximately 3,700 km. The measurements took place from October 21, 2024, to November 12, 2024.

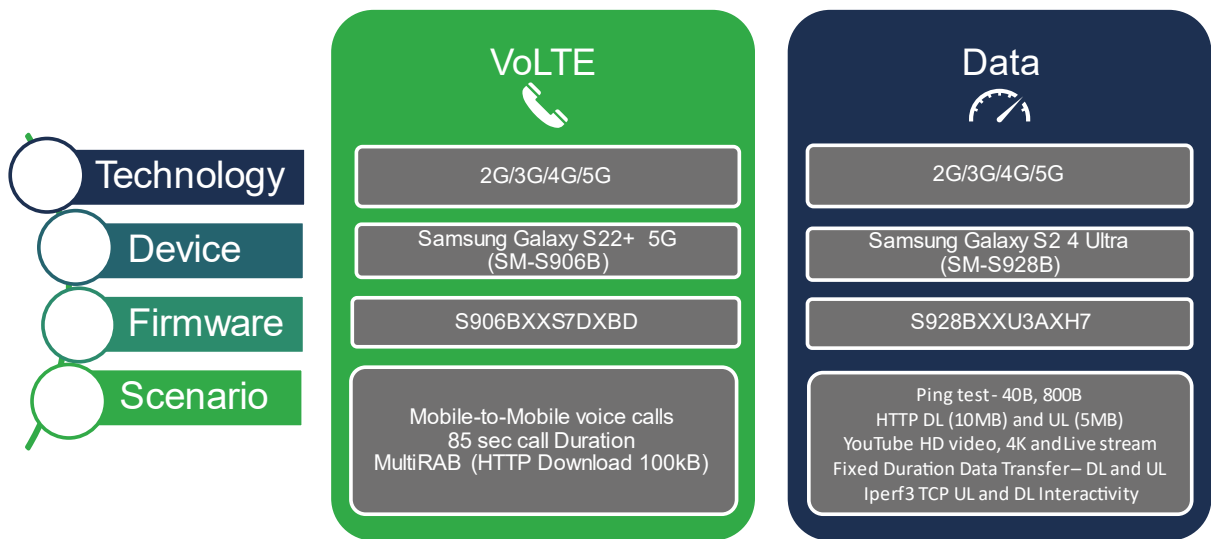
The benchmarking campaign covered five key regions in Denmark, ensuring a diverse mix of urban, suburban, and rural environments for comprehensive assessment of mobile network performance across different population densities and geographical conditions. The regions and key cities included in the measurement campaign are as follows:



3. Test Equipment and Measurement Scenarios

The benchmarking campaign was conducted using commercial smartphones. Both voice and data devices were configured to operate in free mode allowing automatic connection to all radio access technologies (2G/3G/4G/5G) available in tested networks. The tests were executed in a controlled and repeatable manner to guarantee consistency and comparability of results.

Test scenarios were constructed to assess: (1) for voice call setup success rate, speech quality, call retention, and simultaneous data session performance in a MultiRAB environment, (2) for data services network latency, throughput, reliability, and user experience across different services and applications.



4. Scoring Methodology Overview

The benchmarking evaluation of mobile networks in Denmark follows the Scoring Rules of ETSI TR 103 559 V1.2.1 Annex B. This Technical Report assures a standardized and objective assessment framework for evaluating mobile network performance across various environments based on the best practices for measuring and comparing mobile network performance.

The key objectives of ETSI TR 103 559 include:

- Standardization of Measurement Methods for consistency in the way network performance is evaluated.
- Transparency in Benchmarking for a clear framework for fair and unbiased assessment.
- Reflecting Real-World User Experience based on typical usage scenarios.

Applying ETSI TR 103 559 in our benchmarking report for Denmark is crucial for several reasons:

- Objective and Repeatable Assessments – Ensures that network performance measurements are conducted in a controlled and standardized manner.
- Alignment with European Standards – Ensures compliance with widely accepted European network performance evaluation guidelines, making results compatible with reports from other countries.
- Fair Comparison Between Operators – Establishes a neutral framework that prevents bias in scoring and measurement, ensuring an equal playing field for all operators.
- Evaluation of Real-World Usage Scenarios – By using the scoring methodology defined in ETSI TR 103 559, we ensure that the assessment reflects how users actually experience mobile networks in different environments.
- Facilitation of Regulatory and Market Analysis – The standardized methodology makes it easier for regulators, operators, and stakeholders to analyze network performance and make informed decisions regarding network improvements and future investments.

5. Voice Call Performance Evaluation Methodology

The benchmarking methodology follows standardized test scenarios to **evaluate the quality, reliability, and consistency of voice services both VoLTE and CSFB**. The approach ensures comparability between different operators while reflecting actual usage conditions.

The assessment includes of **voice calls** conducted in alternating call directions to reflect bidirectional communication. The **POLQA Wideband algorithm** was used to measure voice quality objectively.

For VoLTE tests, **simultaneous data activity (MultiRAB: HTTP Download)** is included to evaluate network performance under multitasking conditions.

The key advantages of this approach are:

- 1) **Objective Voice Quality Evaluation** – the use of **POLQA (WB)** ensures standardized and repeatable voice quality assessment, aligning with industry best practices.
- 2) **Realistic Call Scenarios** – alternated call directions and test conditions simulate actual user behavior, ensuring practical relevance.
- 3) **MultiRAB Testing** – simultaneous data usage provides insights into network stability and congestion management.

6. Data Services Performance Evaluation Methodology

In modern networks, it is crucial to monitor both network performance and user experience. The data sequence designed by our company consists of different types of services, which allows to measure and compare network performance and user experience. Measuring network performance, which includes parameters such as throughput, bandwidth, latency, jitter, and service availability, enables operators to assess the state of the infrastructure and identify areas that require optimization. However, equally important is the measurement of user experience, which reflects how end-users perceive the quality of the network.

User experience measurement takes into account subjective factors such as webpage loading times, connection stability, YouTube buffering time, video quality and application responsiveness. Integrating these two approaches - monitoring network parameters and analyzing user experiences - forms the foundation for maintaining high quality services. This allows operators to quickly address network issues before they become noticeable to the end user and to adapt their offerings to meet the actual needs of consumers, ensuring the best possible service quality.

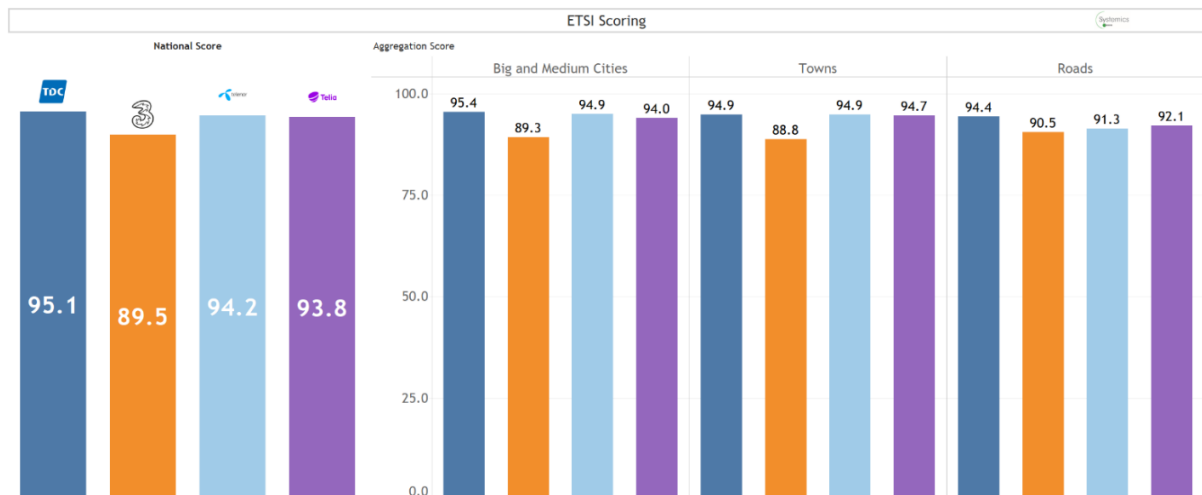
7. Assessment Results for geographical areas

The national aggregation score provides a comprehensive evaluation of mobile network performance across Denmark, reflecting the overall service quality of each operator. The results indicate that TDC achieved the highest national score of 95.1, confirming its position as the leading operator in terms of network performance. Telenor and Telia follow closely with scores of 94.2 and 93.8, respectively, while 3 Denmark lags behind with 89.5. These scores represent an aggregated assessment across different geographical categories, including big and medium cities, towns, and roads, ensuring a balanced comparison of network quality across diverse environments.

In big and medium cities, TDC leads with a score of 95.4, outperforming Telenor and Telia, which score 94.9 and 94.0, respectively. 3 Denmark, with a significantly lower score of 89.3, demonstrates weaker performance in urban areas. A similar trend is observed in towns, where TDC and Telenor both achieve 94.9, with Telia slightly behind at 94.7. 3 Denmark, once again, ranks the lowest with 88.8, indicating a consistent gap in service quality. The analysis of road network performance further confirms this ranking, as TDC maintains the highest score at 94.4, followed by Telia at 92.1 and Telenor at 91.3. 3 Denmark, with 90.5, shows an improvement compared to other categories but remains the lowest-ranked operator.

The results clearly highlight TDC's position as the strongest network provider in Denmark, with leading performance across all evaluated categories. Its dominance, particularly in big and medium cities, suggests substantial investment in network infrastructure, capacity, and optimization. The consistent leadership across urban, suburban, and road environments indicates a well-balanced network strategy, ensuring reliable service in all key locations. The competitive landscape shows that Telenor and Telia remain strong alternatives, offering comparable quality in some areas, though slightly behind TDC in overall performance. Meanwhile, 3 Denmark's results suggest coverage limitations or quality challenges, particularly in urban and suburban areas, which may impact user experience.

TDC's results confirm its position as the most reliable network in Denmark, demonstrating superior service quality in all tested environments. The benchmarking results provide valuable insights for industry stakeholders, regulators, and consumers, highlighting network strengths and potential areas for improvement in the competitive landscape.



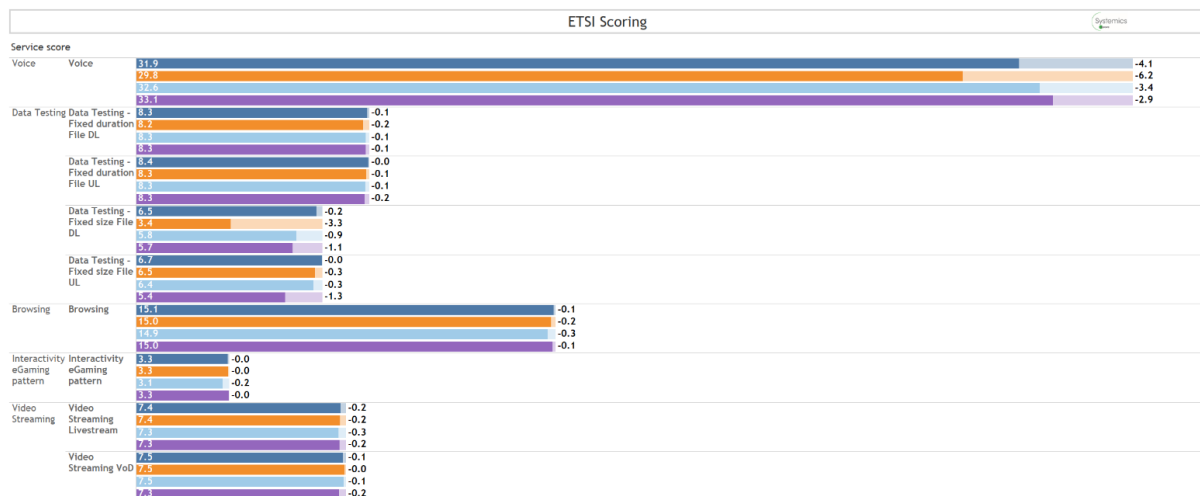
8. Assessment Results for various services

The service score evaluation highlights the performance of mobile networks across key service categories, including voice, data, browsing, gaming interactivity, and video streaming. The results show that TDC has achieved high scores in voice and data testing, which are the most critical aspects of network quality.

In voice services, Telia, Telenor and TDC all demonstrate solid performance, closely competing each with the other. The results confirm the stability and reliability voice services offered. Telia and Telenor have shortest call setup time while TDC offers highest quality of Voice (MOS) In data services TDC is at the top of the ranking with the best scoring for data transfer and closely followed by others in browsing, video streaming and interactivity tests.

Browsing and video streaming results are relatively balanced across all operators, with only minor differences in performance. TDC maintains a strong position, providing a stable browsing experience with fast page loading times and minimal delays. 3 Denmark and Telia are almost on par with TDC. In video streaming, the results suggest that TDC ensures high-quality playback with minimal buffering, reinforcing its capability to support high-bandwidth applications. The similar score for video streaming was achieved by 3 Denmark.

The results confirm that TDC remains the most reliable network provider in Denmark, particularly in voice and data services, which are the primary factors influencing overall user experience. Its ability to maintain consistently high performance across different service categories highlights the effectiveness of its network investments and optimizations. These scores may give TDC as the first choice operator for users who prioritize high-quality voice communication and seamless data access, making it the benchmark for network excellence in Denmark.



9. Service assessment results for geographical areas

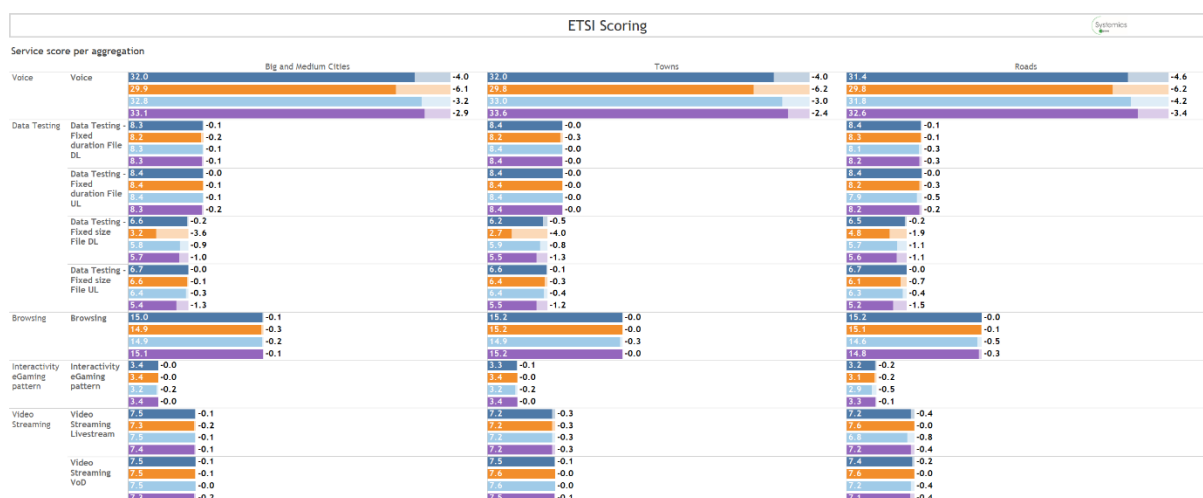
The detailed service score breakdown across big and medium cities, towns, and roads provides deeper insights into network performance under different conditions. TDC continues to demonstrate strong results, maintaining competitive scores across all tested environments, reinforcing its position as the leading mobile network operator in Denmark.

In **voice services**, TDC achieves high and consistent performance across all geographic areas. In big and medium cities, its score remains competitive, reflecting reliable voice call quality, stable connections, and minimal disruptions. A similar trend is observed in towns, where TDC maintains a strong presence, ensuring high-quality voice calls. On roads, TDC slightly drops in score but continues to outperform most competitors, indicating well-managed handovers between cells and stable connectivity in mobile environments.

For **data testing**, TDC leads across most areas, particularly in urban environments, where high-speed connectivity and low latency are essential for user experience. In towns, its performance remains stable, though slightly lower than in cities. On roads, the network demonstrates strong adaptability, ensuring data reliability even in more challenging coverage scenarios. The results indicate that TDC effectively balances its capacity between densely populated areas and transport corridors, ensuring uninterrupted access to mobile data services.

When analyzing **browsing performance**, TDC delivers a seamless experience, with consistently high scores in all categories. Users in both urban and rural environments benefit from quick page loads and smooth navigation, reinforcing the operator's strength in data transmission efficiency. **Interactivity for gaming** shows minimal differences between operators, suggesting that network latency and responsiveness for online gaming remain stable across all providers. **Video streaming** results confirm TDC's ability to provide high-quality streaming with minimal buffering across all test environments, supporting the increasing demand for video consumption on mobile networks.

The results highlight TDC's strategic approach to network optimization, **ensuring high-quality** service in all geographical areas. Its ability to maintain strong performance in both urban and transport environments reflects a well-balanced infrastructure investment strategy. Compared to its competitors, TDC consistently achieves one of the highest scores across all service categories, reaffirming its leadership in the Danish market. The strong performance in voice, data, and browsing services ensures that users experience **a reliable and seamless mobile network, regardless of location.**



TDC's network approach, which primarily operates in the Idle - Idle state rather than maintaining a continuous Connected - Connected state, presents a clear advantage in terms of energy efficiency. While operators like Telia and Telenor keep the majority of calls in Connected - Connected mode,

ensuring slightly faster call setup times, this method comes at the cost of increased battery consumption on user devices. Given the growing global focus on sustainability and energy efficiency, TDC's strategy can be seen as a more environmentally friendly approach that extends battery life without causing a noticeable impact on user experience.

The difference in paging cycle duration – 1.280 ms for TDC versus 640 ms for Telenor and Telia - may seem significant from a network perspective, but in real-world usage, it is unlikely to be perceptible for end-users. However, the reduced power consumption on mobile devices can lead to meaningful battery savings over time. When scaled across millions of subscribers, this approach contributes to a substantial reduction in overall energy consumption, aligning with modern environmental and energy-saving initiatives.

For mobile users, this means that while TDC's call setup may be marginally slower, their devices will consume less energy, resulting in longer battery life throughout the day. This is particularly beneficial for users who rely heavily on mobile connectivity and need their devices to last longer without frequent charging. In a time when sustainability is a key consideration in technology development, TDC's approach not only enhances user convenience but also supports broader environmental goals, making it a strong example of a "go green" network optimization strategy.

10. Summary of Data Performance Analysis

The evaluation of data services confirms TDC's strong position as the leading operator in Denmark, particularly in terms of LTE-5G NR utilization and throughput performance. TDC demonstrates the highest LTE-5G NR utilization rate (98%) and the most extensive use of NR Carrier Aggregation (CA), leveraging the n78 - n78 combination to maximize network capacity. In comparison, Telia employs a different strategy with the n78 - n3 combination, while Telenor and 3 Denmark do not utilize NR CA at all. The results highlight TDC's advanced network deployment, providing users with greater access to high-capacity 5G services.

TDC achieved best results for good and sustainable connection rate for nearly all data service tests, including iPerf, capacity, HTTP transfer, browsing, and YouTube streaming. In the results table it is represented by low rate of non-qualified connections (those with setup or termination problems or the quality of service during the connection). That indicates a high level of network reliability and service consistency, ensuring that users experience minimal disruptions and maximum availability of mobile data.

Throughput performance further reinforces TDC's leadership, with the highest average speeds recorded in both downlink and uplink tests. While Telenor and Telia deliver competitive results, TDC outperforms in most regions. However, in Sjælland, TDC shows slightly lower downlink throughput compared to its competitors, primarily due to lower n78 utilization in this area. This suggests that further optimization of 5G deployment in certain locations could enhance performance.

One of TDC's key advantages is its wide NR CA n78 - n78 deployment, with 130 MHz on the NR leg, allowing for exceptional downlink performance. Additionally, the 100 MHz carrier on band n78 ensures optimal capacity and high-speed connectivity, making TDC the preferred network for demanding applications such as ultra-HD video streaming, cloud gaming, and enterprise use cases. In contrast, Telenor and Telia achieve the best 4G leg throughput by utilizing a 25 MHz carrier on band n3, which improves performance in NR CA scenarios. Comparatively, TDC and 3 Denmark operate with a 15 MHz carrier, which, while effective, offers slightly lower 4G support in CA configurations.

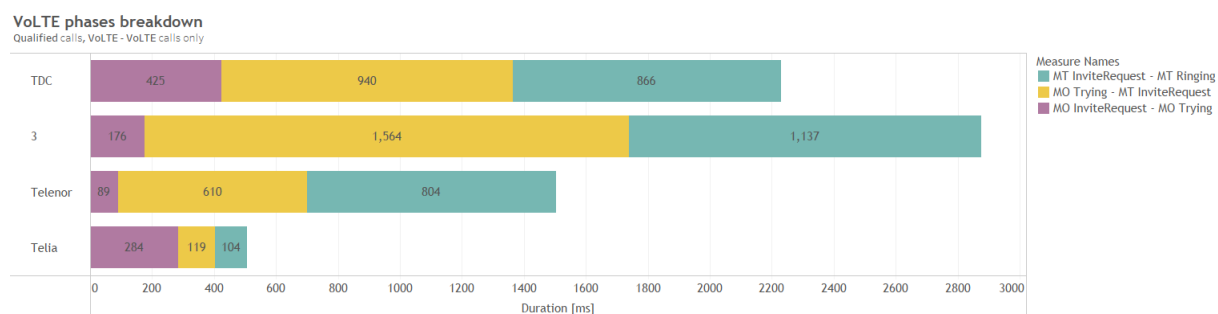
On the uplink side, TDC achieves the best throughput results, thanks to a higher proportion of samples utilizing 4G-only throughput and an optimized split bearer configuration. This approach ensures efficient data transmission, benefiting users who frequently upload large files, use video conferencing, or rely on cloud-based services.

The findings confirm that TDC leads the Danish market in next-generation mobile data performance, with an extensive 5G deployment strategy, advanced carrier aggregation, and superior downlink and uplink speeds. While competitors such as Telia and Telenor offer strong 4G-based solutions, TDC's focus on 5G evolution and network expansion positions it as the most future-ready operator. Continued optimization of n78 utilization in regions like Sjælland and further improvements in 4G carrier configurations for CA scenarios could further solidify its competitive advantage. These results underline TDC's commitment to delivering the highest quality mobile data experience, ensuring fast, reliable, and future-proof connectivity for users across Denmark.

11. Major differentiators

11.1.1. Call Setup Time Performance

Telia and Telenor demonstrate a **similar ECM state strategy**, with the majority of their VoLTE calls occurring in the **Connected - Connected state**. This means that most devices on these networks remain actively connected to the core network, allowing for **faster call setup times**. In contrast, TDC and 3 Denmark show a different approach, with a significantly larger proportion of calls occurring in **Idle - Idle state** (around 71-73%). This strategy leads to **slightly longer call setup times** but provides **energy-saving benefits** for mobile devices by reducing unnecessary background connectivity..



The data indicates that Telia achieves the **fastest call setup time**, thanks to its optimized **MO Trying - MT InviteRequest** and **MT InviteRequest - MT Ringing** phases. TDC, while maintaining a **strong network performance**, experiences **longer MO InviteRequest - MO Trying and MO Trying - MT InviteRequest phases**, which result in **slower call establishment compared to Telia and Telenor**. This suggests that Telia's approach, which minimizes the number of signaling steps and optional SIP procedures, contributes to more efficient call initiation.

Faster call setup times translate to **reduced waiting periods when making or receiving a call**, improving overall satisfaction. However, the **Connected - Connected strategy** used by Telia and Telenor **comes at a cost**, as it keeps devices continuously engaged with the network, leading to **higher battery consumption**. In contrast, **TDC's approach prioritizes energy efficiency**, which may be more beneficial in the long run, as it extends battery life without a significantly noticeable delay in call setup.

In conclusion, while Telia provides the **quickest VoLTE call setup experience**, TDC's strategy offers a more **power-efficient approach** that aligns with modern energy-saving initiatives. This analysis highlights the importance of **balancing speed, efficiency, and sustainability** in network design, ensuring that users receive a reliable and environmentally conscious mobile service.

11.1.2. Packet Loss Analysis in VoLTE

Packet loss is a critical factor influencing voice call quality in mobile networks. It occurs when data packets traveling over the network fail to reach their intended destination, leading to **audio distortions, interruptions, and overall degradation of call quality**. The analysis of packet loss among Danish operators provides valuable insights into network stability and its impact on user experience.

TDC demonstrates the **highest percentage of voice samples without lost packets**, which directly contributes to its high Mean Opinion Score (MOS) in overall statistics. This indicates that TDC's network ensures a stable transmission of voice data with minimal disruptions, leading to a superior call experience for users. It is worth to mention that Telia and Telenor **achieve the highest MOS values for voice samples** which are packet loss-free. It means that by improving that both of them have a chance for better score. The results also indicate that even if TDC has a **better and more consistent overall quality**, there is still room for voice MOS improvement in places without packet loss.

3 Denmark **presents the lowest ratio of voice samples with lost free packets** what probably significantly impacts its MOS results. For voice samples with lost free packets 3 Denmark achieves a

MOS score comparable to TDC, indicating that its underlying voice transmission quality is strong but frequently affected by network instability. It suggests that **improvement of the packet loss rate could substantially improve the user experience** on 3 Denmark's network.

Packet Loss per sample
Qualified tests

	TDC		3		Telenor		Telia	
	without lost packets	with lost packets	without lost packets	with lost packets	without lost packets	with lost packets	without lost packets	with lost packets
% of samples	73%	27%	58%	42%	65%	35%	70%	30%
Avg. Packet Loss [%]	0.0%	1.1%	0.0%	1.4%	0.0%	1.6%	0.0%	1.8%
Avg. MOS	4.65	4.24	4.65	4.12	4.68	4.23	4.68	4.13

For users, packet loss translates to **choppy or robotic voice quality, dropped words, and reduced intelligibility during calls**. A lower occurrence of packet loss, as seen on TDC's network, ensures **clearer and more natural-sounding conversations**, which is particularly important for business communications, customer service interactions, and emergency calls.

From a network optimization perspective, **minimizing packet loss is essential for enhancing voice service reliability**. Operators facing higher packet loss rates, such as 3 Denmark, could benefit from **improving network congestion management, optimizing handover processes, and refining Quality of Service (QoS) policies** to prioritize voice traffic. By addressing these issues, they can enhance call stability, reduce audio distortions, and **improve user satisfaction**.

The findings highlight that **TDC leads in providing the most stable VoLTE experience**, with consistently low packet loss ensuring high-quality voice transmission. While Telia and Telenor deliver excellent quality in optimal conditions, their networks experience packet loss more frequently. For 3 Denmark, tackling packet loss presents a clear **opportunity for improving voice services**, as its core transmission quality is on par with top competitors when disruptions are absent.

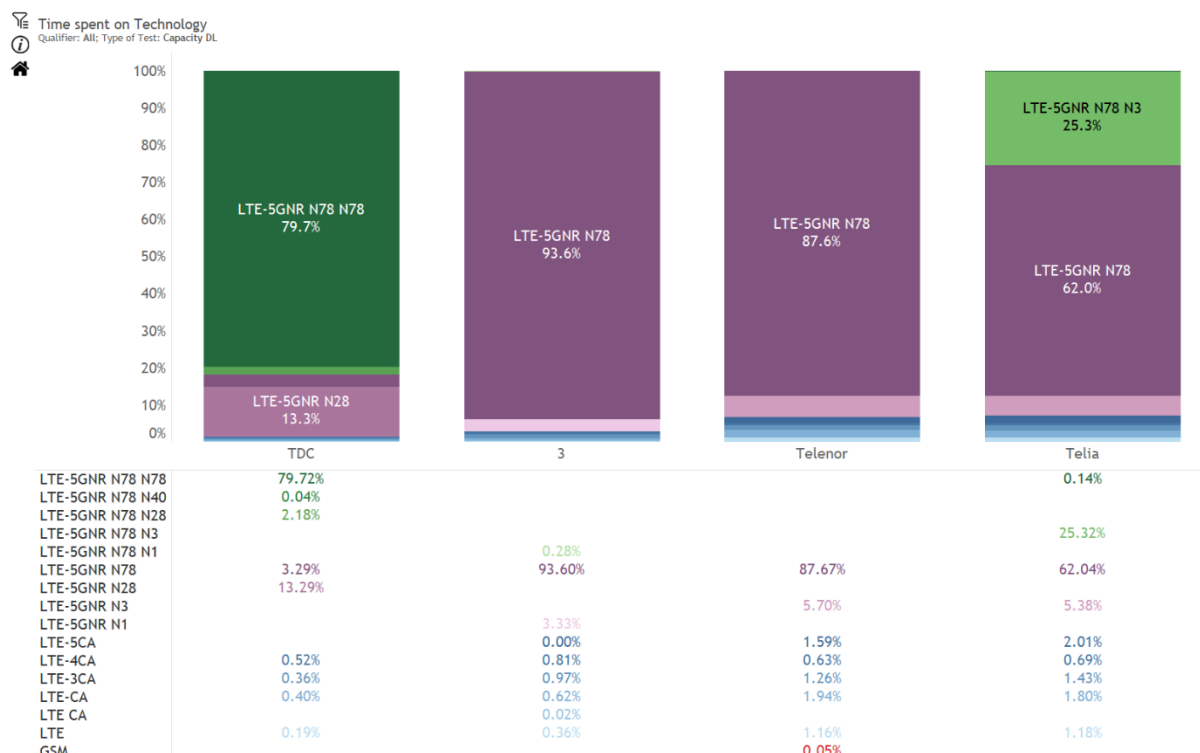
11.1.3. Technology Usage Analysis

The evaluation of technology usage among Danish mobile operators provides insights into how each network utilizes LTE and 5G resources to optimize data performance. The results highlight **significant differences in network deployment strategies**, particularly in the use of **5G Carrier Aggregation (NR CA)** and frequency band utilization.

TDC stands out as the operator with the **highest share of LTE-5G NR utilization**, demonstrating a clear focus on 5G network expansion and efficiency. A significant portion of its 5G deployment, **80% of NR CA**, is based on the n78-n78 combination, which **provides higher capacity, faster speeds, and improved spectral efficiency**. Additionally, 13% of TDC's 5G usage comes from a single **NR carrier (n28)**, which is likely utilized for **wider coverage and enhanced signal penetration** in less densely populated areas. This dual-layer approach enables both high-performance connectivity in urban areas and extended reach in suburban and rural locations, ensuring **a balanced and efficient 5G rollout**.

Telia takes a different approach, utilizing NR CA with the n78 - n3 combination for 25% of its 5G usage. This strategy leverages the n3 band for better mid-band coverage, complementing its **62% share of n78 usage**, which provides high capacity. Telia's choice of NR CA bands suggests a focus on **balancing 5G performance with broader reach**, optimizing connectivity in areas where pure n78 deployments might struggle with coverage limitations. While this strategy ensures greater **flexibility in network performance**, it does not reach the same capacity efficiency as TDC's n78 - n78 deployment.

Unlike TDC and Telia, **Telenor and 3 Denmark** do not implement NR CA, meaning **their 5G deployments rely solely on standalone n78 usage**. This results in a more simplistic 5G strategy, which may be sufficient for basic capacity expansion **but lacks the full potential of Carrier Aggregation** to enhance throughput. Among these two operators, 3 Denmark shows a 6% higher share of n78 usage compared to Telenor, indicating a more aggressive adoption of 5G spectrum resources. However, the **absence of NR CA may limit their ability to match TDC and Telia's performance** in high-traffic environments, where aggregating multiple 5G bands can significantly boost capacity and speed.



For mobile users, TDC’s **strong NR CA strategy translates into faster and more reliable 5G connections**, especially in areas with high data demand. The widespread deployment of **n78 - n78 aggregation enables higher peak speeds**, making TDC’s network better suited for applications such as **ultra-HD video streaming, cloud gaming, and enterprise-level connectivity**. Telia’s hybrid approach offers **better mid-band coverage**, making it a competitive alternative in areas where coverage is a priority. While it is to some extent effective, **may not deliver the same level of peak throughput** as TDC’s pure n78 - n78 aggregation.

For Telenor and 3 Denmark users, the **lack of NR CA suggests** that while they can **experience high-capacity 5G on n78**, their networks may **struggle to match the performance of operators utilizing CA technology**. This could impact download speeds, network responsiveness, and overall quality in high-demand situations, particularly in dense urban areas where bandwidth competition is high.

TDC’s **aggressive deployment of NR CA positions it as the most future-ready network**, ensuring it can scale performance efficiently as 5G adoption grows. The high usage of n78 - n78 aggregation maximizes spectral efficiency, meaning TDC is well-prepared for **expanding its 5G capabilities as demand increases**. Telia’s strategy, while different, offers a solid balance between capacity and coverage, suggesting continued investment in **CA technologies could further enhance its performance**.

For Telenor and 3 Denmark, **introducing NR CA** would be a key step toward improving their 5G competitiveness, allowing them to **unlock higher speeds, better load balancing, and improved network efficiency**. Without NR CA, their networks may **struggle to keep up with growing data demands**, particularly in high-density environments where aggregation provides a clear advantage.

11.1.4. Downlink Throughput Analysis

Downlink throughput is a valuable metric for assessing the performance of mobile networks, as it directly impacts the user experience in activities such as video streaming, file downloads, cloud applications, and general web browsing. The results reveal **notable differences between operators in Denmark**, highlighting the impact of **5G network deployment strategies and spectrum utilization** on data speed performance.

TDC achieves the **highest average downlink throughput**, reaching **525.9 Mbps**, surpassing its competitors in overall data speed performance. This result underscores the **effectiveness of TDC’s**

5G Carrier Aggregation (CA) strategy, which utilizes n78 - n78 deployment and optimized split bearer configuration to maximize spectral efficiency and throughput capacity.

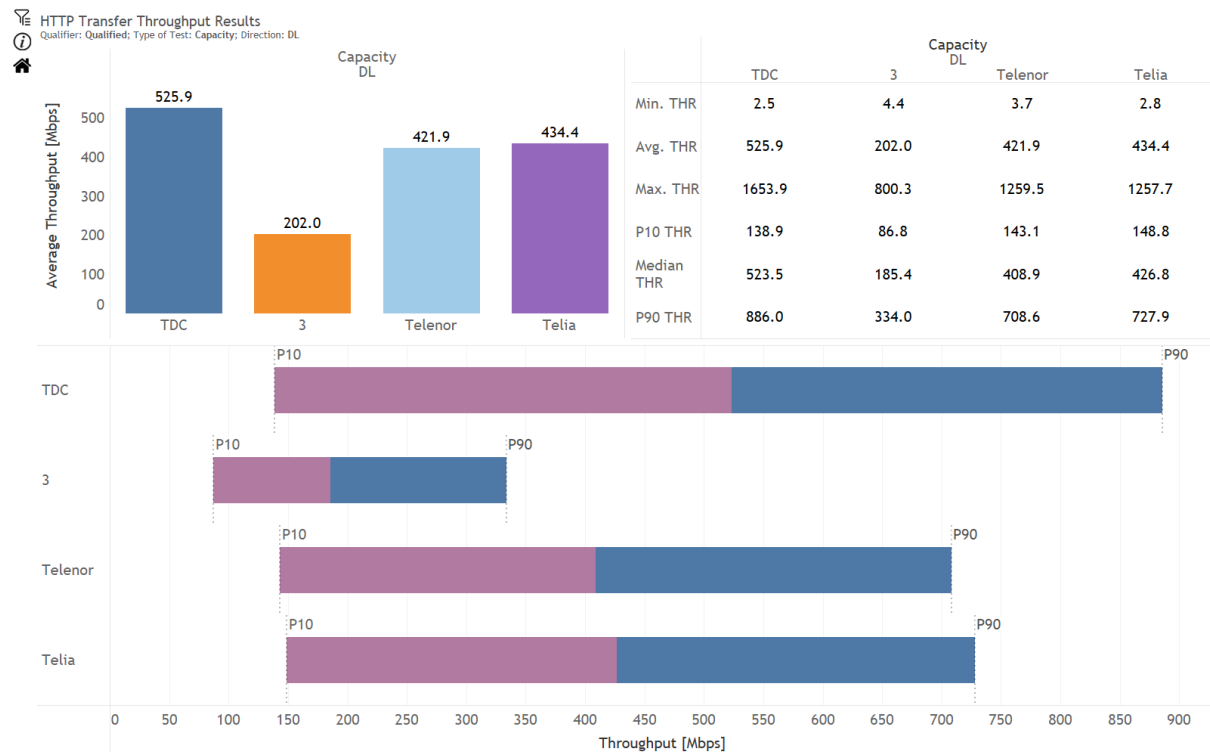
Following closely behind, **Telia records an average throughput of 434.4 Mbps**, with **Telenor slightly lower at 421.9 Mbps**. Both operators deliver competitive speeds, benefiting from their extensive 5G deployments and strategic mid-band spectrum allocations. However, their **lack of NR CA implementation** compared to TDC may contribute to minor differences in speed consistency under varying network conditions.

3 Denmark significantly lags behind the other operators, achieving an average throughput of just **202.0 Mbps**, which is substantially lower than its competitors. This **indicates limitations in its 5G rollout strategy, spectrum availability, or network optimization**, potentially leading to a **weaker user experience in high-data-demand scenarios**.

The distribution of throughput values across different percentiles provides deeper insights into **network stability and consistency**. The P10-P90 analysis illustrates the range of download speeds experienced by users:

- TDC exhibits the widest throughput range, with high speeds level at the 90th percentile (P90) of 886 Mbps, ensuring fast data rates for users in optimal conditions while still maintaining strong performance at lower percentiles (P10) of 139 Mbps.
- Telia and Telenor show their P90 values above 728 Mbps and 709 Mbps respectively.
- 3 Denmark demonstrates the lowest values at the 90th percentile (P90) of 334 Mbps and of 87 Mbps at lower percentiles (P10). across different usage scenarios and potentially more frequent performance bottlenecks.

For users, higher downlink throughput translates into better overall performance, ensuring fast content downloads, buffer-free video streaming, and smoother cloud-based services. **TDC's superior speeds offer a clear advantage**, particularly for **advanced users, businesses, and those relying on high-data applications**.



Telia and Telenor offer consistent speeds across different network conditions, making them **alternatives for general consumers**. However, **their slightly lower peak speeds** suggest that users in high-demand scenarios may experience **minor performance limitations** compared to TDC.

3 Denmark's **significantly lower throughput values may impact overall user experience**, leading to longer file download times, potential buffering in high-definition video streaming, and reduced performance for high-bandwidth applications. Addressing these through network optimizations and expanded 5G deployments would be crucial for improving its competitive standing.

TDC's **network strategy**, centered around NR CA and efficient spectrum utilization, positions it as the market leader in downlink throughput. The combination of **high-speed access and a well-balanced throughput distribution** ensures **optimal performance for a wide range of applications**.

Telia and Telenor maintain **competitive performance**, but **further investments in Carrier Aggregation (CA) and mid-band spectrum optimization** could help **narrow the gap with TDC**.

For 3 Denmark, enhancing its 5G infrastructure, increasing NR CA usage, and optimizing network load balancing would be critical in closing the performance gap and improving user experience.

TDC currently offers the **best downlink throughput experience in Denmark**, ensuring **fast and consistent data speeds for its customers**. While Telia and Telenor remain strong competitors, their performance slightly trails behind due to the lack of advanced NR CA implementations. 3 Denmark, however, faces significant challenges in maintaining competitive speeds, requiring further network improvements to meet modern data consumption demands.

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