

A large white helicopter, possibly a Sikorsky UH-60 Black Hawk, is the central focus of the image. It is parked on a tarmac at an air show, with its main rotor blades extended. In the background, other aircraft, including a blue and white jet, and a crowd of people can be seen under a cloudy sky. The text is overlaid in white on a dark, semi-transparent background.

Unveiling the Mobile Network Performance at the Royal International Air Tattoo: A Comprehensive Analysis



The Royal International Air Tattoo (RIAT) is a globally renowned airshow held annually at RAF Fairford in Gloucestershire, England. Drawing up to 200,000 spectators([https://en.wikipedia.org/wiki/Royal International Air Tattoo](https://en.wikipedia.org/wiki/Royal_International_Air_Tattoo)) , RIAT is not only a showcase for cutting-edge aviation technology but also a platform for international aerospace and defense industries to demonstrate their advancements. Given the scale and significance of the event, ensuring robust and efficient mobile connectivity is paramount.

This week, we are thrilled to share insights from our recent comprehensive network survey analysis of all three major operators (Vodafone UK, EE, O2) and one MVNO (Lebara) at RAF Fairford in Gloucestershire, England, on Sunday, July 17th. Through these tests, our goal was to ensure that visitors and participants could depend on robust and efficient mobile connectivity throughout the event.



Detailed Significance of Reliable Mobile Network Coverage at the Royal International Air Tattoo (RIAT)

The consequences of the mobile network performance analysis report from the Royal International Air Tattoo (RIAT) are multifaceted and can impact several stakeholders, including event organizers, network operators, and attendees.

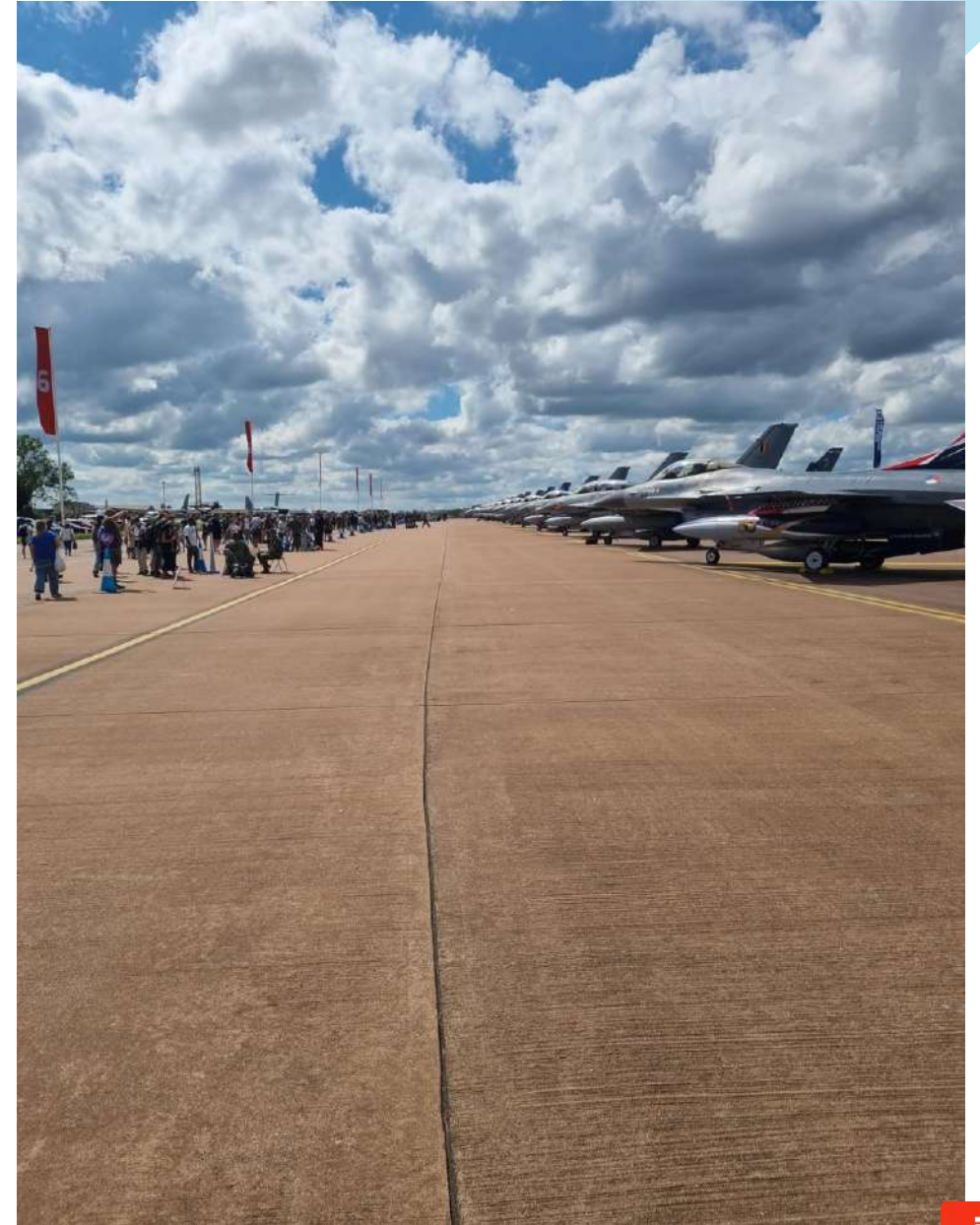


Why is Mobile Connectivity Essential for Enhancing Visitor Experience?

- **Real-Time Sharing:** Reliable network coverage is crucial for attendees who want to share their experiences instantly through social media, photos, and videos. This not only enhances their personal experience but also amplifies the event's visibility and engagement across platforms like Twitter, Instagram, and Facebook.
- **Access to Event Information:** With seamless connectivity, visitors can easily access event schedules, maps, and updates. This is particularly important in large, crowded events like RIAT, where the ability to navigate the venue, find specific exhibits, or plan their day is dependent on real-time access to information.
- **Staying Connected with Friends and Family:** In a large venue with thousands of attendees, staying in touch with friends and family is essential for safety and convenience. Reliable mobile networks ensure that attendees can easily coordinate meetups, share their location, or check in with loved ones.

Why Strong Network Connectivity Matters for Event Management?

- **Supporting Media Coverage:** Reliable mobile network coverage at the Air Tattoo show is crucial for both visitors and event organizers. With over 200,000 footfall annually with most of them sharing videos and live-streaming, any connectivity issues could ruin their experience, harm the event's reputation, and diminish trust in the network provider. Poor coverage might even deter future attendance, impacting both the event and the operator's brand.
- **Logistics Coordination:** For event organizers, reliable network coverage is vital for coordinating logistics such as managing crowds, directing staff, and ensuring the smooth operation of various activities. Effective communication is essential for the success of an event of this scale.
- **Emergency Handling:** In the event of an emergency, whether medical or security-related, fast and reliable communication is crucial. Organizers need to be able to contact emergency services, manage the flow of information, and direct attendees safely. Network coverage that supports this ensures that any incidents are handled quickly and efficiently, minimizing potential harm.



What are the Consequences for Network Operators of Inadequate Coverage?

1. Customer Dissatisfaction and Churn:

Event-Specific Frustration: At an event like the Royal International Air Tattoo (RIAT), where attendees rely heavily on mobile connectivity to share their experiences, access event information, and stay connected, poor network coverage can lead to significant frustration. If operators fail to provide reliable coverage during such high-profile events, customers are likely to feel let down, leading to negative perceptions of the operator's service.

Increased Customer Churn: When network operators fail to deliver adequate coverage at a major event, the dissatisfied attendees may decide to switch to a competitor who offers better service. This can lead to increased churn rates, especially among customers who value reliable service in both everyday use and during special events.

2. Damage to Brand Reputation:

Visibility of Failures: Events like RIAT attract large numbers of people, media coverage, and social media engagement. If a network operator provides poor coverage at such an event, the visibility of this failure is amplified. Attendees might share their frustrations on social media, leading to widespread awareness of the network's shortcomings. This can damage the operator's brand reputation, not just among the attendees but also in the broader market.

Negative Word of Mouth: Poor performance at a widely attended event like RIAT can lead to negative word of mouth. Customers may warn others against using the operator, further eroding the operator's reputation and making it difficult to attract new customers.





3. Financial Losses:

Immediate Revenue Impact: Poor network coverage at RIAT can result in immediate financial losses due to customer churn. Customers who switch to competitors reduce the operator's subscriber base and revenue.

Long-Term Financial Consequences: The damage to reputation and the loss of customers can have long-term financial impacts. The operator may need to invest more in marketing and customer retention strategies to recover from the negative publicity, which can strain financial resources.

4. Compliance Risks:

Negative Impact on Public Relations: Poor performance at such an event could also harm the operator's public relations efforts, making it harder to advocate for favorable regulatory conditions in the future.

The negative impacts of not having proper network coverage at a high-profile event like the Royal International Air Tattoo are far-reaching. These include customer dissatisfaction, damage to brand reputation, financial losses, loss of competitive advantage, and potential regulatory risks. For network operators, ensuring reliable coverage at such events is not just about meeting immediate service demands but also about maintaining long-term customer relationships, protecting their brand, and securing their market position. Addressing these coverage issues proactively is essential to avoid the substantial negative consequences that can arise from poor network performance during critical events.

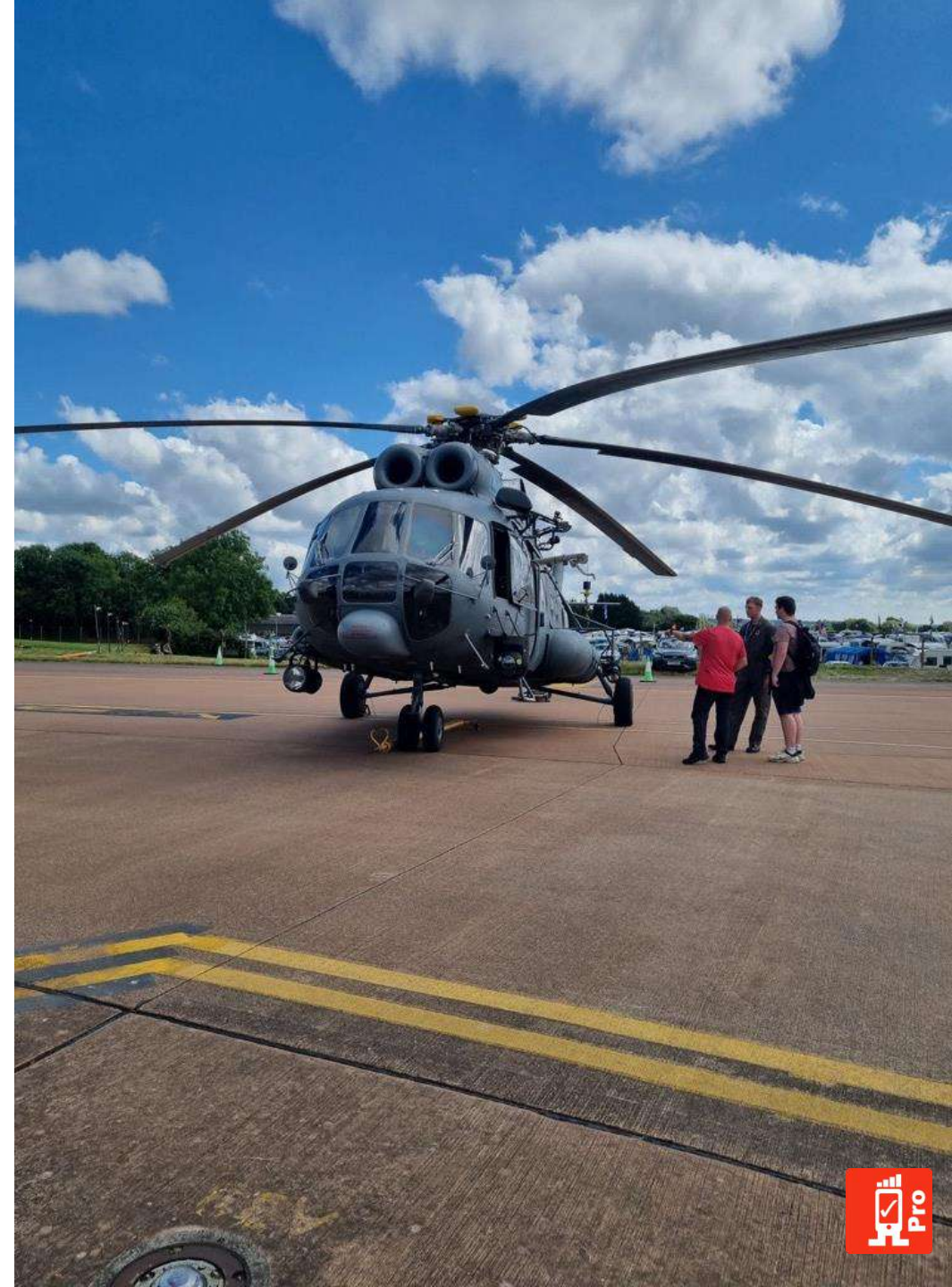
How did we set up the test?

1. Devices and Network Configuration:

- **5G-Enabled Devices:** The test utilized three different devices, all enabled with 5G network capabilities. This was essential for capturing the performance of modern network infrastructure under the high-traffic conditions typical of large-scale events like RIAT.
- **Unlimited Data Packages:** Each SIM card in the devices was equipped with an unlimited data plan, removing any potential limitations on data usage. This ensured that the tests reflected true network performance without being skewed by data caps or throttling.

2. Types of Tests Conducted:

- **Latency Test:** The latency test measured the time it took for data to travel from the device to the network server and back. This test is crucial for understanding the responsiveness of the network, particularly for applications that require real-time data exchange.
- **Speed Test:** Speed tests were conducted to measure both download and upload speeds. This provided insights into how quickly data could be sent to and received from the network, which is a critical factor for users engaging in activities like streaming, file uploading, and browsing.
- **Call Test:** Voice call success rates were also tested to evaluate the reliability of traditional mobile communication. This involved making and receiving calls to check for any issues with call connectivity, quality, and stability.



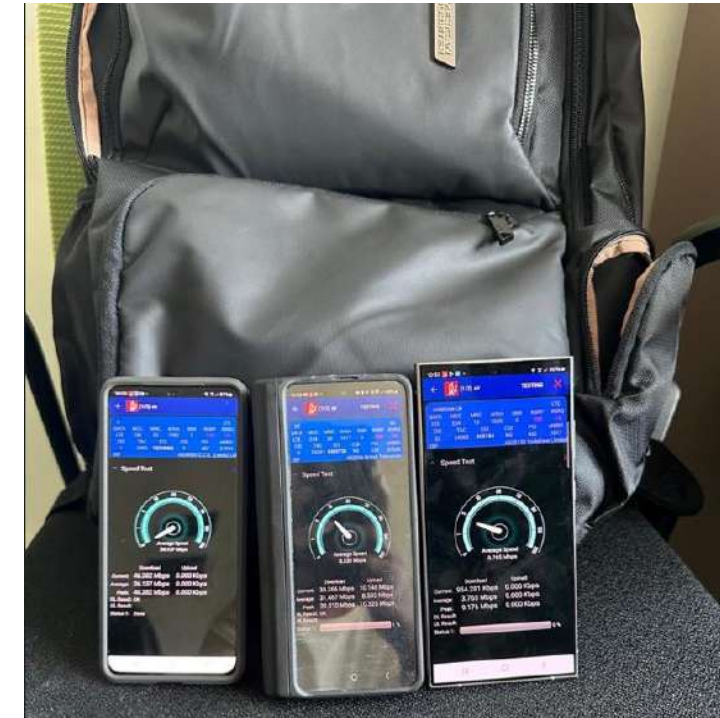
3. Continuous Monitoring:

- **Test Frequency:** The tests were set to run at regular intervals of every 15 minutes throughout the duration of the event. This frequency allowed for a comprehensive data set to be gathered, showing how the network performed over time, especially during peak usage periods.
- **Mobility and Coverage:** The devices were kept in a backpack, which was carried by field engineer as they walked around the event area. This method ensured that the tests covered a wide geographic area within the event, capturing data on network coverage and performance across different locations. This "footprint experience" approach was designed to simulate the real-world experience of engineer moving around the event.

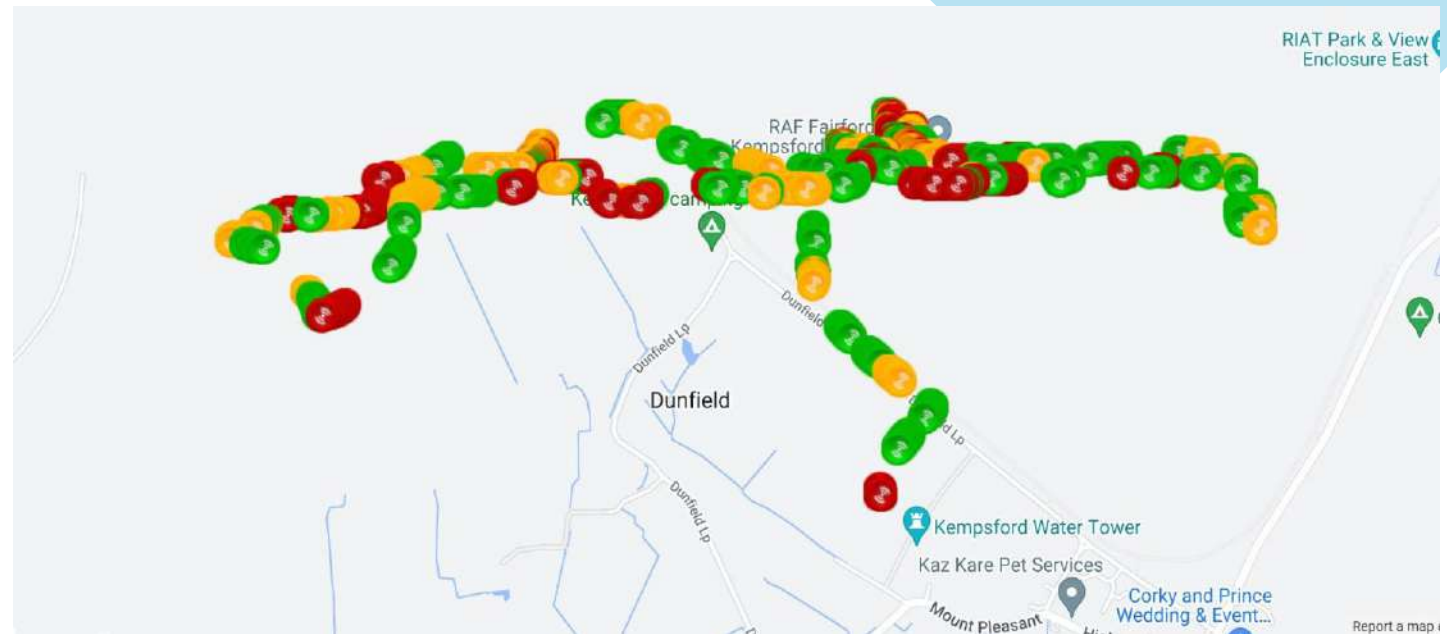


4. Experience at RIAT:

- While conducting these tests, field engineer also had the opportunity to enjoy the event. This dual focus ensured that the testing process was integrated seamlessly into the natural flow of the event, providing authentic insights into how the network performed under typical user conditions.



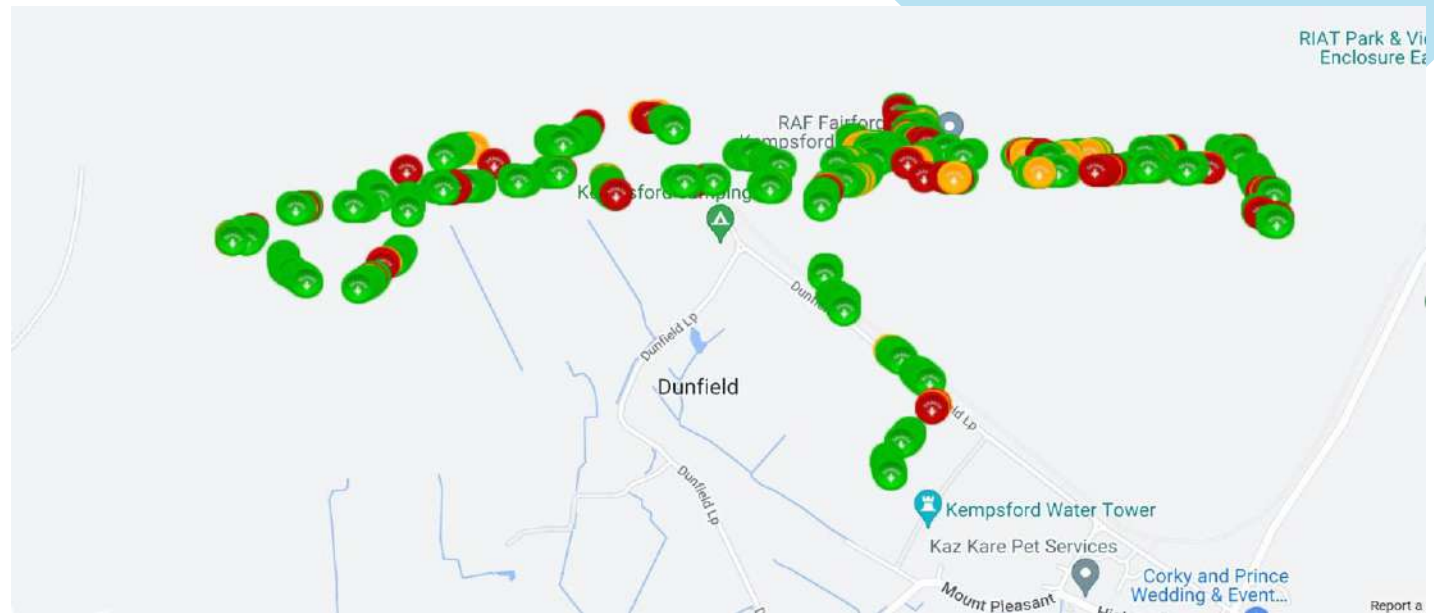
Latency Test Report



Metric	T-Mobile UK (23430)	Vodafone UK (23415)	O2 (UK) (23410)
Low Latency Performance	The majority (78.6535%) of latency measurements are within the optimal range of 0ms to 120ms, indicating strong network performance in most tested locations.	58.3574% of latency measurements are within the optimal range of 0ms to 120ms.	Only 7.589% of latency measurements are within the optimal range of 0ms to 120ms, indicating poor network performance in most tested locations.
Moderate Latency Performance	A smaller proportion (14.6552%) of latency measurements exceed 121ms, suggesting occasional performance issues.	22.3381% of latency measurements exceed 121ms	31.8241% of latency measurements exceed 121ms.
Packet Loss	Dropped packets are relatively low at 6.6913% , indicating good network reliability.	Dropped packets are at 19.3072% , higher than T-Mobile, indicating some reliability issues.	Dropped packets are very high at 65.4161% , indicating significant network reliability issues.
Extremes	The highest recorded latency is 578ms , and the lowest is 25ms.	The highest recorded latency is 10882ms , and the lowest is 25ms	The highest recorded latency is 10901ms , and the lowest is 46ms.
Total Samples	2436 samples were collected	5081 samples were collected	2319 samples were collected.



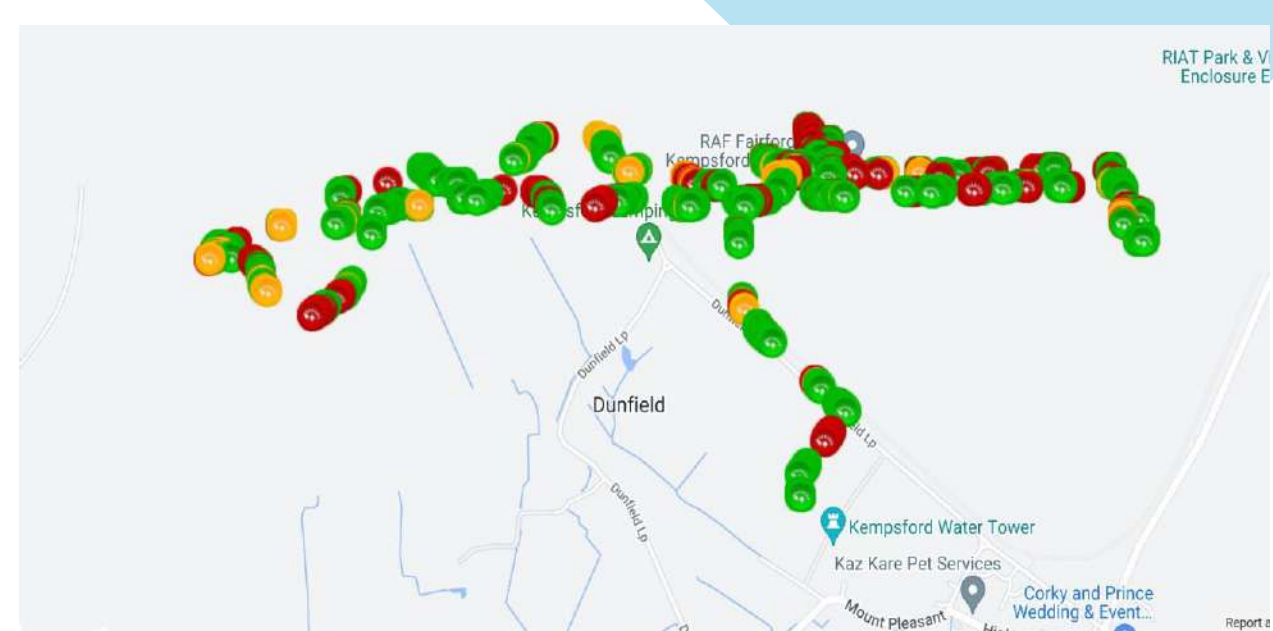
HTTP Download Speed Test Report



Metrics	T-Mobile UK (23430)	Vodafone UK (23415)	O2 (UK) (23410)
High Speed Performance	A significant majority (88.2384%) of download speeds are above 1.2Mbps, indicating good performance in most areas	85.6464% of download speeds are above 1.2Mbps, indicating good performance overall	Only 25.3138% of download speeds are above 1.2Mbps, indicating poor performance in most areas
Moderate Speed Performance	10.4548% of speeds fall within the range of 0.4Mbps to 1.19Mbps	5.2915% of speeds fall within the range of 0.4Mbps to 1.19Mbps	14.6444% of speeds fall within the range of 0.4Mbps to 1.19Mbps
Low Speed Performance	Only 1.3068% of speeds are below 0.39Mbps, showing rare instances of poor performance	9.0621% of speeds are below 0.39Mbps, suggesting some issues with performance in certain areas	A significant majority (60.0418%) of speeds are below 0.39Mbps, showing major performance issues
Average Speed	The average download speed is 5.09Mbps	The average download speed is 13.62Mbps .	The average download speed is 1.66Mbps
Peak Speed	The highest recorded speed is 37.16Mbps	The highest recorded speed is 125.15Mbps	The highest recorded speed is 54.21Mbps
Lowest Recorded Speed	The lowest recorded speed is 0.1Mbps	The lowest recorded speed is 0.01Mbps .	The lowest recorded speed is 0.01Mbps .
Total Samples	1913 samples were collected	3156 samples were collected	478 samples were collected



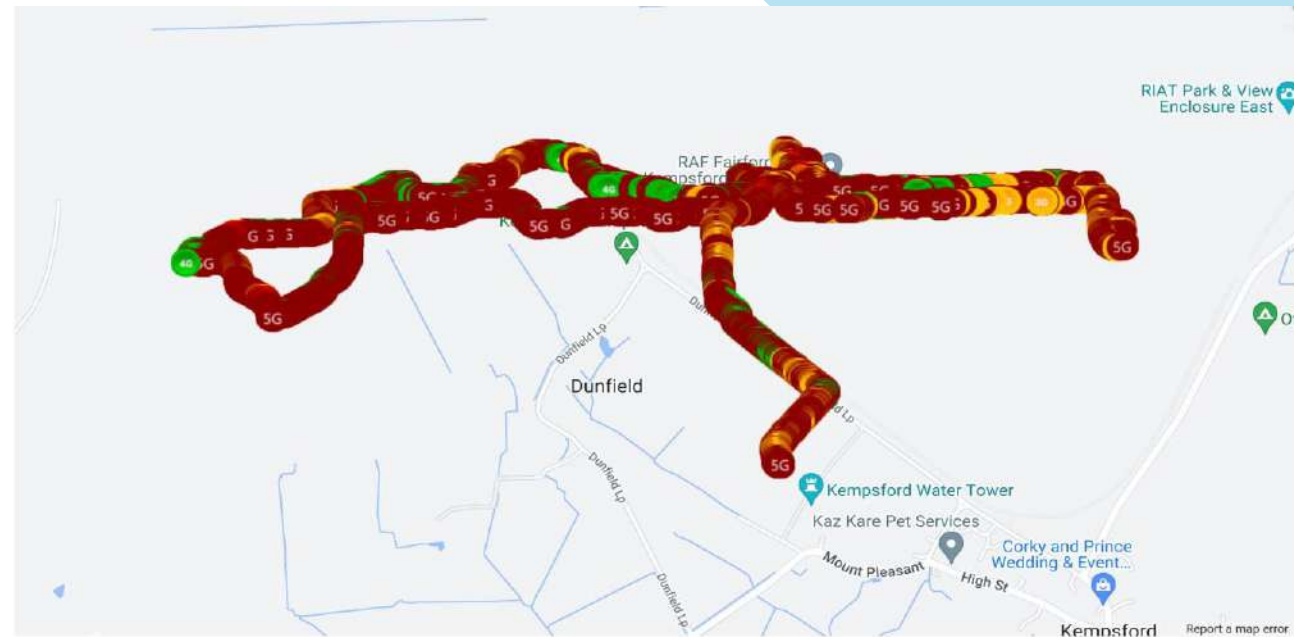
HTTP Upload Speed Test Report



Metrics	T-Mobile UK (23430)	Vodafone UK (23415)	O2 (UK) (23410)
High Speed Performance	The majority (80.7633%) of upload speeds are above 0.5Mbps, indicating strong upload performance in most areas	66.0643% of upload speeds are above 0.5Mbps, indicating good performance overall but not as strong as T-Mobile	Only 16.3810% of upload speeds are above 0.5Mbps, indicating poor performance in most areas.
Moderate Speed Performance	11.8102% of speeds fall within the range of 0.2Mbps to 0.49Mbps.	1.2251% of speeds fall within the range of 0.2Mbps to 0.49Mbps.	8.0000% of speeds fall within the range of 0.2Mbps to 0.49Mbps
Low Speed Performance	7.4265% of speeds are below 0.19Mbps, showing rare instances of poor upload performance.	32.7106% of speeds are below 0.19Mbps, indicating some issues with upload performance in certain areas	A significant majority (75.6190%) of speeds are below 0.19Mbps, showing major upload performance issues
Average Speed	The average upload speed is 8.20Mbps .	The average upload speed is 6.76Mbps	The average upload speed is 0.52Mbps
Peak Speed	The highest recorded upload speed is 97.72Mbps .	The highest recorded upload speed is 62.16Mbps	The highest recorded upload speed is 8.4Mbps
Lowest Recorded Speed	The lowest recorded upload speed is 0.01Mbps .	The lowest recorded upload speed is 0.01Mbps	The lowest recorded upload speed is 0.01Mbps
Total Samples	1939 samples were collected.	3265 samples were collected	525 samples were collected.



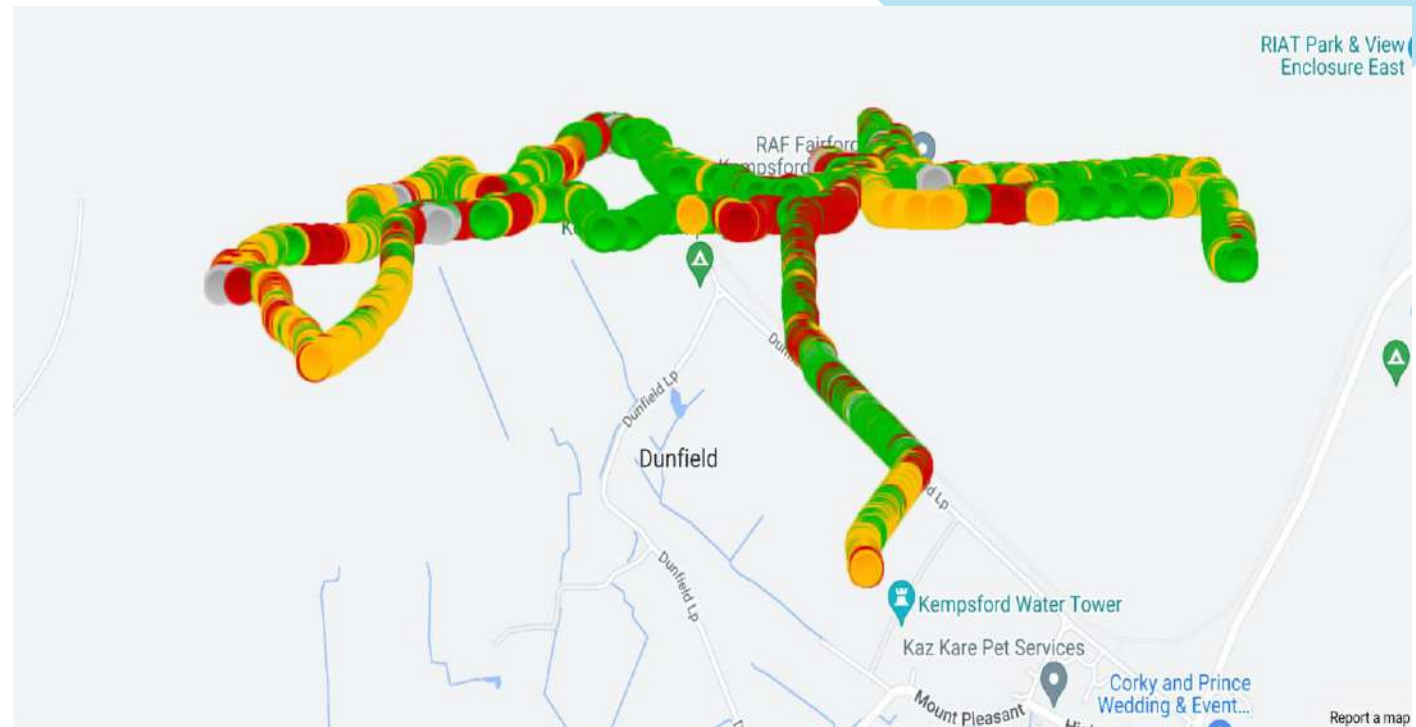
RAN Coverage Report during Test



Metrics	T-Mobile UK (23430)	Vodafone UK (23415)	O2 (UK) (23410)
5G Coverage	The majority of samples (94.1720%) indicate 5G network coverage, showing a strong presence of the latest technology.	A significant majority of samples (93.7342%) indicate 5G network coverage, showing strong adoption of the latest technology.	No samples indicate 5G network coverage, showing a lack of the latest network technology.
4G Coverage	5.8280% of samples indicate 4G network coverage, providing a good backup to 5G.	2.3010% of samples indicate 4G network coverage.	42.8371% of samples indicate 4G network coverage.
3G Coverage	No samples indicate 3G network coverage.	No samples indicate 3G network coverage.	The majority of samples (55.9324%) indicate 3G network coverage, suggesting reliance on older network technology.
2G Coverage	No samples indicate 2G network coverage.	3.7208% of samples indicate 2G network coverage, which is higher compared to T-Mobile.	0.9604% of samples indicate 2G network coverage.
Non-Network	No samples indicate areas without network coverage.	0.2440% of samples indicate areas without network coverage.	0.2701% of samples indicate areas without network coverage.
Total Samples	16884 samples were collected.	31552 samples were collected	9996 samples were collected.



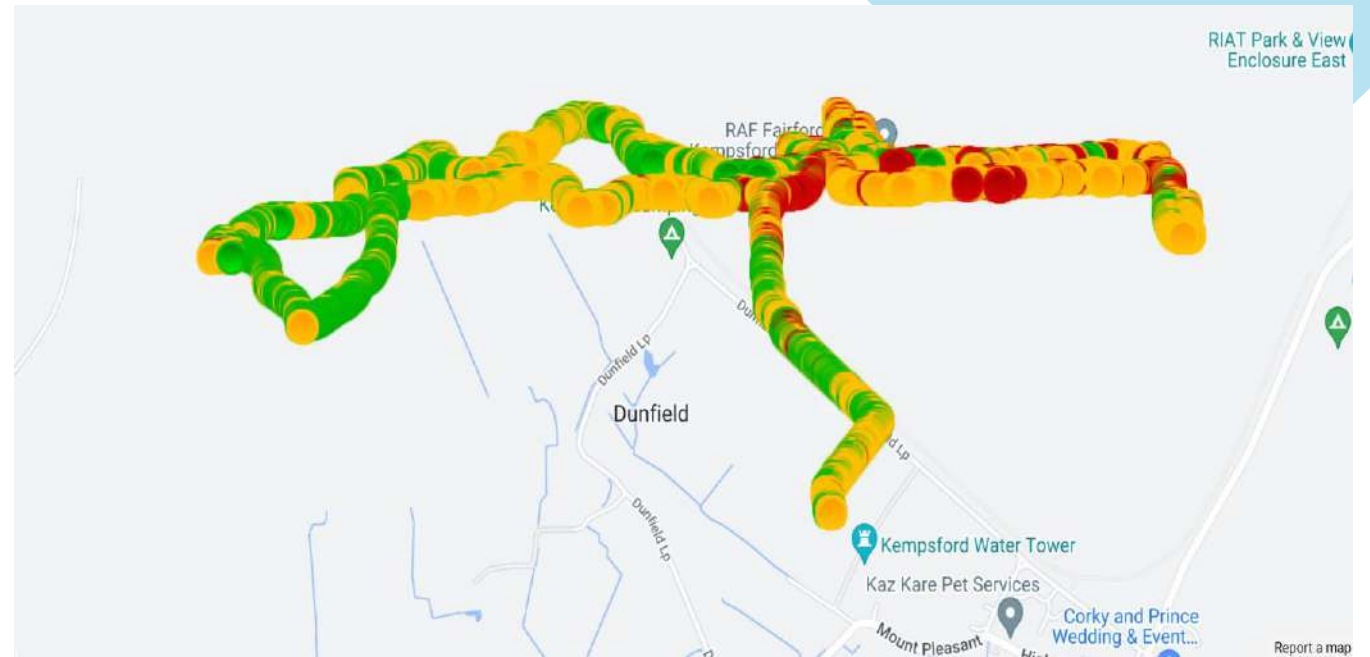
RSRP KPI Statistics



Metrics	T-Mobile UK (23430)	Vodafone UK (23415)	O2 (UK) (23410)
Strong Signal ($\geq -89\text{dBm}$)	Only 12.2424% of samples indicate a strong signal	The majority of samples (52.7199%) indicate a strong signal, showing excellent coverage.	35.8835% of samples indicate a strong signal
Moderate Signal (-99dBm to -90dBm)	20.3743% of samples fall within this range	35.1678% of samples fall within this range	33.0454% of samples fall within this range
Weak Signal (-109dBm to -100dBm)	The majority of samples (38.0123%) fall within this range	11.6802% of samples fall within this range	24.8766% of samples fall within this range
Very Weak Signal ($\leq -110\text{dBm}$)	A significant 29.3710% of samples indicate a very weak signal	Only 0.4321% of samples indicate a very weak signal	6.1945% of samples indicate a very weak signal
Total Samples	16884 samples were collected	29854 samples were collected.	4052 samples were collected



RSRQ KPI Statistics



Metrics	T-Mobile UK (23430)	Vodafone UK (23415)	O2 (UK) (23410)
Good Quality ($\geq -10\text{dB}$)	Only 5.1410% of samples indicate good signal quality, which is significantly lower compared to Vodafone and O2.	A significant 34.7182% of samples indicate good signal quality, reflecting strong network performance.	A substantial 37.8890% of samples indicate good signal quality, showing robust network performance.
Moderate Quality (-11dB to -17dB)	A substantial portion of samples (49.3663%) fall within this range, showing a relatively stable network performance	The majority of samples (63.4691%) fall within this range, indicating a well-balanced network performance.	The majority of samples (62.0612%) fall within this range, indicating consistent network performance.
Poor Quality ($\leq -18\text{dB}$)	A significant 45.4928% of samples indicate poor signal quality, suggesting potential issues with network performance in many areas	Only 1.8126% of samples indicate poor signal quality, showing minimal areas with potential network issues.	Only a very small fraction (0.0498%) of samples indicate poor signal quality, suggesting very few areas with network issues.
Total Samples	16884 samples were collected	29846 samples were collected	4017 samples were collected.



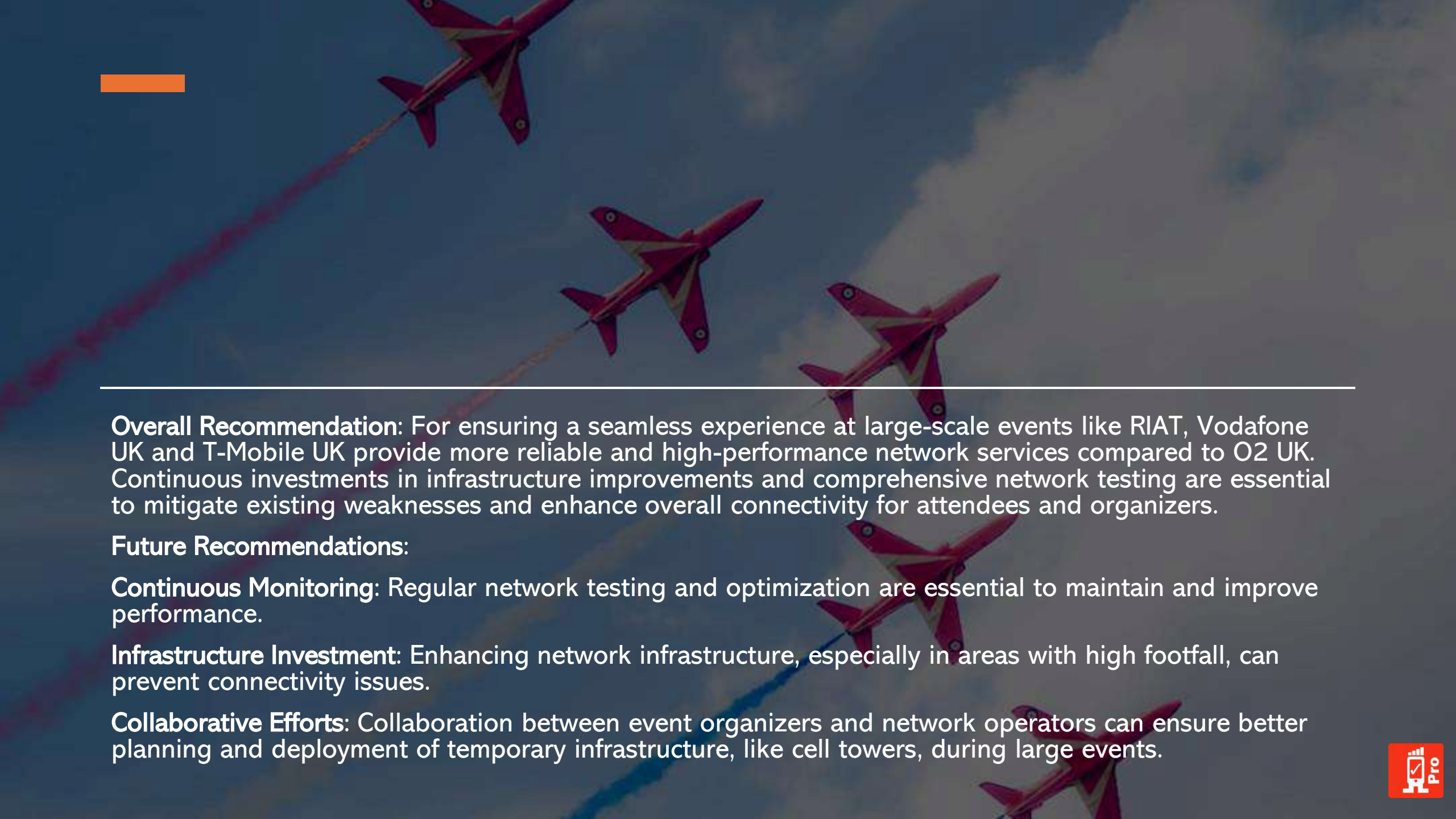
Conclusion

T-Mobile UK (EE): Exhibited the best low latency performance and strong download and upload speeds. However, there were significant issues with weak signal strength and poor signal quality in many areas.

Vodafone UK: Demonstrated the highest download speeds and strong signal strength and quality. However, it had moderate latency performance and higher packet loss compared to T-Mobile.

O2 UK: Showed significant areas for improvement with poor latency, download, and upload performance, and very high packet loss. Reliance on older 3G technology and lack of 5G coverage were major drawbacks.

Ensuring seamless connectivity at events like the Royal International Air Tattoo is crucial not only for enhancing the visitor experience but also for supporting critical event operations and global media coverage. By addressing the weaknesses and building on the strengths identified in these reports, network operators can significantly improve their service quality and reliability at such large-scale events.



Overall Recommendation: For ensuring a seamless experience at large-scale events like RIAT, Vodafone UK and T-Mobile UK provide more reliable and high-performance network services compared to O2 UK. Continuous investments in infrastructure improvements and comprehensive network testing are essential to mitigate existing weaknesses and enhance overall connectivity for attendees and organizers.

Future Recommendations:

Continuous Monitoring: Regular network testing and optimization are essential to maintain and improve performance.

Infrastructure Investment: Enhancing network infrastructure, especially in areas with high footfall, can prevent connectivity issues.

Collaborative Efforts: Collaboration between event organizers and network operators can ensure better planning and deployment of temporary infrastructure, like cell towers, during large events.

If you need raw data from all three network providers, you can request a copy by emailing us at sales@rantcell.com .

Additionally, if there are large coverage areas where you'd like to conduct network testing, both indoors and outdoors, we offer comprehensive testing services to assess network coverage in various environments.