SCRA
SEYCHELLES COMMUNICATIONS REGULATORY AUTHORITY

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Mobile Data Quality of Service

Report

Mahé, Praslin & La Digue, Seychelles

PUBLISHED BY: METRO GLOBAL TELECOM SERVICES (PTY) LTD

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Contents

List of Abbreviations and Acronyms

DL	*Downlink*
ETSI	*European Telecommunications Standards Institute*
GSM	*Global System for Mobile Communications*
HTTP	*Hypertext Transfer Protocol*
HTTPS	*Hypertext Transfer Protocol Secure*
ICMP	*Internet Control Message Protocol*
KPI	*Key Performance Indicator*
LTE	*Long Term Evolution*
Mbps	*Megabits per second*
SFTP	*Secure File Transfer Protocol*
QoS	*Quality of Service*
WCDMA	*Wideband Code Division Multiple Access*
UE	*User Equipment*
UL	*Uplink*
UMTS	*Universal Mobile Telecommunications Service*

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1. EXECUTIVE SUMMARY

As mandated under the Communications Act, 2023, the Seychelles Communications Regulatory Authority (hereinafter referred to as SCRA) has the responsibility to take measures to protect the rights of consumers and end users in relation to matters of customer service, including the quality of service. In addition, the Broadcasting and Telecommunications (Quality of Service) Regulations, promulgated in November 2022, prescribe specific targets for some indicators that service providers must meet to comply with the regulations.

SCRA engaged Metro Global Telecom Services (Pty) Ltd. (MetroTelworks) to conduct a comprehensive Quality of Service (QoS) assessment on the mobile networks of Airtel Seychelles and Cable & Wireless Seychelles (CWS) to assess the performance against the set targets. This evaluation, undertaken from September 25 to October 31, 2024, focused on assessing the performance of data services provided by these operators in multiple regions on the islands of Mahé, La Digue & Praslin. During the assessment period, measurements were conducted across over 1300 kilometres.

The primary objective of this initiative was to evaluate end-user experience concerning data service quality by simulating real-world data usage scenarios. The findings aim to provide valuable insights into service performance and help ensure that both operators meet established specific regulatory targets and industry standards for data, network coverage, and overall service reliability. Measurement activities were carried out in districts where mobile data services are commonly accessed. The sampled regions on Mahé Island included Central, East, North, South, and West, along with the combined region of La Digue & Praslin Islands. Each of these regions encompasses multiple districts.

To facilitate the QoS assessment, a vehicle was equipped with the advanced Keysight Nemo Backpack Pro measurement tool, incorporating four (4) devices dedicated to data testing to simulate typical mobility & stationary conditions. Six test cases were used to evaluate QoS for mobile data services; each test case has several Key Performance Indicators (KPIs) including the HTTP download throughput, HTTP upload throughput, SFTP download throughput, SFTP upload throughput, Latency, Web Browser download time and YouTube performance. A set of 2 devices were set to 4G (LTE) preferred mode and another set of 2 devices were set to 3G (UMTS) preferred mode during the measurements.

In summarising the results, the overall 4G Preferred mobility results indicate that Airtel led in thirteen (13) KPIs[1], and CWS led in seven (7) KPIs[2], out of twenty (20) KPIs and showed the best performance for tests done. CWS met the average Latency target of less or equal to 250ms. Both operators had web browsing time (Web Page Download time) of less than or equal to 11 seconds. Both operators had the overall YouTube Success Ratio of at least 93.5%.

The overall 3G Preferred results indicate both operators were tied at leading in 10 KPIs each. CWS led in ten (10) KPIs[3], and Airtel also led in the other ten (10) KPIs[4], out of twenty (20) KPIs for tests done. CWS met the average Latency target of less or equal to 250ms. Both operators had web browsing time (Web Page Download time) of less than or equal to 9 seconds.

The Overall Stationary measurements result in 4G Preferred mode, indicates that CWS led in ten (10)[5] and Airtel led in the other ten (10) KPIs[6] out of twenty (20) measured KPIs.

The Overall Stationary measurements result in 3G Preferred mode, indicates that Airtel led in nine (9)[7] and CWS led in the other ten (11) KPIs[8] out of twenty (20) measured KPIs.

Airtel demonstrated superior performance in throughput-related metrics (HTTP and SFTP) and file access ratios, and YouTube success ratios, establishing itself as a leader in data-intensive activities. CWS excelled in latency, packet loss ratio, web browsing, and streaming-related metrics, ensuring a faster and more responsive experience for users. Both operators showcase strengths in distinct areas, offering users diverse options based on specific service priorities.

[1] HTTP Dl throughputs, HTTP UL throughputs, Capacity DL throughputs, Capacity UL throughputs SFTP DL throughputs, SFTP UL throughputs, Kepler page browsing time, Unsuccessful file access ratio for both download and upload, Mobile Kepler page browsing time, web-browsing time average for Shein, YouTube Successful Ratio, YouTube average resolution
[2] Overall Browsing Time, web-browsing time average for NBS & SBC, Overall Average Latency, Overall Median Latency, Packet loss ratio, YouTube Access time
[3] Capacity DL throughputs, Overall Browsing Time, web-browsing time average for Shein, NBS & SBC, Overall Average Latency, Overall Median Latency, Packet Loss ratio, YouTube average resolution YouTube Access time
[4] HTTP DL throughputs, HTTP UL throughputs, Capacity UL throughputs SFTP DL throughputs, SFTP UL throughputs, Unsuccessful file access ratio for both upload and download, Kepler page browsing time, Mobile Kepler page browsing time, YouTube Successful Ratio
[5] Capacity DL throughputs, Unsuccessful file access ratio for download, Overall Browsing Time, web-browsing time average for Shein, NBS & SBC, Overall Average Latency, Overall Median Latency, Packet loss ratio, YouTube average resolution and YouTube Access time
[6] HTTP DL throughputs, HTTP UL throughputs, Capacity UL throughputs SFTP DL throughputs, SFTP UL throughputs, Download and upload unsuccessful file access ratio, Kepler page browsing time, Mobile Kepler page browsing time, YouTube Successful Ratio
[7] Capacity DL throughputs, download unsuccessful file access ratio, Overall Browsing Time, web-browsing time average for Shein, NBS & SBC, Overall Average Latency, Overall Median Latency, Packet Loss Ratio, YouTube average resolution YouTube Access time
[8] HTTP DL throughputs, HTTP UL throughputs, Capacity UL throughputs, SFTP DL throughputs, SFTP UL throughputs, Upload unsuccessful file access ratio, Kepler page browsing time, Mobile Kepler page, Packet loss ratio, YouTube Successful Ratio

2. INTRODUCTION

As mandated under the Communications Act, 2023, the Seychelles Communications Regulatory Authority (hereinafter referred to as SCRA) has the responsibility to take measures to protect the rights of consumers and end users in relation to matters of customer service, including the quality of service. In addition, the Broadcasting and Telecommunications (Quality of Service) Regulations, promulgated in November 2022, prescribe specific targets for some indicators that service providers must meet to comply with the regulations.

SCRA is committed to ensuring that all residents of Seychelles have access to high-quality, affordable communication services. To support this goal, SCRA has contracted Metro Global Telecom Services (Pty) Ltd. (Metro Telworks) to perform drive testing of data services in mobility and stationary conditions provided by Airtel Seychelles and Cable & Wireless Seychelles (CWS) on the island of Mahé.

Mahé, the largest island in Seychelles, is a tropical paradise renowned for its breath-taking landscapes, rich Creole culture, and diverse attractions. The Central Region, home to the capital city, Victoria, serves as the vibrant hub of the island, featuring landmarks like the iconic Clock Tower, bustling local markets, and the lush Botanical Gardens. To the north, Beau Vallon Bay captivates visitors with its crystal-clear waters, lively beachfront atmosphere, water sports, and dining options. The eastern side offers a more tranquil escape, characterized by serene fishing villages and peaceful beaches like Anse Royale, perfect for snorkelling and unwinding. In the south, the island's natural beauty shines through secluded beaches such as Anse Intendance, surrounded by lush rainforests that beckon nature enthusiasts and hikers.

The western region is a sanctuary of tranquillity, featuring dramatic granite cliffs, turquoise waters, and attractions like the stunning Port Launay Marine Park. At the heart of the island lies the mountainous Morne Seychellois National Park, offering breath taking hiking trails and panoramic views of Mahé's lush interior.

Beyond Mahé, the combined region of La Digue and Praslin Islands enhances Seychelles' allure. Praslin, home to the UNESCO-listed Vallée de Mai, boasts stunning beaches like Anse Lazio and vibrant coral reefs. Meanwhile, La Digue is known for its relaxed charm, traditional ox-cart culture, and the iconic Anse Source d'Argent, one of the world's most photographed beaches.

Together, these islands offer a harmonious blend of adventure, relaxation, and cultural exploration, making Seychelles a true tropical paradise. Figure 1 depicts the routes which were driven on Mahé as well as La Digue & Praslin islands of Seychelles.

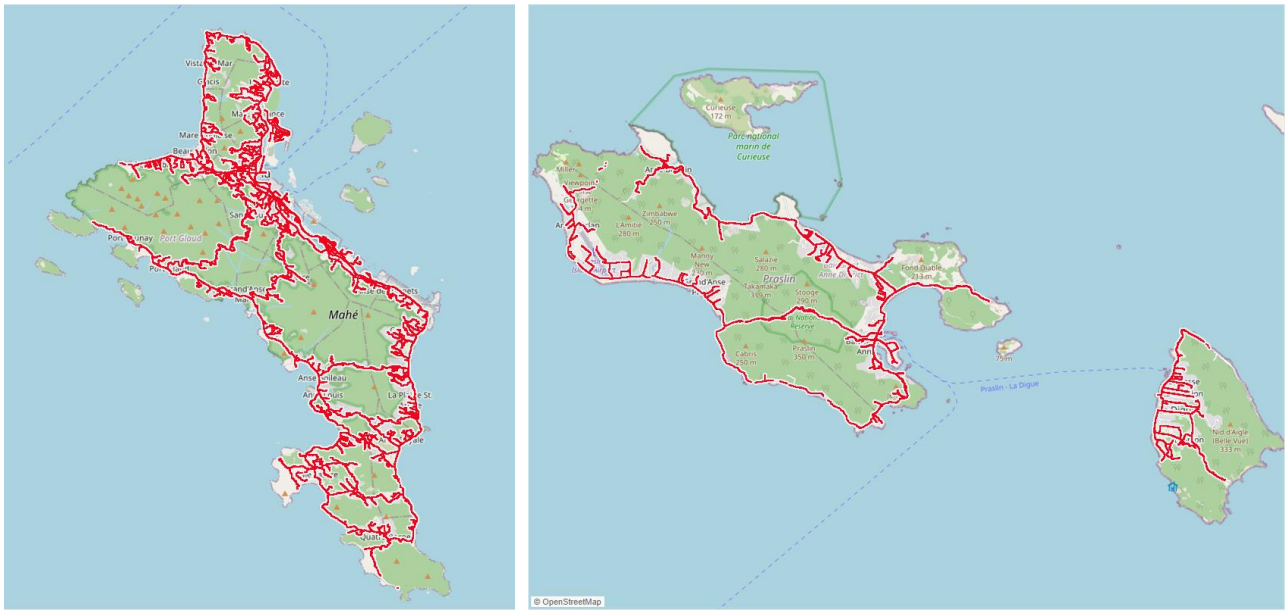

Figure 1. Mahé & La Digue/Praslin Drive Route

The QoS data tests were conducted across the Central, East, North, South, and West regions of Mahé Island, Seychelles, as well as the combined region of La Digue & Praslin Islands. The selected regions included multiple districts, encompassing major roadways, and key economic activity hubs.

3. METHODOLOGY

Drive tests were planned to ensure, as far as practicable, that the results adequately reflect the QoS perceived by customers for the period under review.

Data testing set-up consisted of two categories which were Mobile and Stationary testing, each tested separately in 4G/LTE Preferred mode and 3G/UMTS Preferred mode. A vehicle was equipped with the advanced Keysight Nemo Backpack Pro measurement tool, incorporating four (4) devices dedicated to data testing to simulate typical mobility & stationary conditions. The set-up results in one user equipment (UE) per operator. Details of test case methodology can be found on Table 1.

The results are based on a user whose smartphone is Long Term Evolution (LTE) capable. These devices will select LTE as the preferred serving technology where available and cascade down to UMTS in the absence of LTE and finally select GSM in the absence of UMTS.

3.1. TEST CASES

Table 1 shows the sequence of tests within the methodology used for both mobile and stationary tests. The mobile was always connected to the data network (PDP always on/always attached) between the different tests, a 10 second pause was inserted to allow the phone and the network to release any resources used on the previous test. Technology for testing used in Seychelles were 4G Preferred and 3G Preferred.

Table 1. Test Case Methodology Flow Cycle

SCRA BENCHMARKING DATA TESTING METHODOLOGY			
Test Number	***Test Type & Timeout***	***4G Preferred Technology***	***3G Preferred Technology***
PDP always on			
1	***ICMP PAYLOAD PING 800 BYTES***		
	Secure FILE TRANSFER DOWNLOAD	*SFTP DL (5MB)*	*SFTP DL (3MB)*
	135s	***wait 10s***	***wait 10s***
2	***ICMP PAYLOAD PING 800 BYTES***		
	Secure FILE TRANSFER UPLOAD	*SFTP UL (3MB)*	*SFTP UL (1MB)*
	135s	***wait 10s***	***wait 10s***
3	***ICMP PAYLOAD PING 800 BYTES***		
	FILE TRANSFER DOWNLOAD	*HTTPS Get (5MB)*	*HTTPS Get (3MB)*
	135s	***wait 10s***	***wait 10s***

SCRA BENCHMARKING DATA TESTING METHODOLOGY			
Test Number	**Test Type & Timeout**	**4G Preferred Technology**	**3G Preferred Technology**
4	**ICMP PAYLOAD PING 800 BYTES**		
	FILE TRANSFER UPLOAD	HTTPS Put (3MB)	HTTPS Put (1MB)
	135s	**wait 10s**	**wait 10s**
5	**ICMP PAYLOAD PING 800 BYTES**		
	ICMP PING 32 BYTES	Ping (32 bytes) * 5	Ping (32 bytes) * 5
		wait 10s	**wait 10s**
6	**ICMP PAYLOAD PING 800 BYTES**		
	YOUTUBE STREAMING	Video: YouTube 60sec	Video: YouTube 60sec
	95 seconds	**wait 10s**	**wait 10s**
7	**ICMP PAYLOAD PING 800 BYTES**		
	STATIC WEB BROWSING	HTTPS Browsing: Kepler	HTTPS Browsing: Kepler
	45s	**wait 10s**	**wait 10s**
8	**ICMP PAYLOAD PING 800 BYTES**		
	LIVE WEB BROWSING	Shein, NBS, SBC	Shein, NBS, SBC
	45s	**wait 10s**	**wait 10s**
9	**ICMP PAYLOAD PING 800 BYTES**		
	STATIC WEB BROWSING	HTTPS Browsing: Mobile Kepler	HTTPS Browsing: Mobile Kepler
	45s	**wait 10s**	**wait 10s**
10	**ICMP PAYLOAD PING 800 BYTES**		
	ICMP PING 32 BYTES	Google & Independent Server	Google & Independent Server
		wait 10s	**wait 10s**
11	**ICMP PAYLOAD PING 800 BYTES**		
	FILE TRANSFER – CAPACITY DOWNLOAD	HTTPS Get (500MB) - Multiple files	HTTPS Get (500MB) - Multiple files
	10s fixed duration	**wait 10s**	**wait 10s**
12	**ICMP PAYLOAD PING 800 BYTES**		
	FILE TRANSFER – CAPACITY DOWNLOAD	HTTPS Put (500MB) - Multiple Files	HTTPS Put (500MB) - Multiple Files
	10s fixed duration	**wait 10s**	**wait 10s**

3.2. EQUIPMENT TEST SETUP AND CONFIGURATION

3.2.1. SYSTEM USED.

The testing equipment used was a Nemo Backpack Pro that was equipped with 12 Samsung Galaxy A52S (5G) devices supporting the following technologies: - GSM, UMTS, LTE, LTE-A & 5G. Figure 2 & 3 below shows the testing kit used for collection and full set of technologies supported by the devices:

The mobile devices were configured to automatically select a mobile network and radio access technology.

- Voice/Circuit switched test - 4 mobile devices were used for Short Call.
- Voice/Circuit switched test - 4 mobile devices were used for Long Call:[9] and
- Data/packet switched test - 4 mobile devices were used for data test.

The mobile devices were configured to automatically select a mobile network and radio access technology. The results for voice services are provided in a separate report. The Samsung Galaxy A52S (5G) Smartphone supports the following technologies GSM, CDMA, HSPA, LTE, LTE-A and 5G.

Figure 2. Drive Test System hardware configuration

[9] Voice/Circuit-switched tests were used to perform mobile voice service tests and reported accordingly in a separate voice report.

3.3. ROUTE SELECTION

The QoS benchmark was conducted on the Mahé Island of Seychelles and covered the regions listed in Table 2 and for stationary points the regions listed in Table 3 below.

Table 2. Regions tested in Mobility mode.

Regions Testing Dates - Mobility		
Regions	**Dates**	**Phases**
Central	04/10/2024 to 07/10/2024	Phase 1
	18/10/2024 to 21/10/2024	Phase 2
East	08/10/2024 to 16/10/2024	Phase 1
	21/10/2024 to 31/10/2024	Phase 2
North	03/10/2024 to 04/10/2024	Phase 1
	18/10/2024	Phase 2
South	09/10/2024 to 14/10/2024	Phase 1
	22/10/2024 to 28/10/2024	Phase 2
West	10/10/2024 to 11/10/2024	Phase 1
	31/10/2024	Phase 2
Praslin & La Digue	23/10/2024 to '24/10/2024	Phase 1
	29/10/2024 to 30/10/2024	Phase 2

Table 3. Regions tested in stationary mode.

Regions Testing Dates - Stationary	
Regions	**Dates**
Central	25/09/2024 to 30/09/2024
	01/10/2024 to 03/10/2024
East	02/10/2024
	15/10/2024 to 16/10/2024
North	26/09/2024 to 27/09/2024
	02/10/2024
South	14/10/2024 to 15/10/2024
West	11/10/2024 to 14/10/2024
Praslin & La Digue	24/10/2024 to 25/10/2024
	29/10/2024 to 30/10/2024

3.4. TEST OVERVIEW

3.4.1. MEASUREMENT ENVIRONMENT

For this campaign, two main environments were used for data measurement testing. The tests covered both stationary and mobile user simulations. The data collection environments are explained as follows:

Mobile Drive Test Scenario: The purpose of this scenario is to emulate a nomadic wireless user in mobile conditions. The location types covered by this test scenario were districts sub-districts, and towns.

Static Points of Interest (SPOI) Scenario: The purpose of this scenario is to emulate an outdoor nomadic wireless user in a non-mobile situation at public points of concentration. These location types include shopping centres, churches, districts and sports complex.

3.4.2. QUALITY CONTROL

When conducting benchmark testing, it is important to ensure that the test environment functions correctly throughout the campaign. The following measures were therefore put in place to ensure reliable and objective results:

- Daily integrity checks were performed on the vehicle installation and test equipment operation, prior to the commencement of each day's test campaign.
- During the mobility test, there were two people in the test vehicle: a driver and technician responsible for monitoring the equipment.
- The same equipment was used throughout the campaign.
- Daily checks were performed on the collected test data for validation and checked for any abnormalities.

3.4.3. TEST CASES

Data/ Packet switched services benchmark testing is more complex than voice benchmark testing as there is number of applications running on the data bearer, compared to only one in the case of circuit-switched (voice). It is therefore common practice to conduct tests using several applications or protocols. Table 4 lists the test types used in the benchmarking campaign. These are widely used by operators and regulators around the world to measure the basic factors which affect users' experience of data; speed, latency (or response) and video content reproduction quality.

Table 4. Test Types

Test Case	Key Measurements	Test Description
32-byte ICMP Ping	1. Round trip time or latency, in milliseconds 2. Packet size used for test – 32 bytes 3. Packet loss	RTT (Round Trip Time) is the time required for a packet to travel from a source to a destination and back. It measures the delay on a network at a given time. Testing was conducted to two servers: 1. The server hosted within the Microsoft Azure environment making this the "Independent Server." 2. https://www.google.com Packet loss is measured by how many of the ping packets that were sent did not get a response from the network.
HTTPS	1. HTTPS Protocol 2. Download and Upload throughput 3. Unsuccessful file access ratio	The majority of downloading and uploading to the internet is currently done using the HTTPS protocol and tests were done to assess the throughput speeds that users may experience when using these services. The HTTPS testing files were downloaded and uploaded between the independent server and the device to measure the throughput performance and file accessibility. Unsuccessful File access ratio is measured by calculating how many of the download or upload attempts are completed without any error in the file transfer process.
Capacity	1. HTTPS Protocol (500MB) - Multiple files 2. Capacity Download Upload Throughput Speeds are measured	1. Reference files are downloaded simultaneously from the test server to the users' device to measure capacity download throughput, using the HTTP 'get' command. 2. Reference files are uploaded simultaneously from the users' device to the test server to measure capacity upload throughput, using the HTTP 'put' command.
SFTP	Secure File transfer protocol used. Download and Upload throughput speeds are measured	A reference file is downloaded from the test server to the users' device to measure download throughput, using the FTP 'get' command and SFTP protocol. A reference file is uploaded from the users' device to the test server to measure upload throughput, using the FTP 'put' command and SFTP protocol.

Test Case	Key Measurements	Test Description
		Throughput is the rate at which data is transferred from the server to the user or vice versa and is measured in kbps. The throughput speed varies in any data transfer session.
Browser	Web browsing session time (page loading) – measured for both HTTP and HTTPS protocols.	This test case is associated with web page download or browsing. Customer experience in this environment is difficult to measure due to the dynamic nature of web pages, which carry dynamic content. In accordance with common international best practice, two assessment types were conducted to measure the page loading times and were as follows: 1. Testing of the ETSI Kepler reference page hosted on the independent, with static fixed size content. This allows repeatable test and measurement. The test server is configured in an HTML web page format; to assess throughput as well as the time takes for the page to display on the user's device. This page provides both a mobile version as well as a standard desktop version and both pages were assessed. 2. International and Local websites were also used to test HTTPS performance from live websites with dynamic content with the following being selected. ○ Shein – **HTTPS Protocol** ○ NBS – **HTTPS Protocol** ○ SBC – **HTTPS Protocol** NB: For dynamic websites, the content can vary throughout the day and hence the values are to be used as an indication of performance
YouTube	1. ETSI YouTube Video Play Start 2. Video Average Resolution 3. Overall YouTube Access Success Ratio	YouTube is the most popular video-sharing service on the mobile internet platform and is therefore commonly used as the reference test by MNOs for video experience. Testing involves repeated downloading and playback of a known video clip. The clip selected was 60 seconds long. **https://www.youtube.com/watch?v=NJHcdKf5iHs** The YouTube test was aimed at measuring the following elements that make up the customer experience: 1. How long does a subscriber wait before a video starts playing on their device?

Test Case	Key Measurements	Test Description
		2. At what resolution was the Video clip delivered to the user? 3. The overall access success ratio per operator is the percentage of successful attempts to overall attempts.

3.4.4. MEASURED PARAMETERS AND TARGETS

Table 5 shows the parameters and their respective target as per SCRA.

Table 5: Parameters and Targets

Parameter	Target
FTP Average Download throughput	NA
HTTP Average Download throughput	NA
FTP Average Upload throughput	NA
HTTP Average Upload throughput	NA
Web Page Download time	NA
Video Streaming Completion Success Rate	NA
Latency	≤ 250ms
Packet Loss Ratio	<1%

4. OVERALL RESULTS

This section provides a summary of the mobile operator's data test performance results based on the drive test route in the following tested regions combing all districts: Central, East, North, South, West and La Digue & Praslin.

4.1. MOBILE DRIVE TEST RESULTS

4.1.1. 4G PREFERRED MOBILE DATA TEST SUMMARY RESULTS

Data results are based on a user whose smartphones is LTE/4G capable and the device will select LTE as the preferred serving technology where available, move to UMTS in the absence of LTE and finally GSM in the absence of UMTS. The results are based on districts where the operators had coverage.

Table 6. Mobile Drive Test Overall Results – 4G Preferred

		Airtel	CWS
File Transfer	HTTP DL Throughput - Avg [Mbps]	16.77	7.30
	HTTP UL Throughput - Avg [Mbps]	9.07	6.25
	Capacity DL Throughput - Avg [Mbps]	39.25	24.64
	Capacity UL Throughput - Avg [Mbps]	18.73	18
	SFTP DL Throughput - Avg [Mbps]	12.05	5.91
	SFTP UL Throughput - Avg [Mbps]	5.6	3.51
	Unsuccessful file access ratio [%] - DL	1.0	1.1
	Unsuccessful file access ratio [%] - UL	3.6	5.0
HTTPS Browser	Overall HTTPs Browsing Time [s]	10.2	10.1
	Kepler Page	4.6	5.2
	Mobile Kepler Page	1.9	2.9
	Shein	7.4	8.3
	NBS	18.2	16.6
	SBC	18.5	17.8
Latency	Overall Average Ping Latency [ms]	274	242
	Overall Median Ping Latency [ms]	254	204
	Packet Loss Ratio [%]	3.59	3.26
YouTube	YouTube Successful Ratio [%]	93.79%	93.53%
	YouTube Average Resolution [pixels]	1060	1027
	YouTube Access Time [s]	5.7	2.2

In Table 6, the values in the green blocks indicate which operator is leading in each respective KPI. The results are based on where the Operators had coverage. Airtel led in thirteen (13) KPIs, and CWS led in seven (7) KPIs, out of twenty (20) KPIs and showed the best performance for tests done.

4.1.2. FILE TRANSFER RESULTS

4.1.2.1. HTTP DOWNLOAD

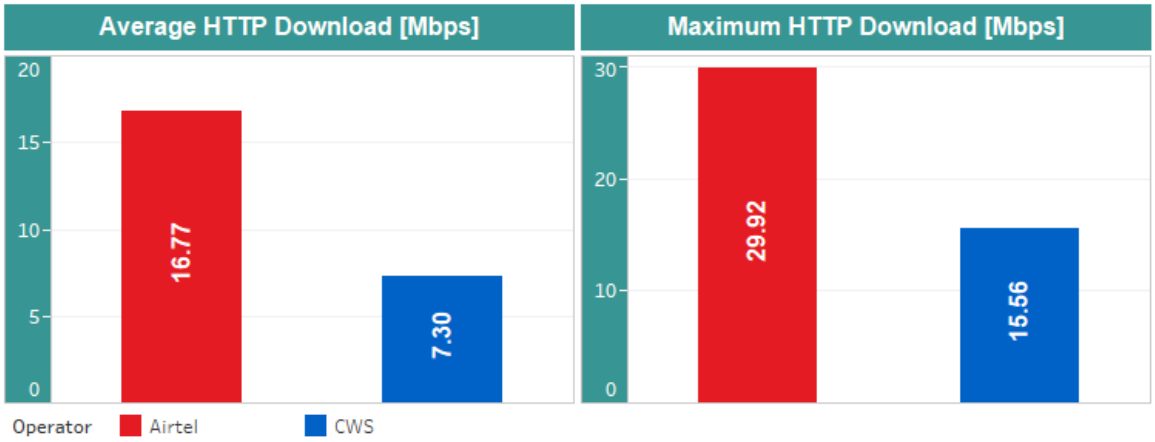

Figure 3.Average HTTP Download Throughput Results [Mbps]

Figure 3 provides a graphical view of the HTTP Download throughput overall test results in Table 6 and incorporates the average and maximum values achieved by each operator. Airtel achieved the highest results for average HTTP Download throughput followed by CWS in descending order. For maximum HTTP Download throughput, Airtel achieved the highest results followed by CWS.

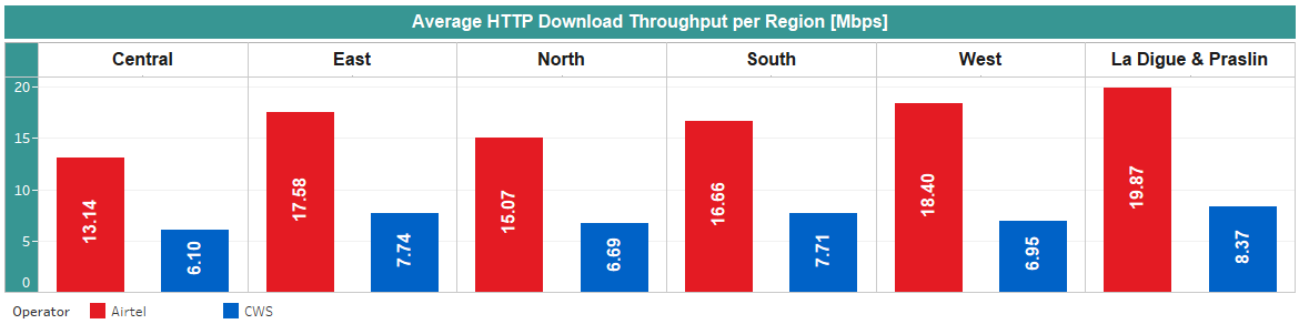

Figure 4. Average HTTP Download Throughput results per Region (Mbps)

Figure 4 shows HTTP Download test results per region. Airtel achieved the highest results for average HTTP download throughput across all five tested regions of Mahé island—Central, East, North, South, and West—as well as in the combined La Digue & Praslin Islands region.

4.1.2.2. HTTP CAPACITY DOWNLOAD

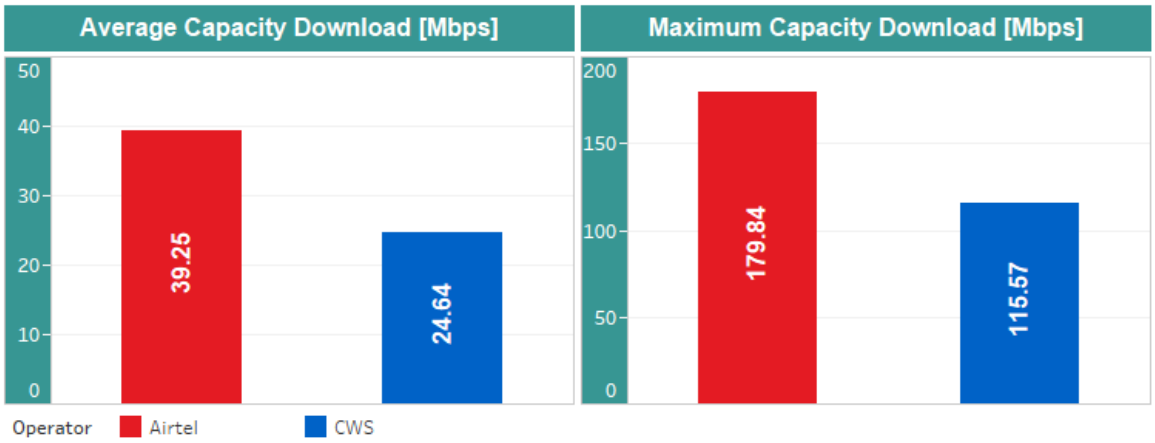

Figure 5. Average Capacity Download Throughput Overall Results (Mbps)

Figure 5 provides a graphical view of the results in Table 6 for the overall HTTP Capacity Download test and incorporates the average and maximum values achieved by each operator. Airtel Seychelles achieved the highest results for the overall average HTTP Capacity Download throughput and the overall Maximum HTTP Capacity Download throughput followed by CWS.

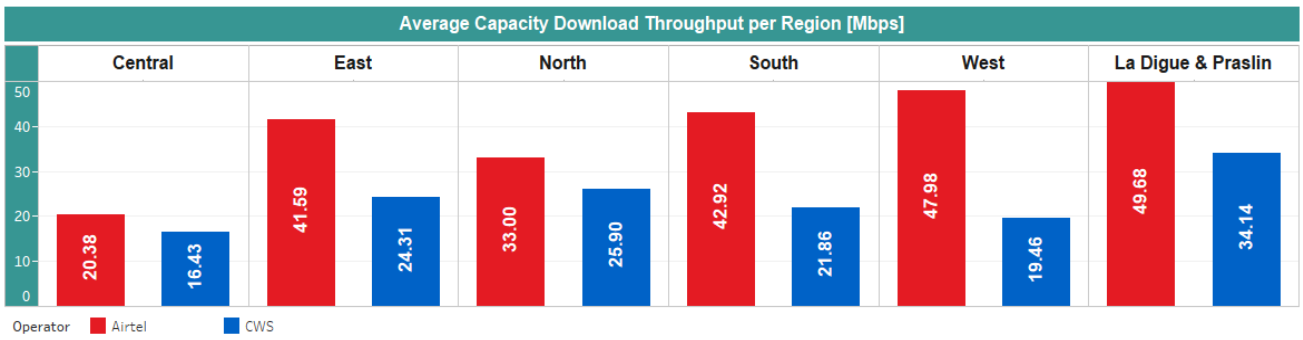

Figure 6. Average Capacity Download Throughput Results per Region (Mbps)

Figure 6 above shows the Average HTTP Capacity Download Throughput results per region. Airtel Seychelles achieved the highest throughput for average HTTP Capacity Download in all six (6) regions tested on the island of Mahé and La Digue & Praslin.

4.1.2.3. SFTP DOWNLOAD

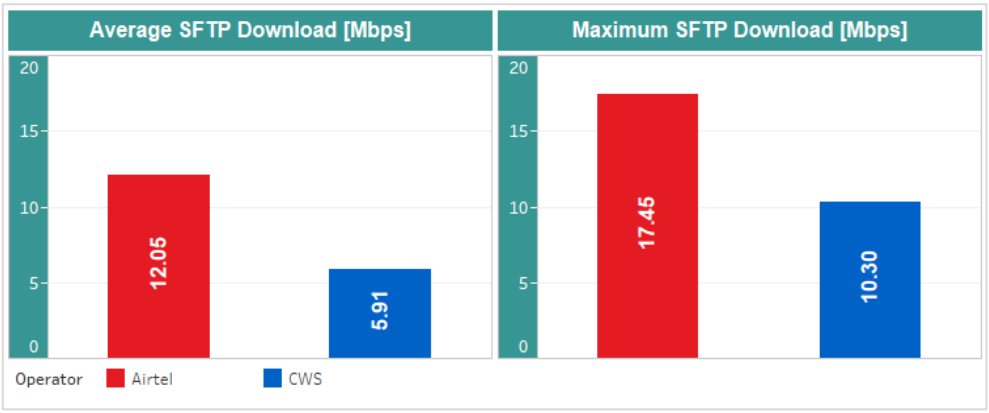

Figure 7. Average SFTP Download Throughput (Mbps) - Overall Results

Figure 7 provides a graphical view of the SFTP Download test results in Table 6 for and incorporates the average and maximum values achieved by each operator. Airtel Seychelles achieved the highest results for the overall average SFTP Download throughput followed by CWS in descending order. Airtel Seychelles achieved the highest for the overall maximum FTP download throughput results followed by CWS in descending order.

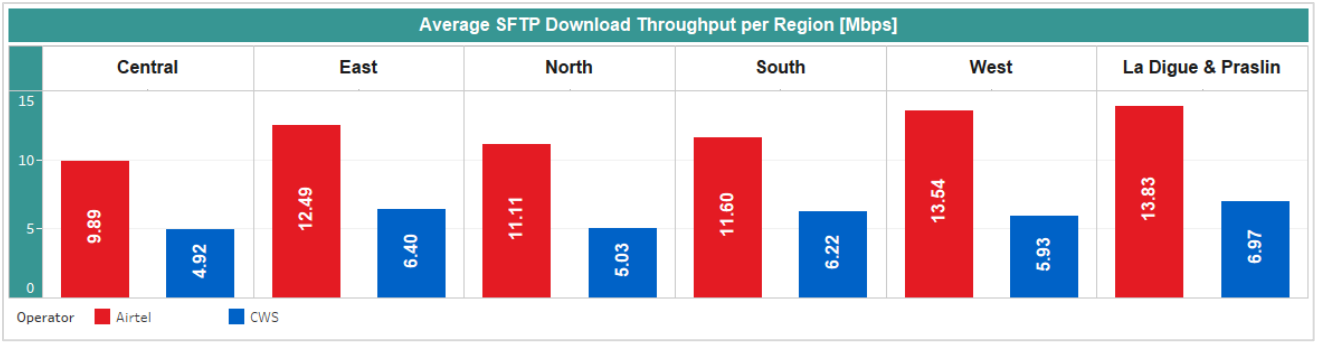

Figure 8. Average SFTP Download Throughput Results per Region (Mbps)

Figure 8 shows SFTP Download Throughput results per region. Airtel Seychelles achieved the highest results for average SFTP download throughput across all five tested regions of Mahé—Central, East, North, South, and West—as well as in the combined La Digue & Praslin Islands region.

4.1.2.4. HTTP UPLOAD

Figure 9. Average HTTP Upload Throughput Overall Results (Mbps)

Figure 9 provides a graphical view of the overall HTTP Upload Throughput results in Table 6 for HTTP Upload test and incorporates the average and maximum values achieved by each operator. Airtel Seychelles achieved the highest results for average HTTP Upload throughput followed by CWS. For maximum HTTP Upload throughput Airtel Seychelles achieved the highest followed by CWS.

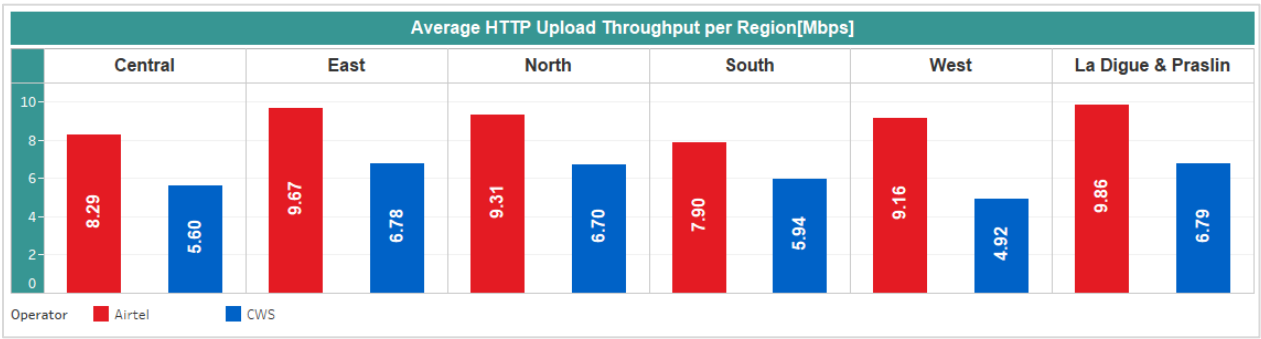

Figure 10. Average HTTP Upload Throughput Results per Region (Mbps)

Figure 10 shows the Average HTTP Upload Throughput test results per region per operator. Airtel Seychelles achieved the highest results for average HTTP Upload throughput across all five tested regions of Mahé—Central, East, North, South, and West—as well as in the combined La Digue & Praslin Islands region.

4.1.2.5. HTTP CAPACITY UPLOAD

Figure 11. Average HTTP Capacity Upload Overall Results (Mbps)

Figure 11 provides a graphical view of the HTTP Capacity Upload Overall results in Table 6 and incorporates the average and maximum values achieved by each operator. The results shows that Airtel achieved the highest results for the overall average capacity throughput followed by CWS Seychelles in descending order. For Maximum HTTP Capacity Upload throughput CWS achieved the highest results followed by Airtel in descending order.

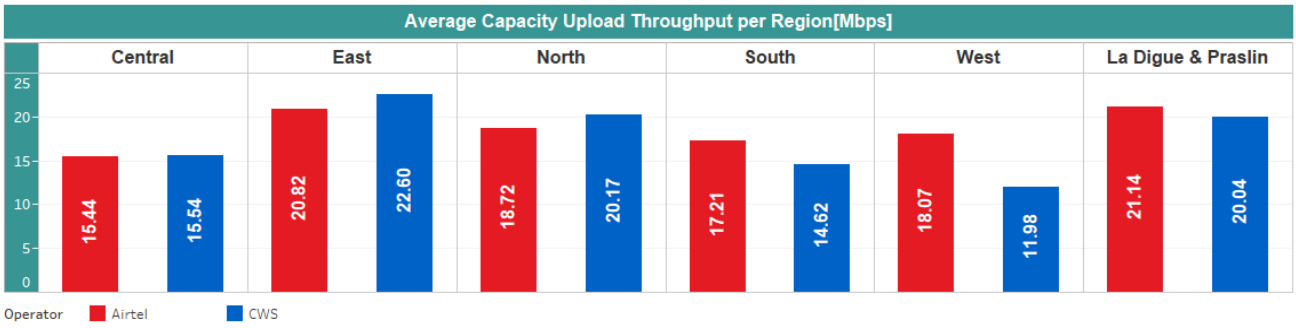

Figure 12. Average HTTP Capacity Upload Results per Region (Mbps)

Figure 12 shows the HTTP Capacity Upload results per region. CWS achieved the highest results for average HTTP Capacity Upload in three (3) tested regions: Central, East and North. Airtel Seychelles achieved the highest results for average HTTP Capacity Upload in three (3) tested regions: South and West on Mahé and in the combined La Digue & Praslin Islands region.

4.1.2.6. SFTP UPLOAD

Figure 13. Average SFTP Upload Throughput Overall Results (Mbps)

Figure 13 above provides a graphical view of the SFTP Upload overall results in Table 6 and incorporates the average and maximum values achieved by each operator. Airtel achieved the highest results for average SFTP upload throughput followed by CWS in descending order. For the maximum FTP upload throughput, Airtel Seychelles achieved the highest results followed CWS.

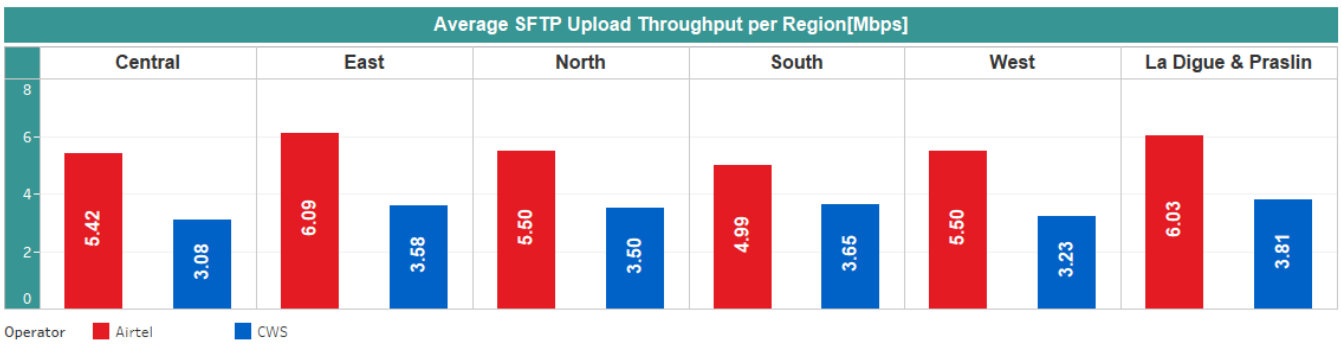

Figure 14.Average SFTP Upload Results per Region (Mbps)

Figure 14 shows the SFTP Upload results per district. Airtel Seychelles achieved the highest results for the average SFTP Upload across all five tested regions of Mahé—Central, East, North, South, and West—as well as in the combined La Digue & Praslin Islands region.

4.1.2.7. HTTP UNSUCCESSFUL FILE ACCESS RATIO

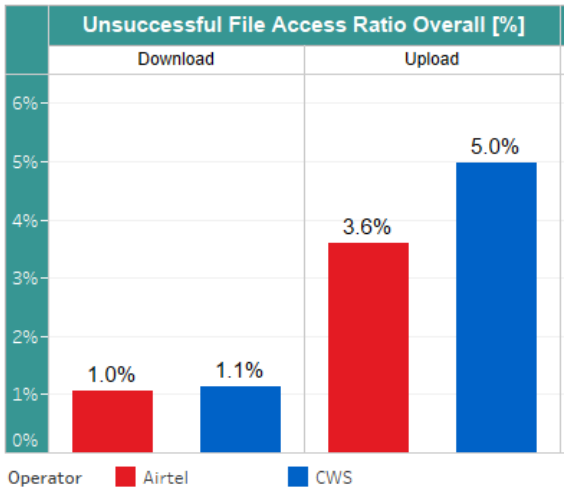

Figure 15. Unsuccessful File Access Ratio (%)

Figure 15 above provides a graphical view of the unsuccessful file access ratio in Table 6. Comparatively, Airtel had less Overall unsuccessful file access ratio than CWS for both upload and download.

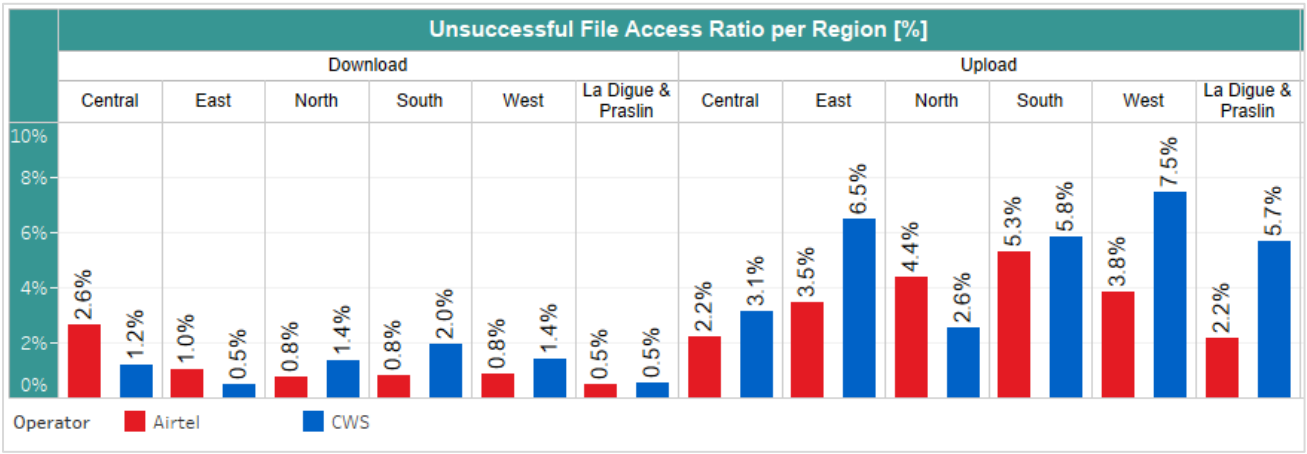

Figure 16. Unsuccessful File Access Ratio Results per Region (%)

Figure 16 shows the unsuccessful file access ratio per region for Download & Upload test, CWS had higher unsuccessful file access ratio for upload in all regions except North where Airtel was higher.

4.1.3. YOUTUBE RESULTS

4.1.3.1. YOUTUBE SESSION SUCCESS RATIO

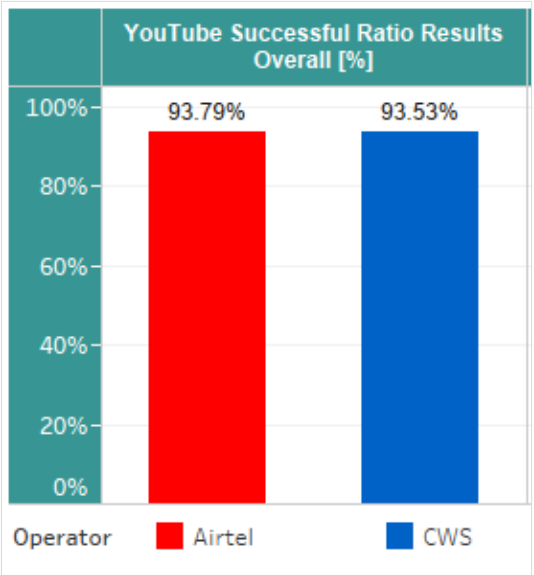

Figure 17. YouTube Success Overall Ratio (%)

Figure 17 depicts the Overall results for YouTube Success Ratio. Airtel and CWS achieved an average YouTube Successful Ratio > 93.5%.

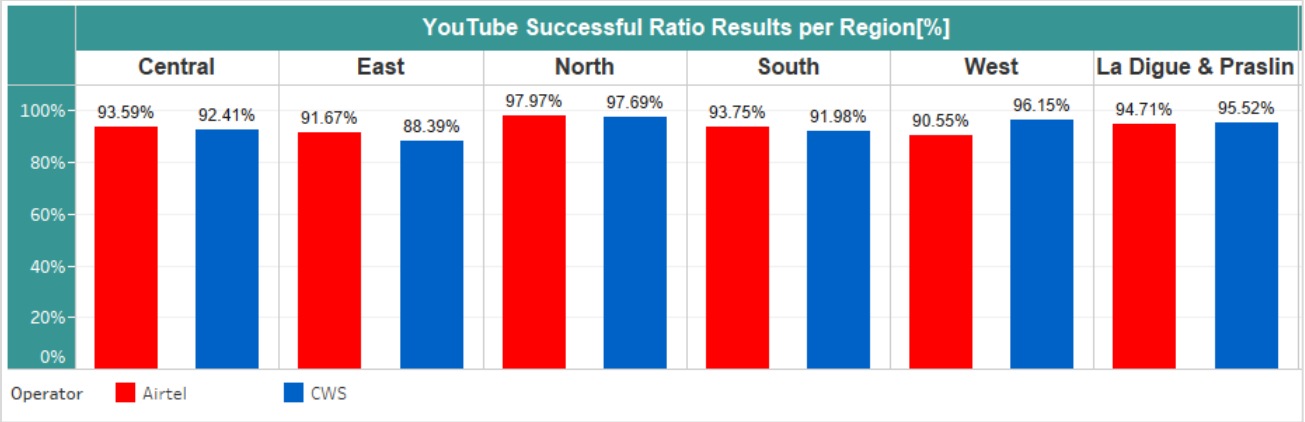

Figure 18. YouTube Success Ratio Results per Region [%]

Figure 18 shows results for YouTube Success Ratio per region. Airtel Seychelles achieved the highest YouTube Success Ratio in four (4) tested regions: Central, East, North and South CWS achieved the highest YouTube Success Ratio in in two (2) tested regions: West Region & in the combined La Digue & Praslin Islands region.

4.1.4. WEB BROWSING RESULTS

4.1.4.1. WEB BROWSING PAGE DOWNLOAD TIME

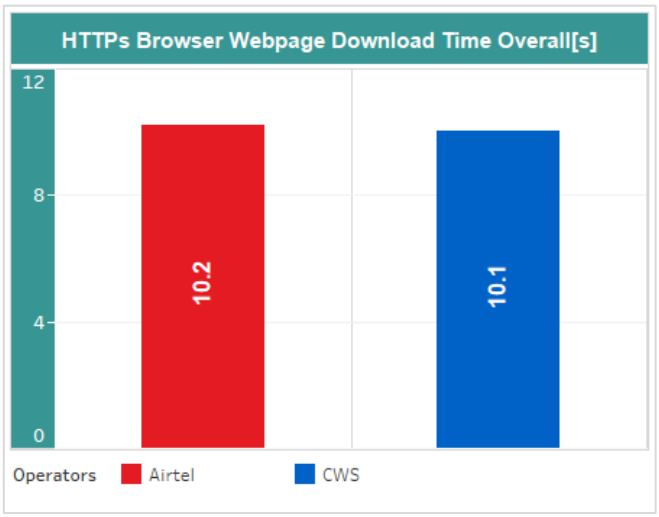

Figure 19. Web Browsing Page Average Load Time Overall Result (s)

Figure 19 depicts overall results for web browser page load time on HTTPS protocol. CWS achieved the fastest overall browser download time followed by Airtel in ascending order.

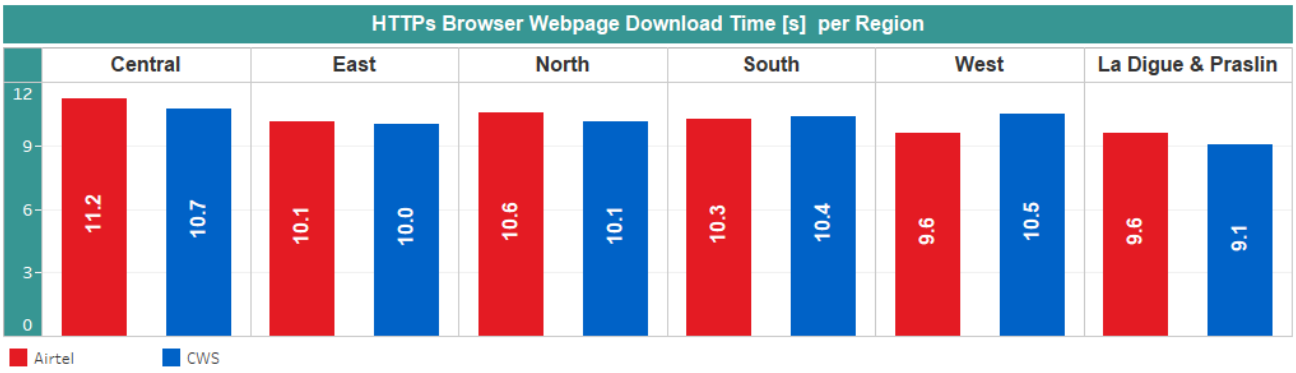

Figure 20. HTTPS Web Browsing Average Page Load Time Results per Region(s)

Figure 20 shows results for web browsing page load time on HTTPS protocol per region. CWS achieved the fastest browsing time in four (4) tested regions: Central, East and North and in the combined La Digue & Praslin Islands region. Airtel achieved the fastest browsing time in two (2) tested regions: South and West.

4.1.5. LATENCY RESULTS

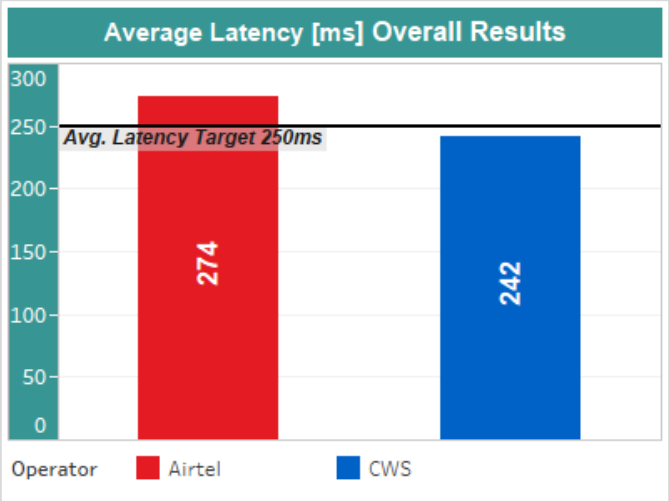

Figure 21. Average Latency Overall Result (ms)

Figure 21 shows the Latency Overall Result. CWS achieved the best latency in overall results followed by Airtel Seychelles in ascending order. CWS achieved overall results of not more than 250ms, thus meeting the target as recommended by SCRA.

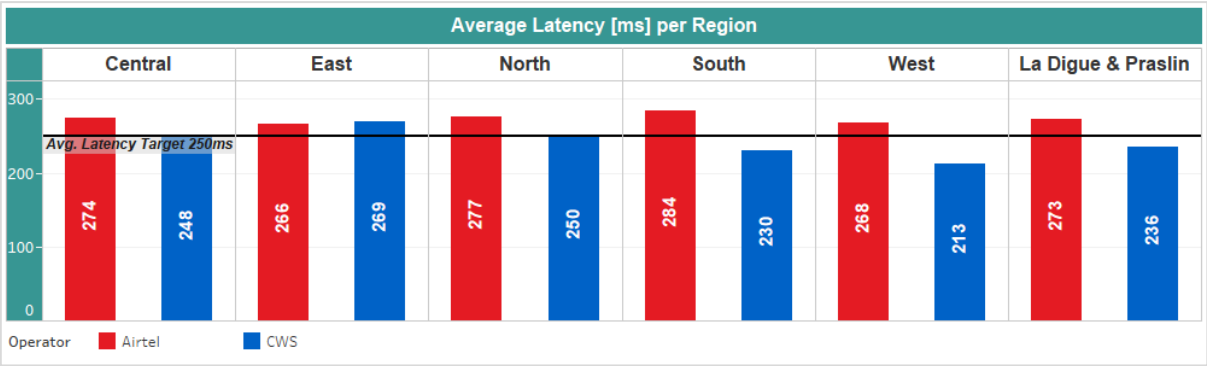

Figure 22. Average Latency Result per Region(ms)

Figure 22 shows the Ping/Latency Result per region. CWS had the lowest latency and the only operator to meet the target of 250ms in fiver (5) of six (6) tested regions Central, North, South and West and in the combined La Digue & Praslin Islands region. Airtel did not meet the target of 250 ms in any of the five (5) tested regions of Mahé Island, Seychelles or the combined La Digue & Praslin Islands region.

4.1.6. PACKET LOSS RATIO RESULTS

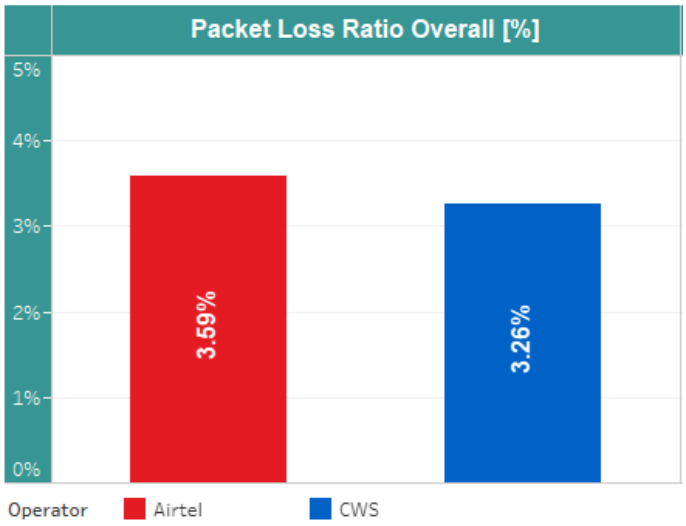

Figure 23. Packet Loss Ratio Overall Result (%)

Figure 23 depicts the Overall Packet Loss Ratio [%] results combined for all regions tested in 4G preferred mode. CWS achieved the lowest Packet Loss Ratio followed by Airtel.

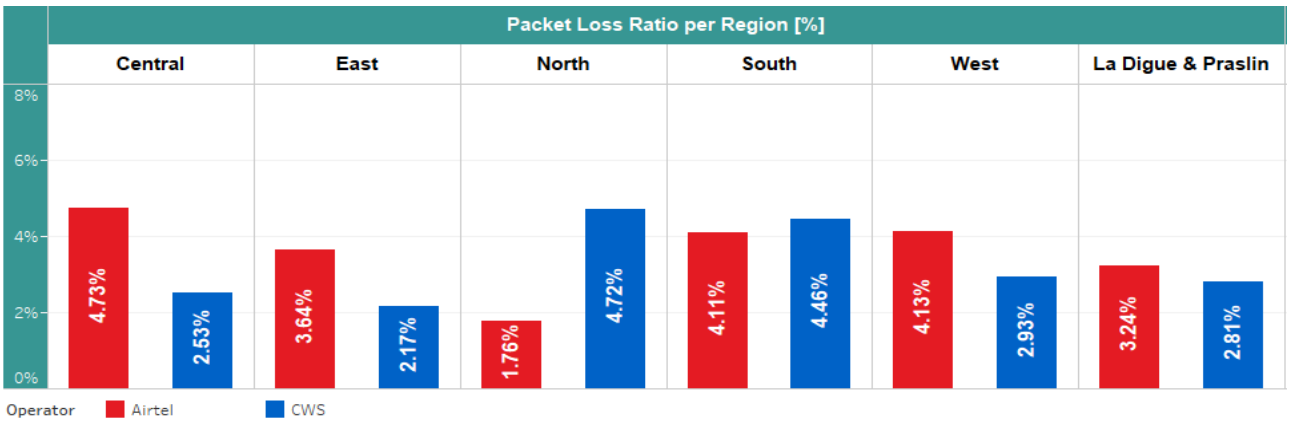

Figure 24.Packet Loss Ratio per Region (%)

Figure 24. shows the Packet Loss Ratio [%] results per region. CWS achieved the lowest Packet Loss Ratio in five (5) tested regions: Central, East, South, West and on La Digue & Praslin combined Region. Airtel achieved the lowest Packet Loss Ratio in the North Region.

4.1.7. 3G PREFERRED MOBILE DATA TEST SUMMARY RESULTS

Data results are based on a user whose smartphones in UMTS/3G capable, and the device will select UMTS as the preferred serving technology where available, move to GSM in the absence of UMTS. The results are based on districts where the operators had coverage.

Table 7. Mobile Drive Test Overall Results – 3G Preferred

		Airtel	CWS
File Transfer	HTTP DL Throughput - Avg [Mbps]	4.56	3.00
	HTTP UL Throughput - Avg [Mbps]	2.2	1.74
	Capacity DL Throughput - Avg [Mbps]	6.07	7.71
	Capacity UL Throughput - Avg [Mbps]	4.68	4.21
	SFTP DL Throughput - Avg [Mbps]	4.57	3.29
	SFTP UL Throughput - Avg [Mbps]	1.53	1.04
	Unsuccessful file access ratio [%] - DL	0.6	3.0
	Unsuccessful file access ratio [%] - UL	4.7	17.7
HTTPS Browser	Overall HTTPs Browsing Time [s]	8.8	8.3
	Kepler Page	4.5	6.2
	Mobile Kepler Page	2.1	2.9
	Shein	10.6	9.8
	NBS	12.4	10.1
	SBC	14.6	12.4
Latency	Overall Average Ping Latency [ms]	285	204
	Overall Median Ping Latency [ms]	392	196
	Packet Loss Ratio [%]	22.04	15.94
YouTube	YouTube Successful Ratio [%]	92.00%	71.86%
	YouTube Average Resolution [pixels]	1005	1032
	YouTube Access Time [s]	4.00	3.10

Table 7 shows summary results for each KPI for data tests in 3G preferred mode.

The values in the green blocks indicate which operator is leading in each respective KPI. The results are based on where the Operators had coverage along the drive test routes. Both operators were tied at leading in 10KPIs each. CWS led in ten (10) KPIs, and Airtel also led in the other ten (10) KPIs out of twenty (20) KPIs for tests done.

4.1.8. FILE TRANSFER RESULTS

4.1.8.1. HTTP DOWNLOAD

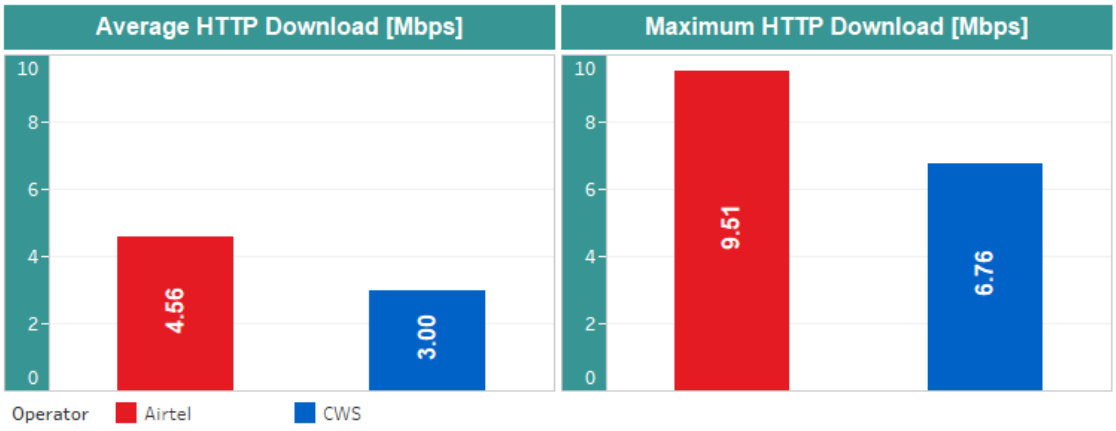

Figure 25. Average HTTP Download Throughput Overall Results (Mbps)

Figure 25 presents a graphical representation of the 3G Preferred HTTP Download throughput test results from Table 7, highlighting the average and maximum values achieved by each operator. Airtel recorded the highest average HTTP download throughput, followed by CWS, with the operators ranking in descending order.

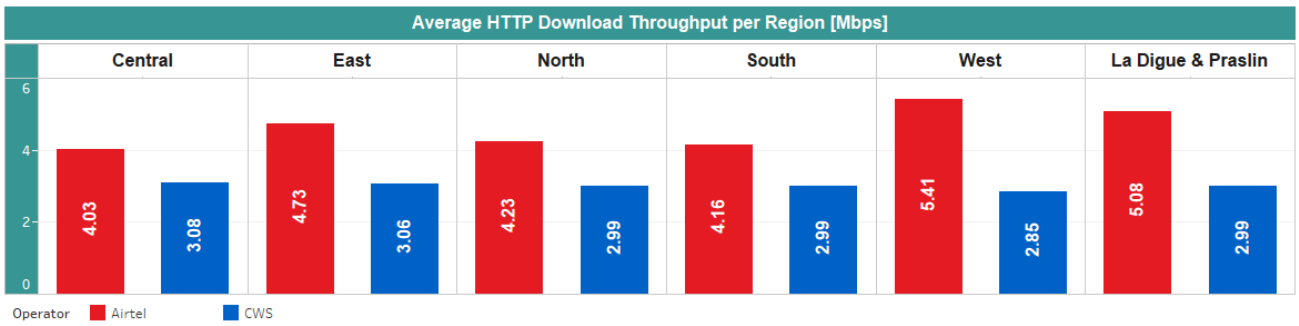

Figure 26. Average HTTP Download Throughput Results per Region (Mbps)

Figure 26 shows HTTP Download test results per district. Airtel achieved the highest results for average HTTP download throughput across all five tested regions of Mahé island—Central, East, North, South, and West—as well as in the combined La Digue & Praslin Islands region.

4.1.8.2. HTTP CAPACITY DOWNLOAD

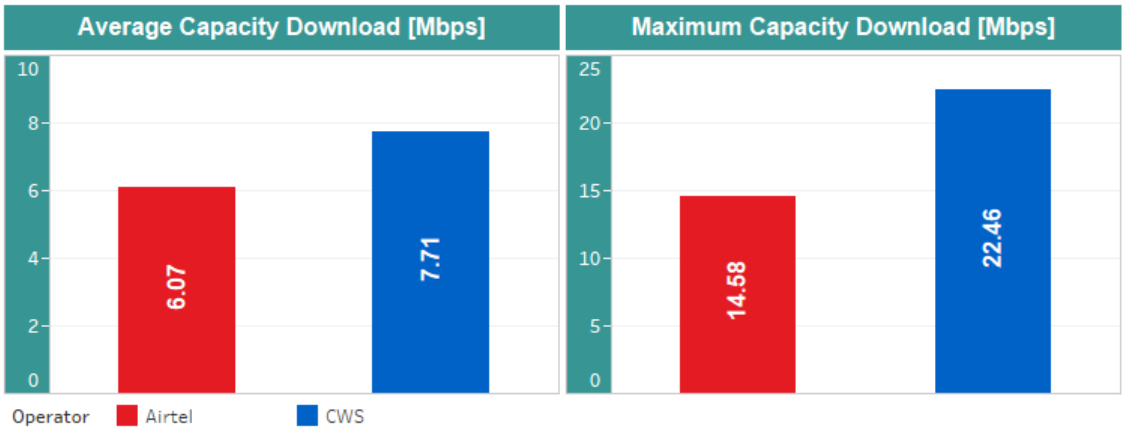

Figure 27. Average HTTP Capacity Download Throughput Overall Results (Mbps)

Figure 27 provides a graphical view of the results in Table 7 for the overall 3G preferred HTTP Capacity Download test and incorporates the average and maximum values achieved by each operator. CWS achieved the highest results for the overall average HTTP Capacity Download throughput and the overall Maximum HTTP Capacity Download throughput followed by Airtel.

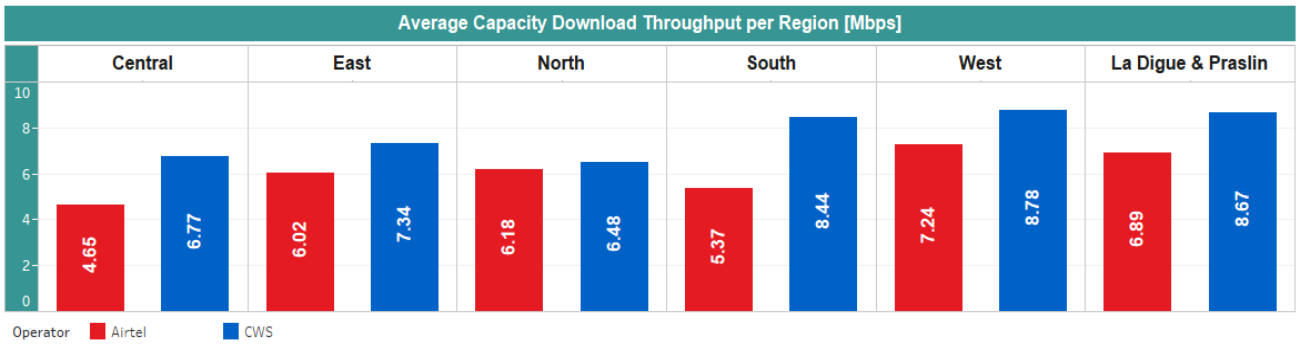

Figure 28. Average HTTP Capacity Download Throughput results per region (Mbps)

Figure 28 shows the Average HTTP Capacity Download Throughput results per region tested in 3G Preferred mode. CWS achieved the highest throughput for average HTTP Capacity Download across all five tested regions of Mahé island—Central, East, North, South, and West—as well as in the combined La Digue & Praslin Islands region.

4.1.8.3. SFTP DOWNLOAD

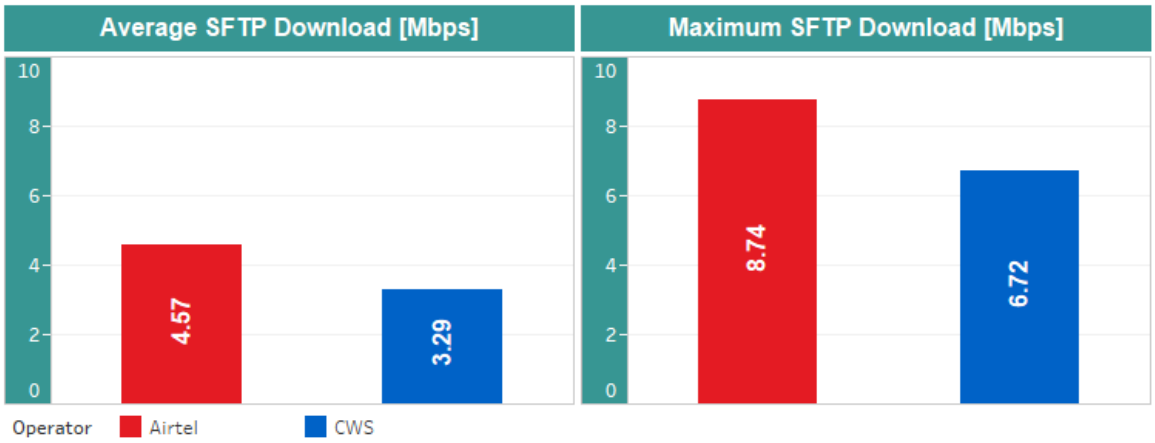

Figure 29. Average SFTP Download Throughput Overall Results (Mbps)

Figure 29 provides a graphical view of the SFTP Download test results in Table 7 for and incorporates the average and maximum values achieved by each operator. Airtel Seychelles achieved the highest results for the overall average SFTP Download throughput followed by CWS in descending order. Airtel Seychelles achieved the highest for the overall maximum SFTP download throughput results followed by CWS in descending order.

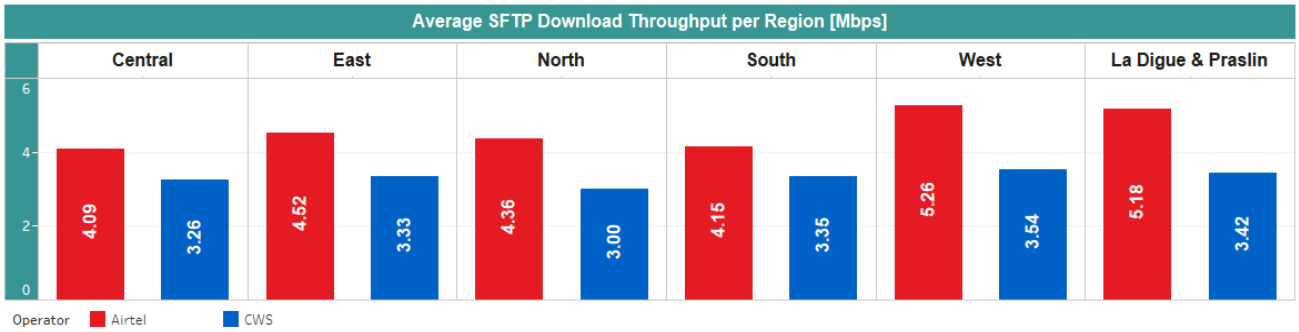

Figure 30. Average SFTP Download Throughput Results per region (Mbps

Figure 30 shows SFTP Download Throughput results per region Airtel Seychelles achieved the highest results for average SFTP download throughput across all five tested regions of Mahé island—Central, East, North, South, and West—as well as in the combined La Digue & Praslin Islands region.

4.1.8.4. HTTP UPLOAD

Figure 31. Average HTTP Upload Throughput Overall Results (Mbps)

Figure 31 provides a graphical view of the overall HTTP Upload Throughput results in Table 7 for HTTP Upload test and incorporates the average and maximum values achieved by each operator. Airtel Seychelles achieved the highest results for average HTTP Upload throughput followed by CWS. For maximum HTTP Upload throughput Airtel Seychelles achieved the highest followed by CWS.

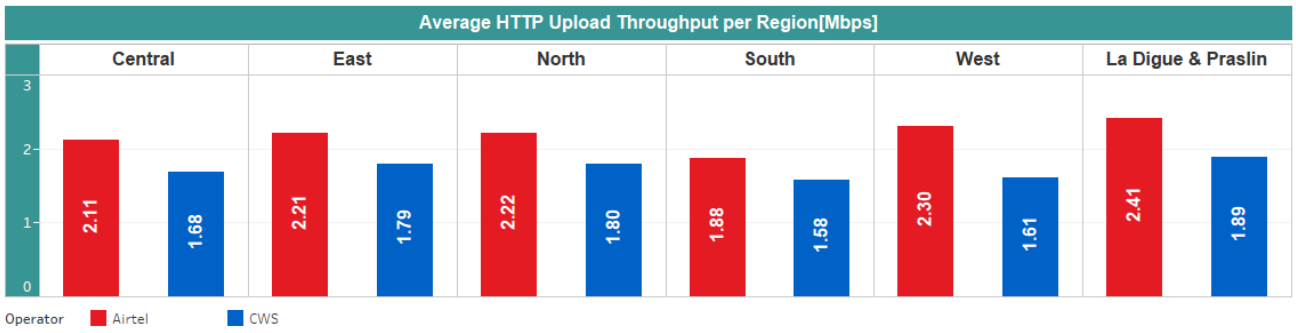

Figure 32. Average HTTP Upload Throughput Results per region (Mbps

Figure 32 shows the Average HTTP Upload Throughput performance by region for two operators: Airtel Seychelles and CWS. Airtel Seychelles consistently outperformed CWS, achieving the highest average HTTP upload throughput across all five tested regions of Mahé—Central, East, North, South, and West—as well as in the combined La Digue & Praslin Islands region.

4.1.8.5. HTTP CAPACITY UPLOAD

Figure 33. Average HTTP Capacity Upload Overall Results (Mbps)

Figure 33 provides a graphical view of the HTTP Capacity Upload Overall results in Table 7 and incorporates the average and maximum values achieved by each operator. The results shows that Airtel achieved the highest results for the overall average capacity throughput followed by Airtel Seychelles in descending order. For Maximum HTTP Capacity Upload throughput CWS achieved the highest results followed by Airtel in descending order.

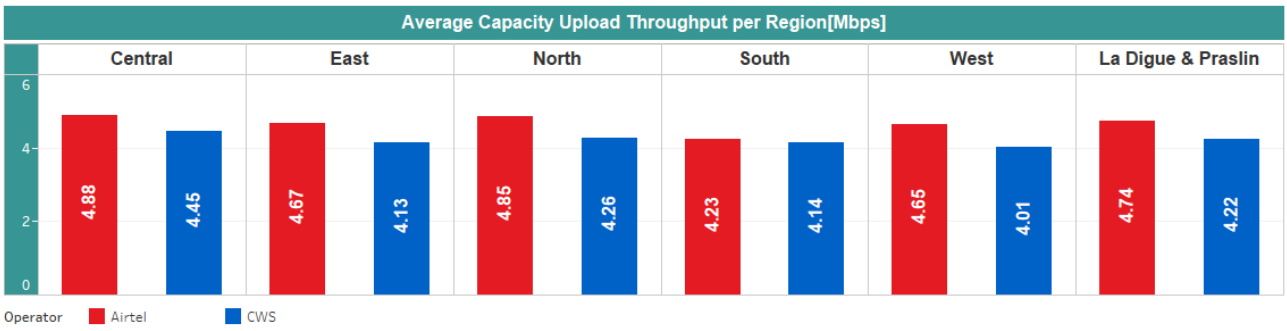

Figure 34. Average HTTP Capacity Upload Results per Region (Mbps)

Figure 34 shows the HTTP Capacity Upload results per region. Airtel achieved the highest results for average HTTP Capacity Upload across all five tested regions of Mahé island—Central, East, North, South, and West—as well as in the combined La Digue & Praslin Islands region.

4.1.8.6. SFTP UPLOAD

Figure 35. Average SFTP Upload Throughput Overall Results (Mbps

Figure 35 above provides a graphical view of the SFTP Upload overall results in Table 7 and incorporates the average and maximum values achieved by each operator. Airtel achieved the highest results for average SFTP upload throughput followed by CWS in descending order. For the maximum FTP upload throughput, Airtel Seychelles achieved the highest results followed CWS.

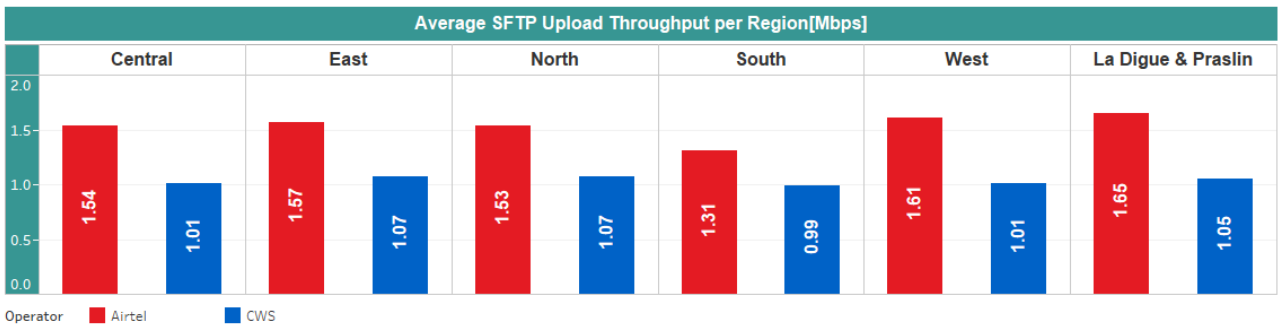

Figure 36. Average SFTP Upload Results per Region (Mbps)

Figure 36. shows the SFTP Upload results per region. Airtel Seychelles achieved the highest results for the average SFTP Upload across all five tested regions of Mahé island—Central, East, North, South, and West—as well as in the combined La Digue & Praslin Islands region.

4.1.8.7. HTTP UNSUCCESSFUL FILE ACCESS RATIO

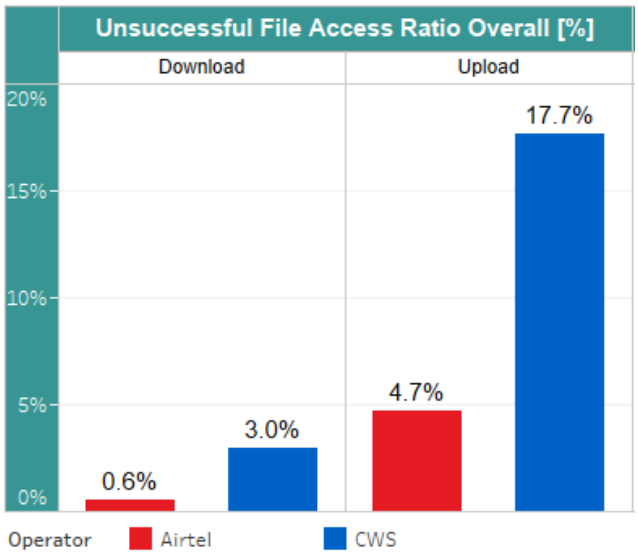

Figure 37. Unsuccessful File Access Ratio (%)

Figure 37 above provides a graphical view of the unsuccessful file access ratio in Table 6. Comparatively, Airtel had a less overall unsuccessful file access ratio than CWS for both download & upload tests.

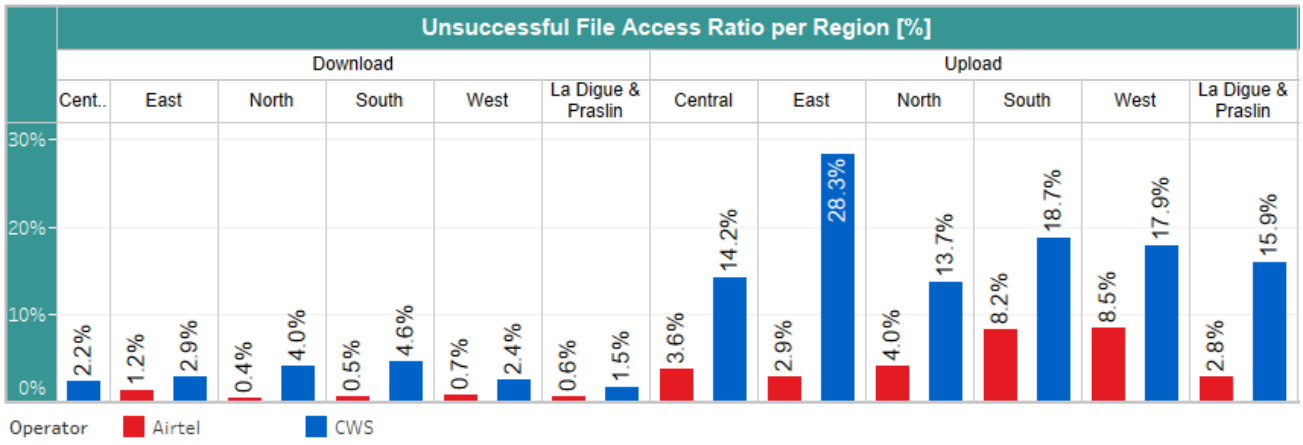

Figure 38. Unsuccessful File Access Ratio Results per Region (%)

Figure 38 shows the unsuccessful file access ratio per region. CWS had higher unsuccessful file access in all region s for both download and upload tests.

4.1.9. YOUTUBE RESULTS

4.1.9.1. YOUTUBE SESSION SUCCESS RATIO

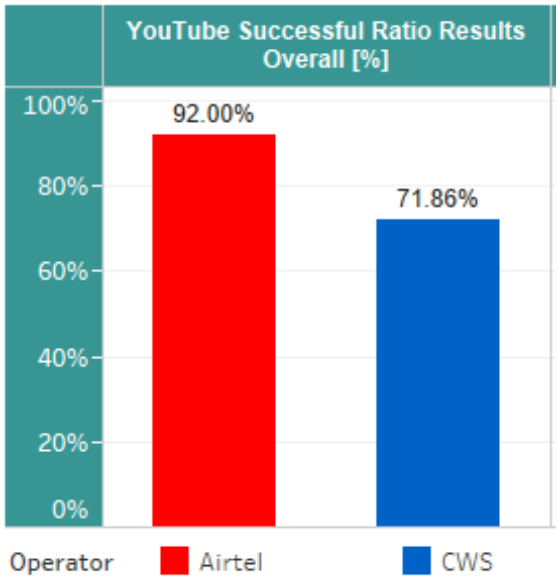

Figure 39. YouTube Success Overall Ratio (%)

Figure 39. depicts the Overall results for YouTube Success Ratio. Airtel achieved Overall YouTube Successful Ratio > 92% and had a better overall when compared to CWS.

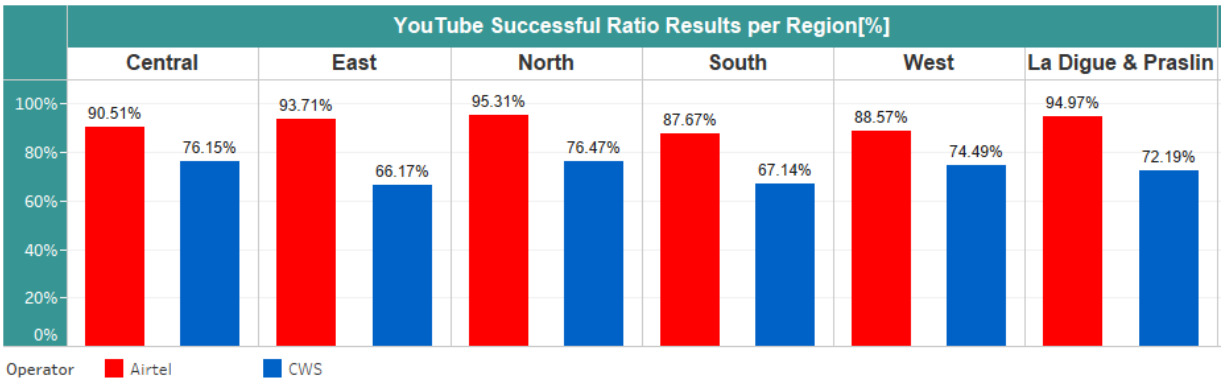

Figure 40. YouTube Success Ratio Results per Region [%]

Figure 40 shows results for YouTube Success Ratio per region. Airtel Seychelles achieved the highest YouTube Success Ratio across all five tested regions of Mahé island—Central, East, North, South, and West—as well as in the combined La Digue & Praslin Islands region.

4.1.10. WEB BROWSING RESULTS

4.1.10.1. WEB BROWSING PAGE DOWNLOAD TIME

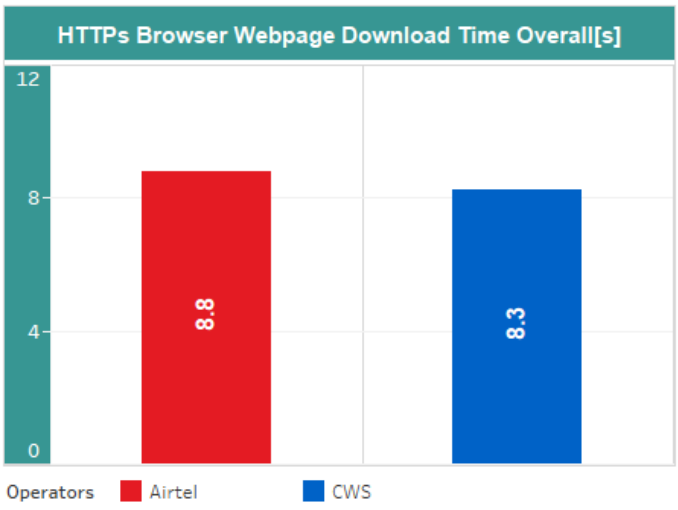

Figure 41. Web Browsing Page Average Load Time Overall Result (s)

Figure 41 depicts overall results for web browser page load time on HTTPS protocol. CWS achieved the fastest overall browsing time followed by Airtel in ascending order.

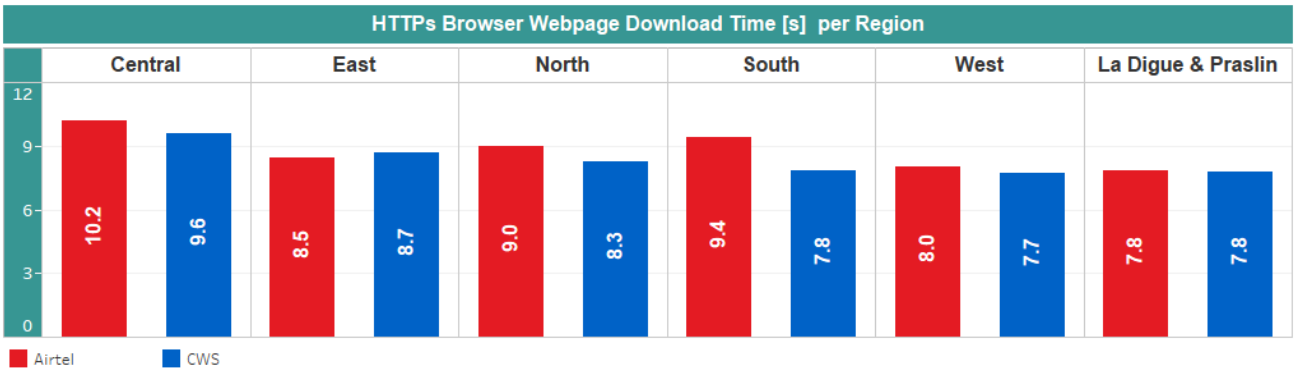

Figure 42. HTTPS Web Browsing Average Page Load Time Results per Region (s)

Figure 42 shows results for web browsing page load time on HTTPS protocol per region. CWS achieved the fastest browsing time in four (4) tested regions: Central, North, South and West. Airtel achieved the fastest browsing time in one (1) tested district: East. Both operators had a tie in the combined La Digue & Praslin Islands region.

4.1.11. LATENCY RESULTS

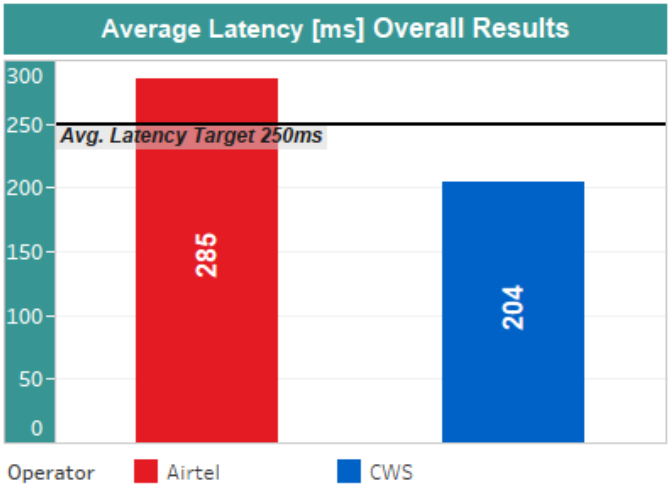

Figure 43. Average Latency Overall Result (ms)

Figure 43 shows the Latency Overall Result. CWS achieved the best latency in overall results followed by Airtel Seychelles in ascending order. CWS achieved overall results of not more than 250ms, thus meeting the target as recommended by SCRA. Airtel did not meet the recommended target of 250ms

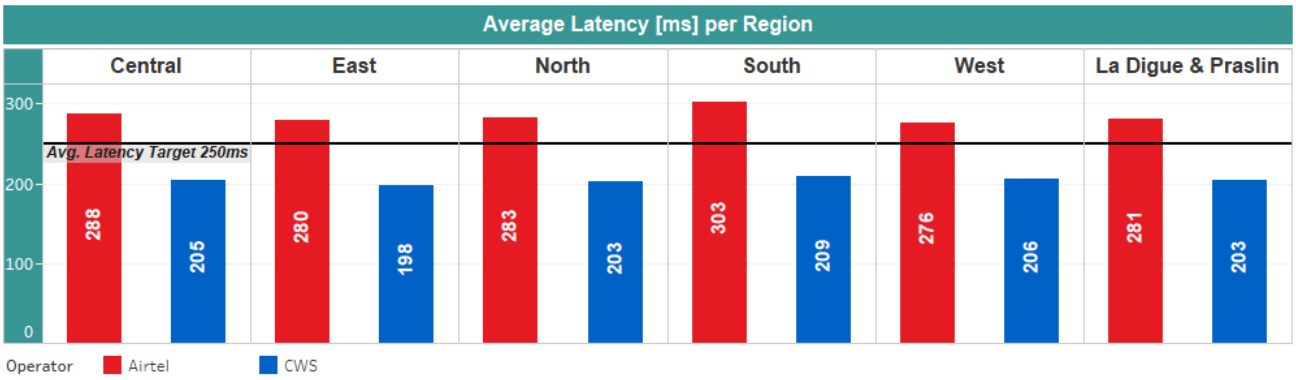

Figure 44. Average Latency Result per Region(ms)

Figure 44 shows the Ping/Latency Result per region. CWS had the lowest latency and the only operator to meet the target of 250ms in all six (6) tested regions. Airtel did not meet the target of 250ms in all five tested regions of Mahé island—Central, East, North, South, and West—as well as in the combined La Digue & Praslin Islands region.

4.1.12. PACKET LOSS RATIO [%]

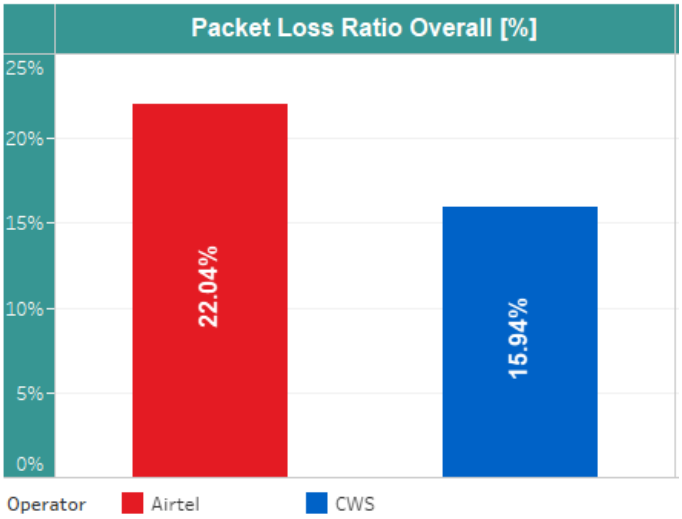

Figure 45. Packet Loss Ratio Overall Result (%)

Figure 45 depicts the Overall Packet Loss Ratio [%] results combined for all regions tested in 3G preferred mode. CWS achieved the lowest Packet Loss Ratio followed by Airtel.

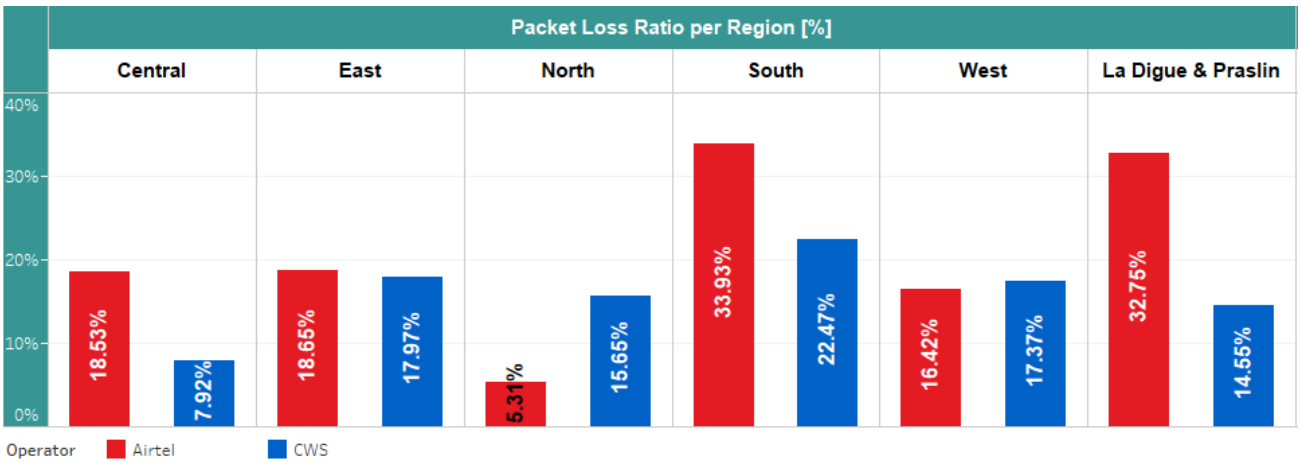

Figure 46. Packet Loss Ratio Results per Region (%)

Figure 46. shows the Packet Loss Ratio [%] results per region CWS achieved the lowest Packet Loss Ratio followed by Airtel in four (4) tested regions: Central, East, South & on La Digue and Praslin combined. Region. Airtel achieved the lowest Packet Loss Ratio followed by Airtel in two (2) tested regions: North and West.

4.2.STATIONARY RESULTS

4.2.1. 4G PREFERRED STATIONARY TESTING SUMMARY RESULTS

Table 8 shows summary results per KPI for stationary points in 4G Preferred Test mode

Table 8: Data Stationary Test Results – 4G Preferred

		Airtel	CWS
File Transfer	HTTP DL Throughput - Avg [Mbps]	16.4	9.35
	HTTP UL Throughput - Avg [Mbps]	11.34	6.5
	Capacity DL Throughput - Avg [Mbps]	41.5	45.25
	Capacity UL Throughput - Avg [Mbps]	23.63	19.84
	SFTP DL Throughput - Avg [Mbps]	11.88	7.19
	SFTP UL Throughput - Avg [Mbps]	6.85	3.68
	Unsuccessful file access ratio [%] - DL	0.5	0
	Unsuccessful file access ratio [%] - UL	1.8	10.5
HTTPS Browser	Overall HTTPs Browsing Time [s]	9.7	8.9
	Kepler Page	4.4	5.3
	Mobile Kepler Page	1.9	3.1
	Shein	6.7	6.4
	NBS	17.5	15.4
	SBC	17.7	14.4
Latency	Overall Average Ping Latency [ms]	271	224
	Overall Median Ping Latency [ms]	263	196
	Packet Loss Ratio [%]	0.98	4.61
YouTube	YouTube Successful Ratio [%]	97.68%	97.50%
	YouTube Average Resolution [pixels]	1047	1058
	YouTube Access Time [s]	5.4	1.6

In Table 8, the values in the green blocks indicate which operator is leading in each respective KPI. The results are based on where the Operators had coverage along the drive test routes & stationary points. both operators were tied at leading in ten (10) KPIs each

4.2.1.1. STATIONARY HTTP DOWNLOAD

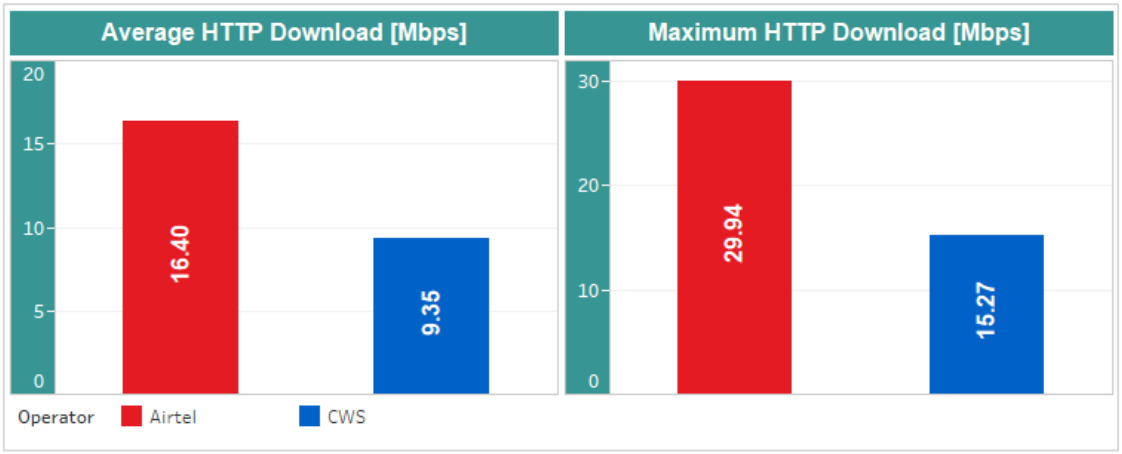

Figure 47. Overall Stationary HTTP Download Throughput Results (Mbps)

Figure 47 shows the overall HTTP Download Throughput results combined for all stationary points tested in 4G Preferred technology. Airtel achieved the highest average for all stationary points combined followed by CWS in descending order. For maximum HTTP download throughput Airtel achieved the highest average for all stationary points combined followed by CWS in descending order.

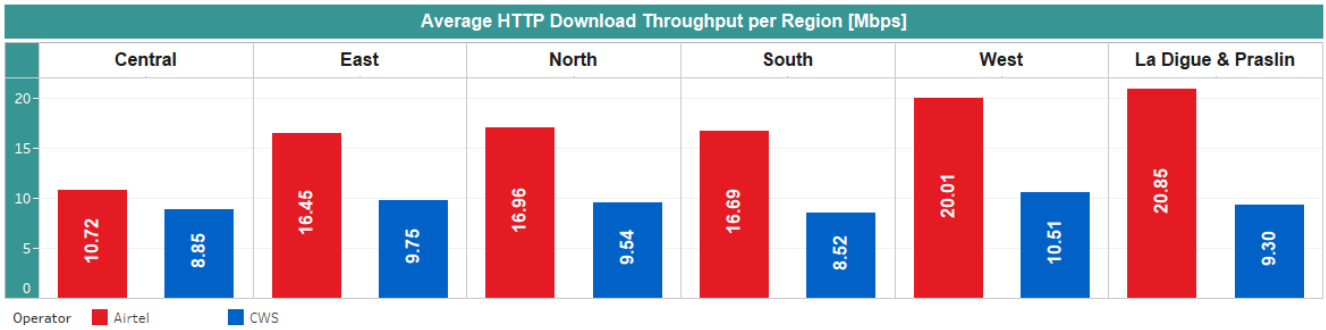

Figure 48. Stationary HTTP Download Throughput Results (Mbps) per region

Figure 48. shows HTTP Download Throughput results per region for all stationary points combined tested in 4G Preferred technology. Airtel achieved the highest results for average HTTP download throughput across all five tested regions of Mahé island—Central, East, North, South, and West—as well as in the combined La Digue & Praslin Islands region.

4.2.1.2. STATIONARY CAPACITY DOWNLOAD

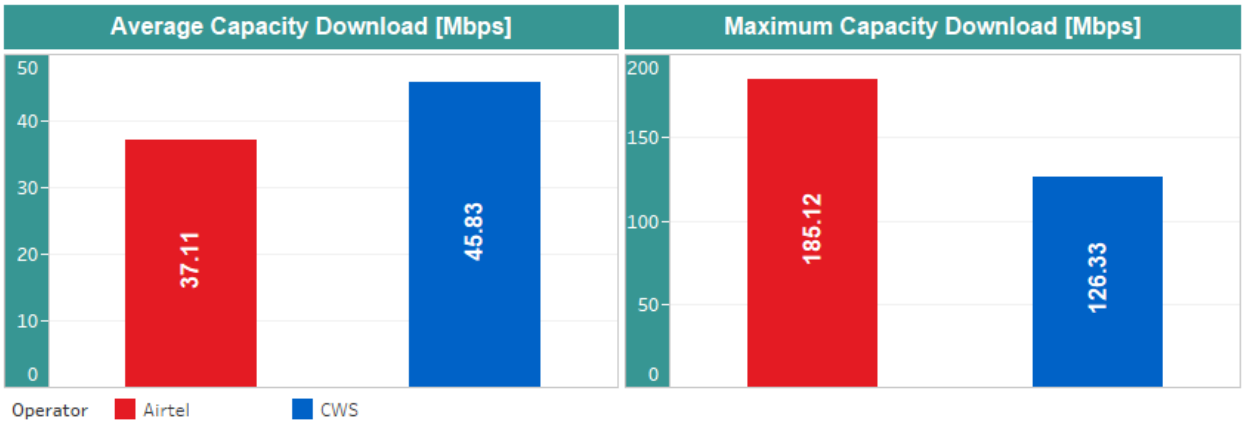

Figure 49. Overall Stationary HTTP Capacity Download Throughput Results (Mbps)

Figure 49 shows the overall HTTP Capacity Download Throughput results combined for all stationary points tested. CWS achieved the highest average HTTP capacity download throughput for all stationary points combined followed by Airtel. For maximum HTTP download throughput Airtel achieved the highest average for all stationary points followed by CWS in descending order.

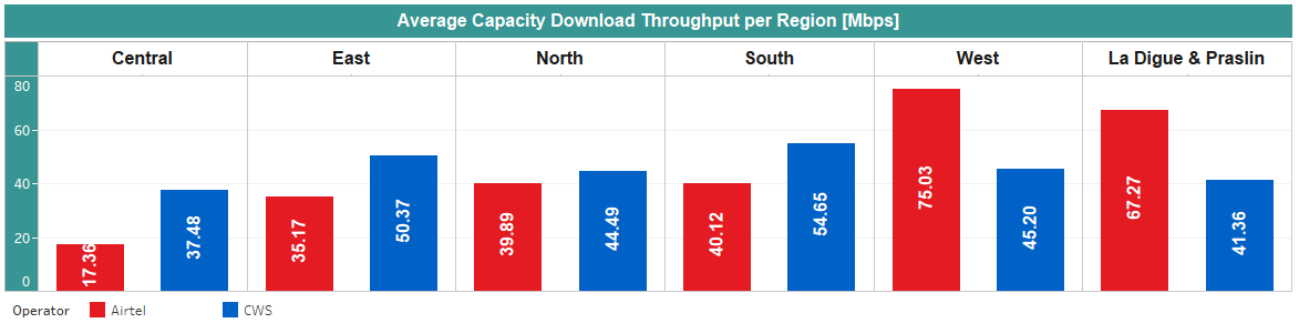

Figure 50. Stationary HTTP Capacity Download Throughput Results per Region

Figure 50. shows HTTP Capacity Download Throughput results per region for all stationary points combined & tested in 4G Preferred technology. CWS achieved the highest results for average HTTP capacity download throughput in all four (4) tested regions of Mahé Island: Central, East, North and South. Airtel had the highest results for average HTTP capacity download throughput in the West region of Mahé and on La Digue & Praslin Island.

4.2.1.3. STATIONARY SFTP DOWNLOAD

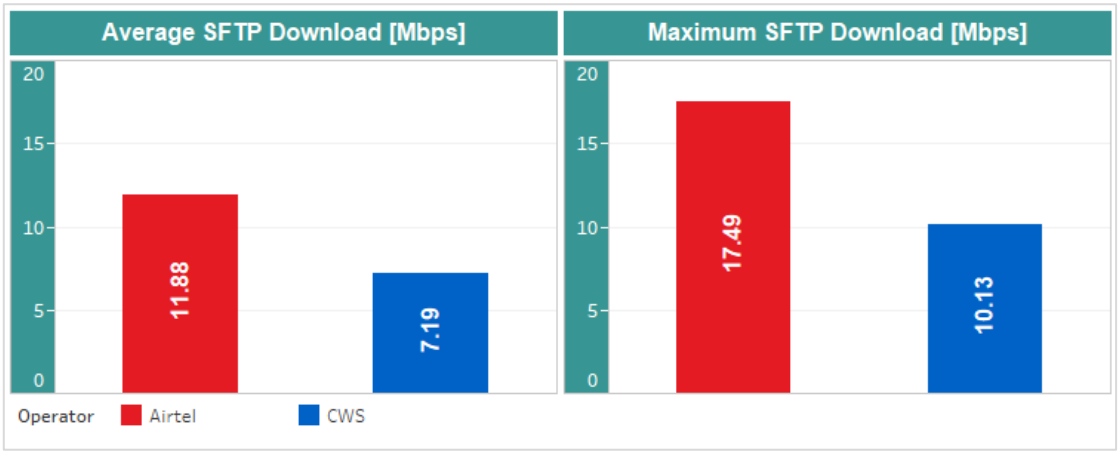

Figure 51. Overall Stationary SFTP Download Throughput Results (Mbps)

Figure 51 shows the SFTP Download Throughput results. Airtel achieved the highest stationary average SFTP download throughputs for all static points combined followed by CWS in descending order. For maximum SFTP capacity download throughput, Airtel achieved the highest followed by CWS in descending order.

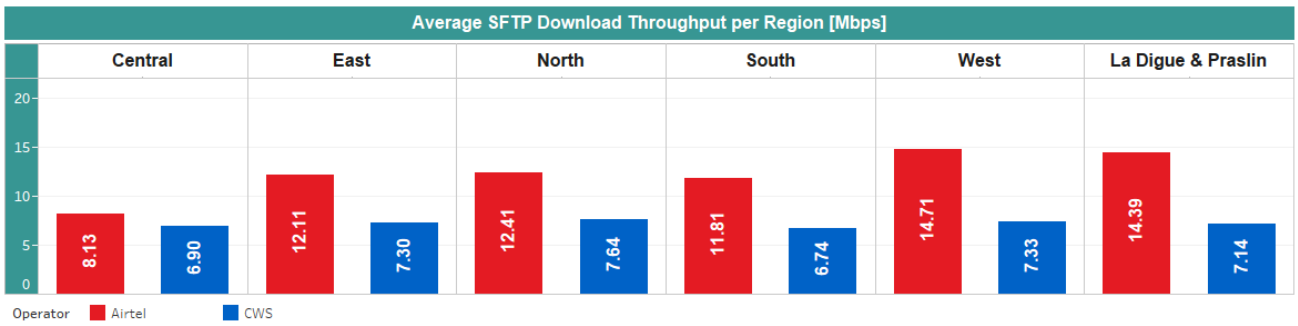

Figure 52. Stationary SFTP Download Throughput Results per Region

Figure 52. shows SFTP Download Throughput results per region for all stationary points combined & tested in 4G Preferred technology. Airtel achieved the highest results for average SFTP download throughput across all five tested regions of Mahé island—Central, East, North, South, and West—as well as in the combined La Digue & Praslin Islands region.

4.2.1.4. STATIONARY HTTP UPLOAD

Figure 53. Overall Stationary HTTP Upload Throughput Results (Mbps)

Figure 53 shows that for overall HTTP Upload Throughput results. Airtel achieved the highest average HTTP upload throughput for all static points combined followed by CWS in descending order. For the maximum HTTP upload throughput, Airtel achieved the highest followed by CWS.

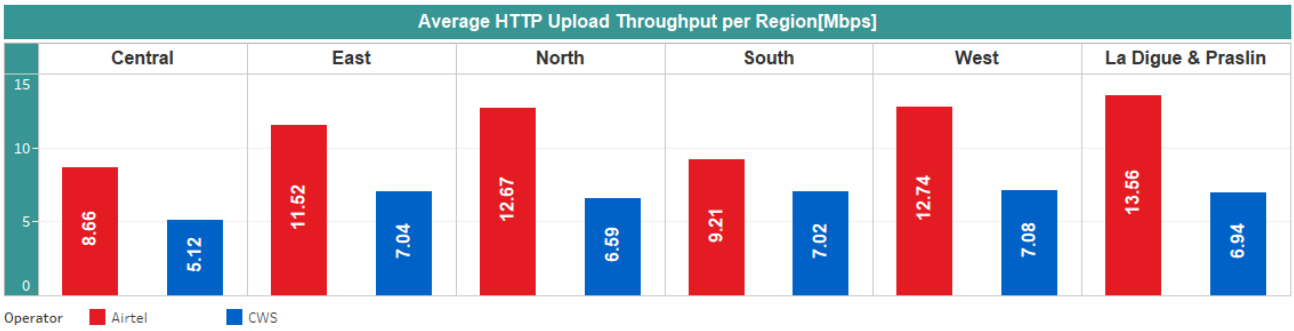

Figure 54. Stationary HTTP Download Throughput Results (Mbps) per region

Figure 54. shows HTTP Upload Throughput results per region for all stationary points combined tested in 4G Preferred technology. Airtel achieved the highest results for average HTTP upload throughput in all five tested regions of Mahé island—Central, East, North, South, and West—as well as in the combined La Digue & Praslin Islands region.

4.2.1.5. STATIONARY CAPACITY UPLOAD

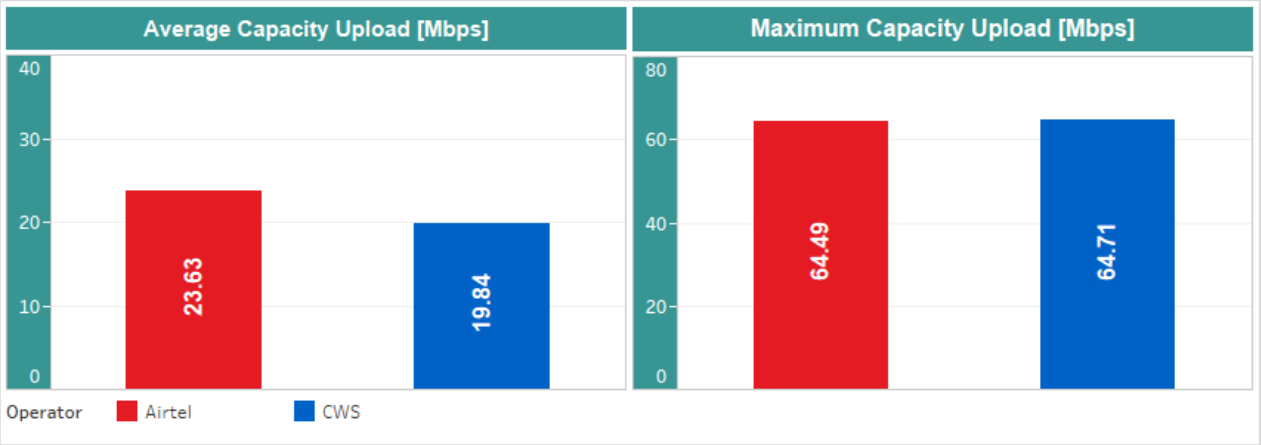

Figure 55. Overall Stationary HTTP Capacity Upload Throughput Results (Mbps)

Figure 55 shows that for overall HTTP Capacity Upload Throughput results. Airtel achieved the highest average HTTP capacity upload throughput for all static points combined followed by CWS in descending order. CWS achieved the highest for maximum HTTP Capacity upload throughput followed by Airtel in descending order.

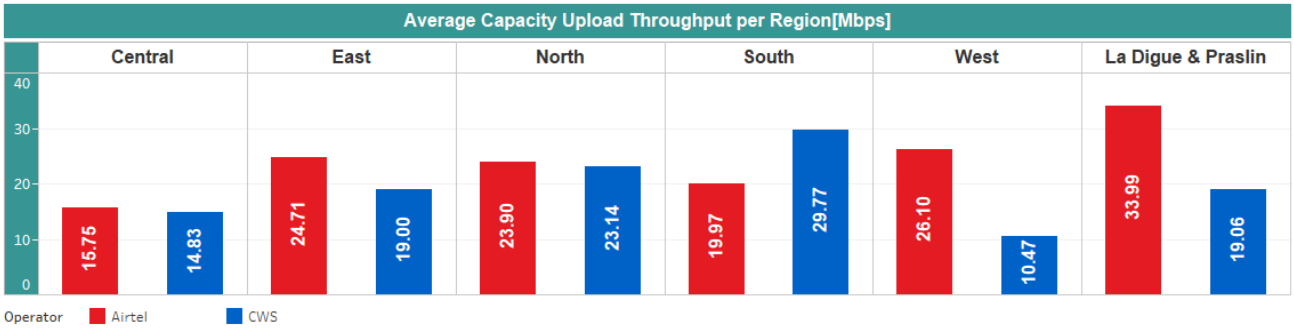

Figure 56. Stationary HTTP Capacity Upload Throughput Results per Region

Figure 56. shows HTTP Capacity Upload Throughput results per region for all stationary points combined & tested in 4G Preferred technology. Airtel achieved the highest results for average HTTP capacity download throughput in all five (5) tested regions of Seychelles Islands: Central, East, North, West & La Digue & Praslin combined region. CWS had the highest results for average HTTP capacity download throughput in the South region.

4.2.1.6. STATIONARY SFTP UPLOAD

Figure 57. Overall Stationary FTP Upload Throughput Results (Mbps)

Figure 57 shows that for overall SFTP Upload Throughput results. Airtel achieved the highest stationary FTP upload average throughput followed by CWS in descending order. Airtel achieved the highest results for maximum FTP upload throughput followed by CWS in descending order.

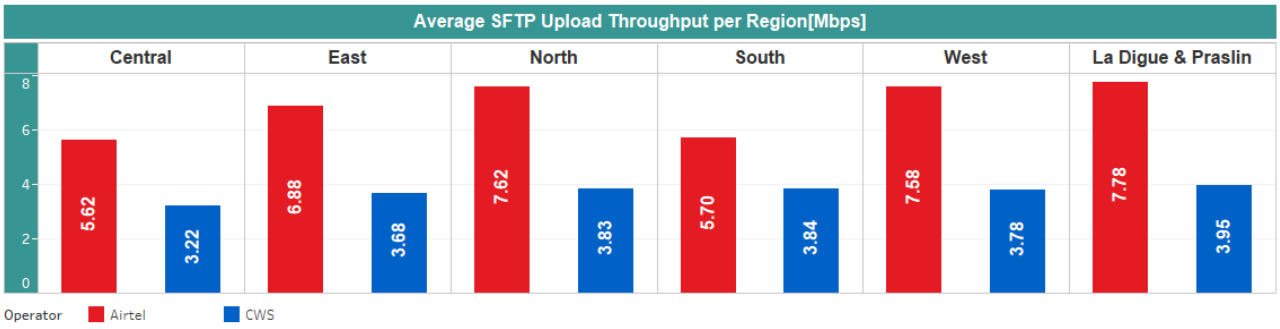

Figure 58. Stationary SFTP Upload Throughput Results per Region

Figure 58. shows SFTP Upload Throughput results per region for all stationary points combined & tested in 4G Preferred technology. Airtel achieved the highest results for average SFTP upload throughput in all six (6) tested regions of Seychelles Island: Central, East, North, West, South and Praslin & La Digue.

4.2.1.7. STATIONARY HTTP UNSUCCESSFUL FILE ACCESS RATIO

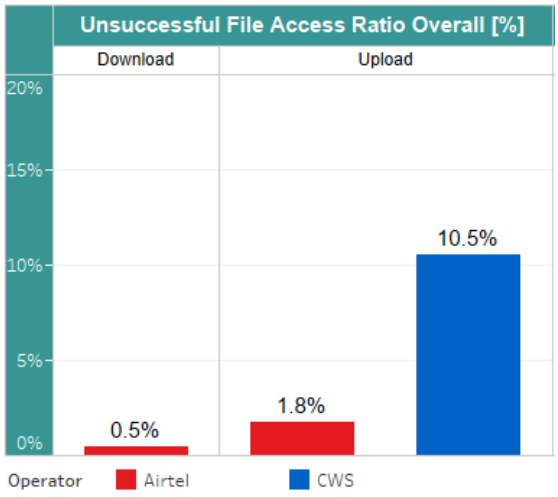

Figure 59. Stationary Unsuccessful File Access Ratio (%)

Figure 59 above provides a graphical view of the unsuccessful file access ratio in Table 6. Comparatively, Airtel had a less overall unsuccessful file access ratio than CWS for upload tests. For Download, CWS performed better with no unsuccessful file access while for upload, Airtel performed better with less file access unsuccessful.

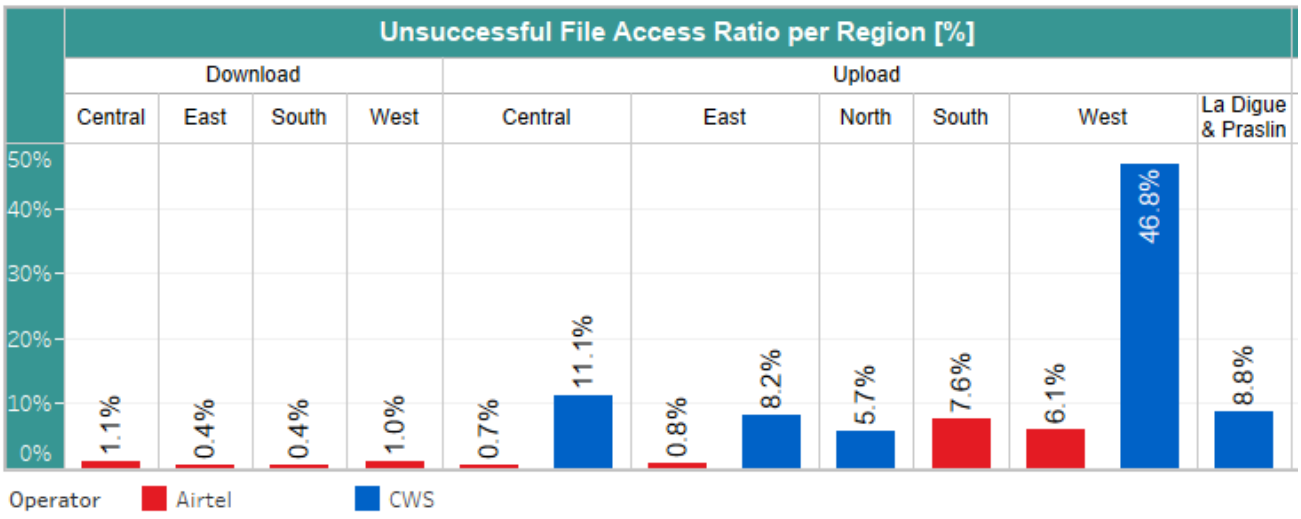

Figure 60. Stationary Unsuccessful File Access Ratio Results per Region (%)

Figure 60 shows the unsuccessful file access ratio per region. CWS showed higher upload file access unsuccessful in Central, East, North, West and La Digue & Praslin. Airtel was higher in South region.

4.2.2. STATIONARY YOUTUBE RESULTS

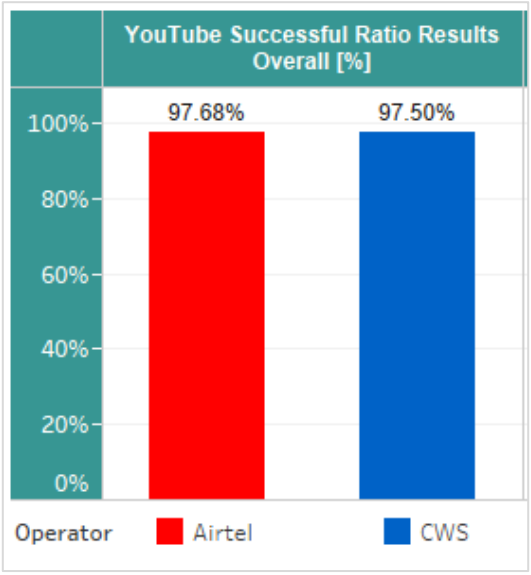

Figure 61. Overall Stationary YouTube Success Ratio Results (%)

Figure 61 shows results for YouTube Success Ratio combined for all stationary points tested in 4G preferred mode. Airtel achieved the best YouTube Overall Success ratio followed by CWS in descending order.

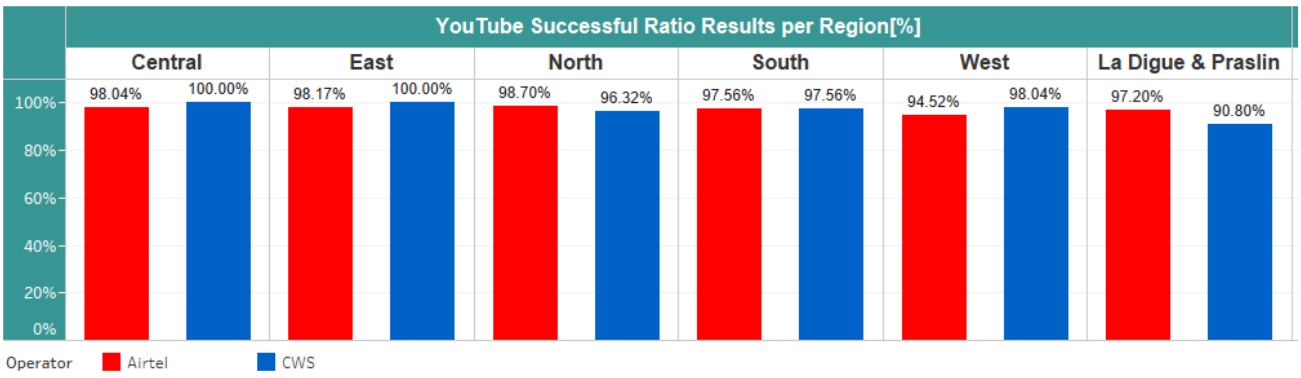

Figure 62. Stationary YouTube Success Ratio Results per Region

Figure 62 shows results for YouTube Success Ratio per region. CWS achieved the highest YouTube Success Ratio in three (3) tested region of Mahé Island in Seychelles: Central, East and West Airtel achieved the highest YouTube Success Ratio in North region and on La Digue & Praslin both operators had a tie in South region.

4.2.3. STATIONARY WEB BROWSING PAGE DOWNLOAD TIME

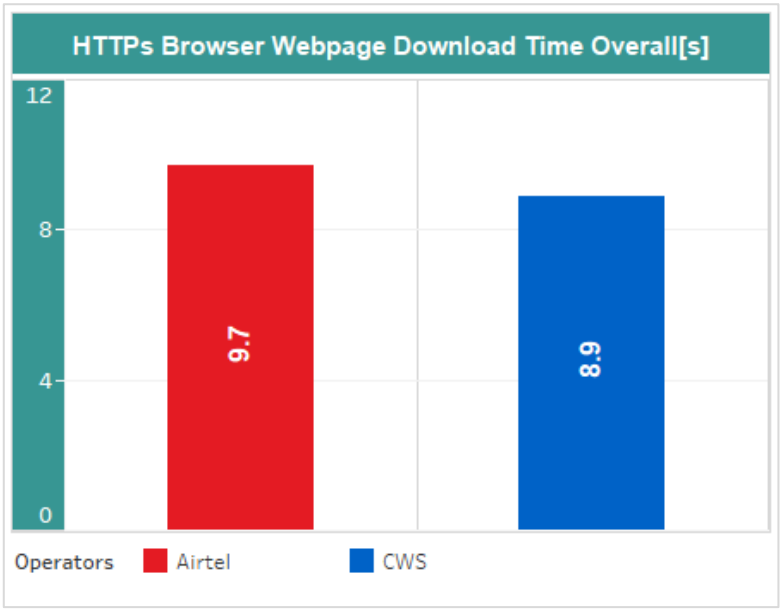

Figure 63. Overall Stationary HTTPS Web Browsing Results

Figure 63 depicts Overall HTTPS Web Browsing results combined for all stationary points tested in 4G preferred mode. CWS achieved the fastest web browsing page load time followed by Airtel.

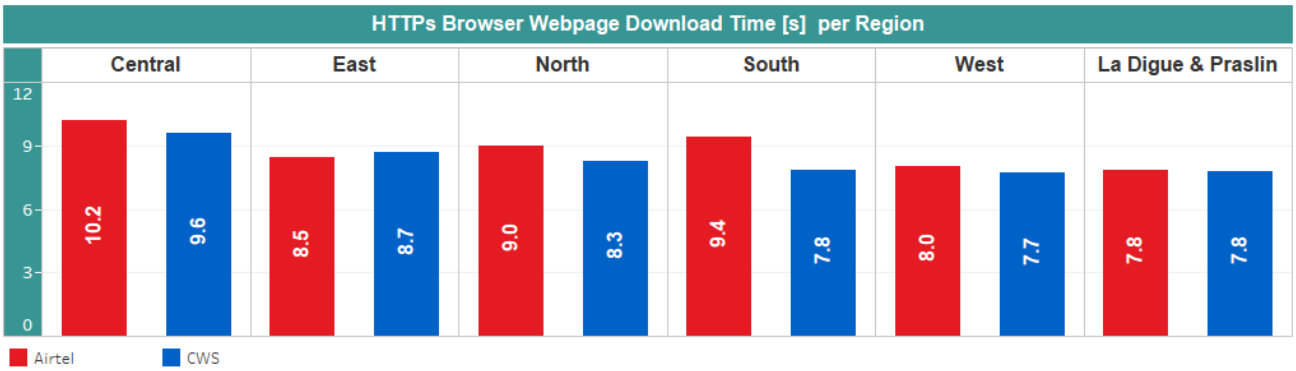

Figure 64. Stationary HTTPS Web Browsing Page Download time(s) per Region

Figure 64. shows results for stationary web browsing page load time on HTTPS protocol per region. CWS achieved the fastest browsing time in all four (4) tested regions: Central, North, South and West. Airtel achieved it in East Region. For La Digue & Praslin both operators were tied.

4.2.4. STATIONARY LATENCY RESULTS

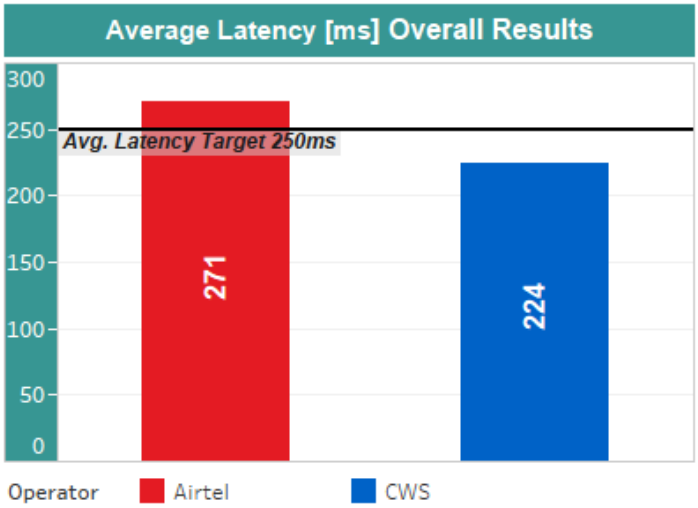

Figure 65. Average Latency Overall Result (ms)

Figure 65 depicts the Overall Latency results combined for all stationary points tested in 4G preferred mode. CWS achieved the lowest latency followed by Airtel. CWS achieved the overall latency results of not more than 250ms

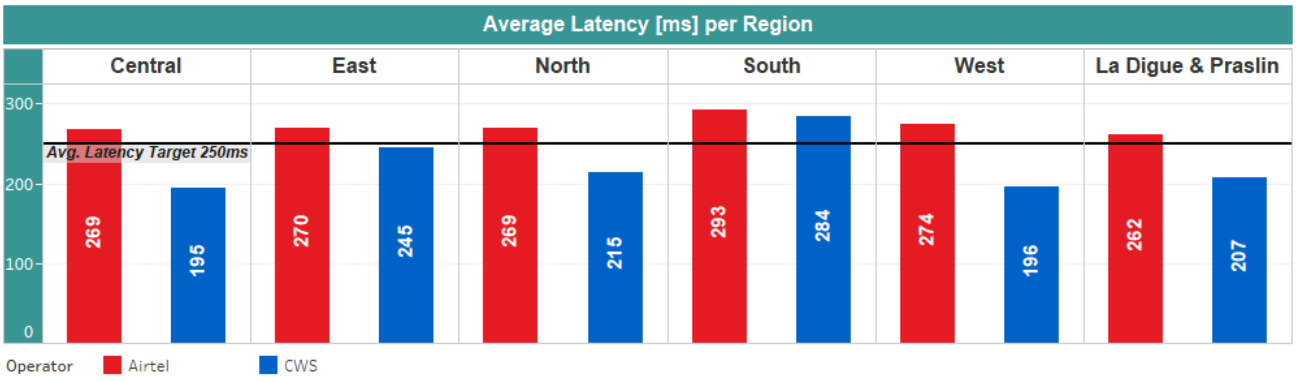

Figure 66. Average Latency Results per Region (ms)

Figure 66 shows the Stationary Ping/Latency Result per region. CWS had the lowest latency and the only operator to meet the target of 250ms in all five (5) tested regions except South. Airtel did not meet the target of 250ms in all six (5) regions tested in Seychelles.

4.2.5. STATIONARY PACKET LOSS RATIO [%]

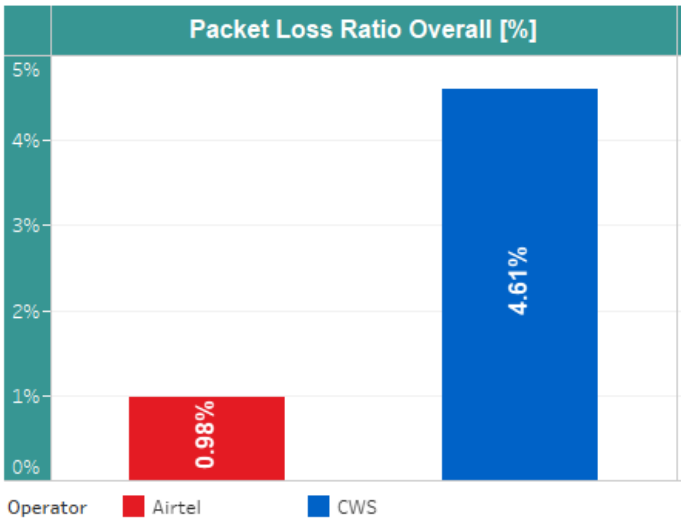

Figure 67.Overall Packet Loss Ratio (%)

Figure 67 depicts the Overall Packet Loss Ratio [%] results combined for all stationary points tested in 4G preferred mode. CWS achieved the lowest Packet Loss Ratio followed by Airtel.

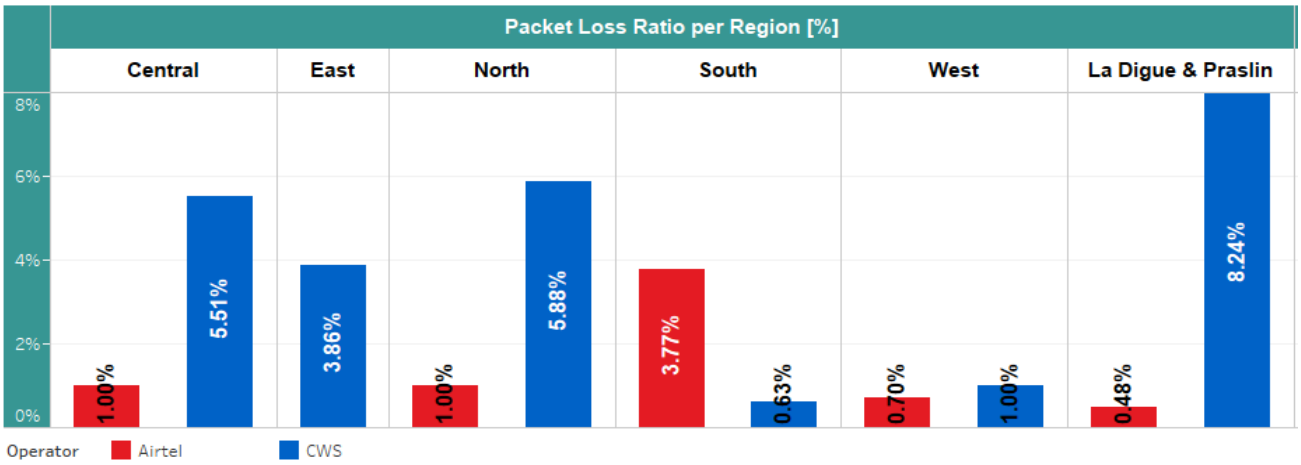

Figure 68. Stationary Packet Loss Ratio per Region (%))

Figure 68 shows the Packet Loss Ratio [%] results combined for all stationary points per region Airtel achieved the lowest Packet Loss Ratio followed by CWS in five (5) out of six (6) tested regions: Central, East, North, West and on La Digue & Praslin combined. CWS had the lowest Packet Loss Ratio in South Region for all stationary points combined per region.

4.2.6. 3G PREFERRED STATIONARY TESTING SUMMARY RESULTS

Table 9. Data Stationary Test Results – 3G Preferred

		Airtel	CWS
File Transfer	HTTP DL Throughput - Avg [Mbps]	5.3	3.14
	HTTP UL Throughput - Avg [Mbps]	2.73	2.02
	Capacity DL Throughput - Avg [Mbps]	7.87	11.06
	Capacity UL Throughput - Avg [Mbps]	5.54	4.52
	SFTP DL Throughput - Avg [Mbps]	5.34	3.65
	SFTP UL Throughput - Avg [Mbps]	1.84	1.04
	Unsuccessful file access ratio [%] - DL	0.4	0
	Unsuccessful file access ratio [%] - UL	1.2	15.3
HTTPS Browser	Overall HTTPs Browsing Time [s]	7.9	7.2
	Kepler Page	3.8	5.9
	Mobile Kepler Page	1.8	2.9
	Shein	9.3	8.1
	NBS	11.2	8.2
	SBC	13.5	10.6
Latency	Overall Average Ping Latency [ms]	282	200
	Overall Median Ping Latency [ms]	392	194
	Packet Loss Ratio [%]	26.81	10.88
YouTube	YouTube Successful Ratio [%]	97.60%	91.06%
	YouTube Average Resolution [pixels]	1038	1052
	YouTube Access Time [s]	3.5	2.0

In Table 9, the values in the green blocks indicate which operator is leading in each respective KPI. The results are based on where the Operators had coverage. Airtel led in nine (9) KPIs, and CWS led in eleven (11) KPIs out of twenty (20) KPIs measured.

4.2.6.1. STATIONARY HTTP DOWNLOAD

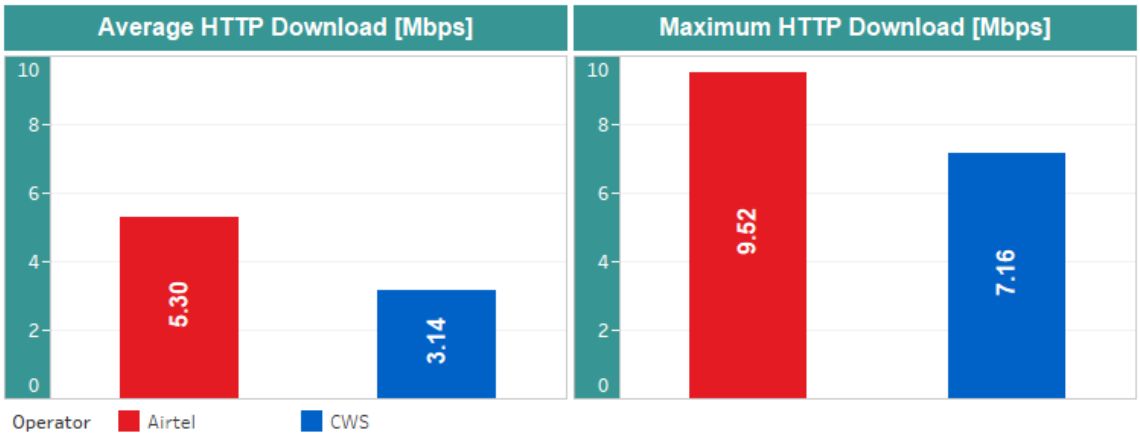

Figure 69. Overall Stationary HTTP Download Throughput Results (Mbps)

Figure 69 shows the stationary overall HTTP Download Throughput results for all stationary points combined in 3G testing mode. Airtel achieved the highest average for all stationary points combined followed by CWS in descending order. For maximum HTTP download throughput Airtel achieved the highest average for all stationary points combined followed by CWS in descending order.

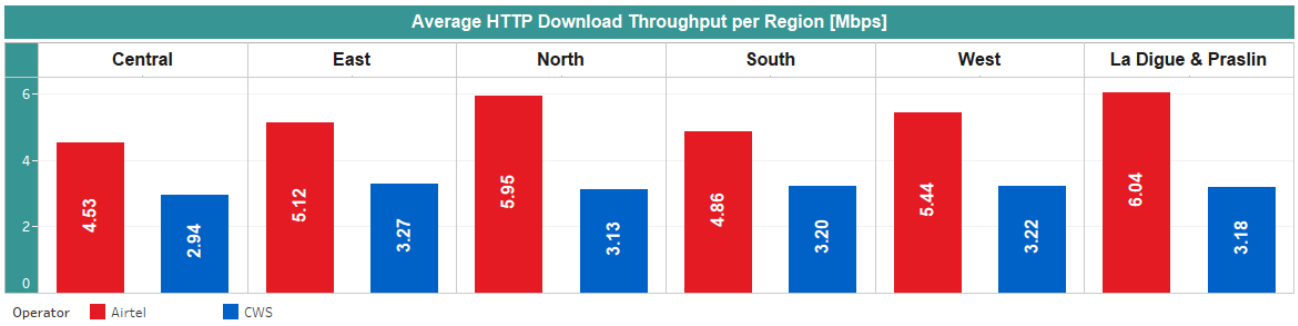

Figure 70. Stationary HTTP Download Throughput Results (Mbps) per region

Figure 70. shows HTTP Download Throughput results per region for all stationary points combined tested in 3G Preferred technology. Airtel achieved the highest results for average HTTP download throughput in all five tested regions of Mahé island—Central, East, North, South, and West—as well as in the combined La Digue & Praslin Islands region.

4.2.6.2. STATIONARY CAPACITY DOWNLOAD

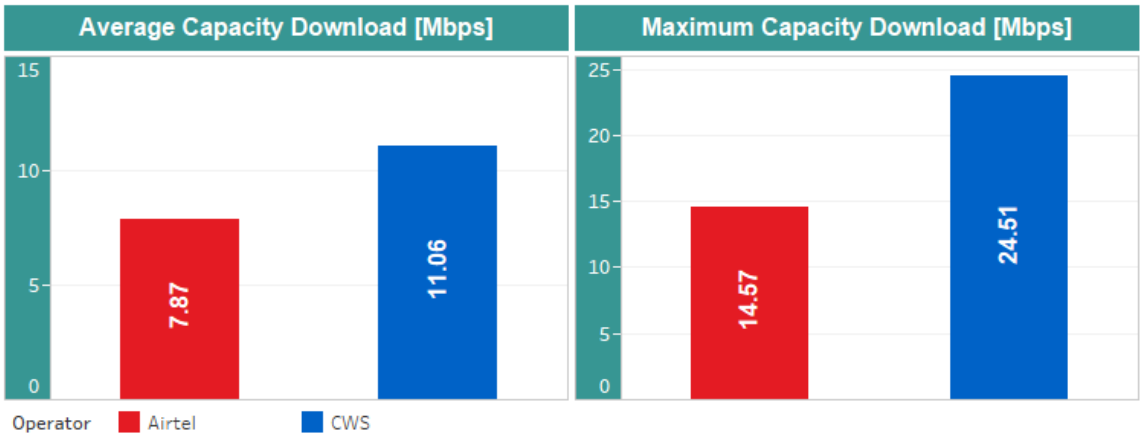

Figure 71. Overall Stationary HTTP Capacity Download Throughput Results (Mbps)

Figure 71 shows the stationary overall HTTP Capacity Download Throughput results for all stationary points combined & tested in 3G preferred mode. CWS achieved the highest average HTTP capacity download throughput for all stationary points combined followed by Airtel. For maximum HTTP download throughput CWS achieved the highest average for all stationary points followed by Airtel in descending order.

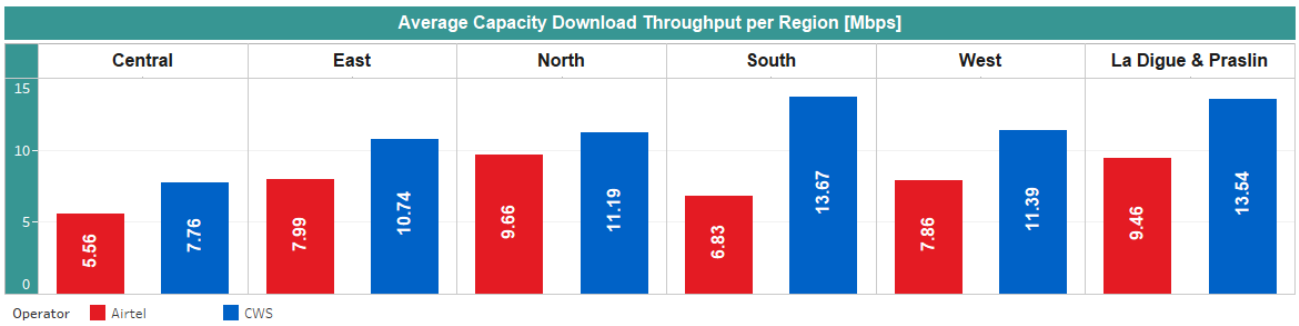

Figure 72. Stationary HTTP Capacity Download Throughput Results (Mbps) per region

Figure 72. shows HTTP Capacity Download Throughput results per region for all stationary points combined & tested in 3G Preferred technology. CWS achieved the highest results for average HTTP capacity download throughput in all five (5) tested regions of Mahé Island: Central, East, North, West and South and on islands of Praslin & La Digue.

4.2.6.3. STATIONARY SFTP DOWNLOAD

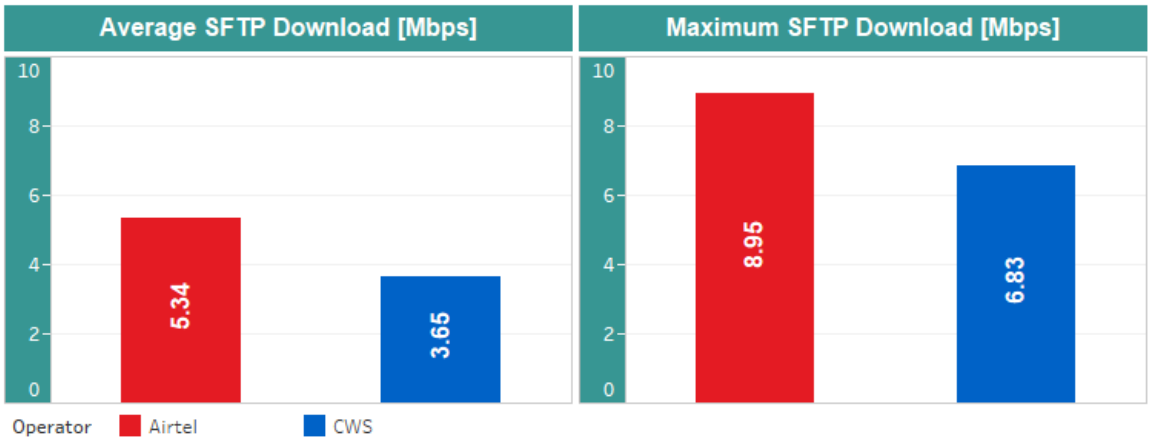

Figure 73. Overall Stationary SFTP Download Throughput Results (Mbps

Figure 73 shows the SFTP Download Throughput results combined for all stationary points tested in 3G preferred mode. Airtel achieved the highest stationary average FTP download throughput for all static points combined followed by CWS in descending order. For maximum SFTP capacity download throughput, Airtel achieved the highest followed by CWS in descending order.

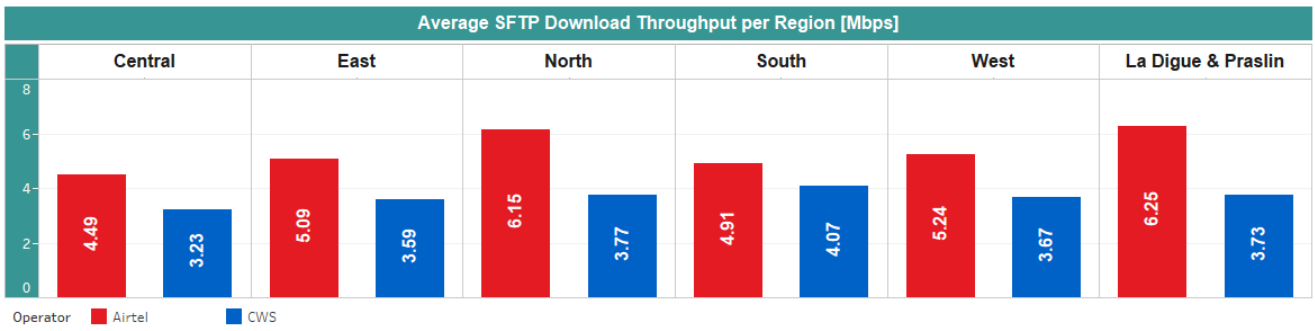

Figure 74. Stationary SFTP Download Throughput Results (Mbps) per region

Figure 74. shows SFTP Download Throughput results per region for all stationary points combined & tested in 3G Preferred technology. Airtel achieved the highest results for average SFTP download throughput across all five tested regions of Mahé island—Central, East, North, South, and West—as well as in the combined La Digue & Praslin Islands region.

4.2.6.4. STATIONARY HTTP UPLOAD

Figure 75. Overall Stationary HTTP Upload Throughput Results (Mbps)

Figure 75 shows that for overall HTTP Upload Throughput results combined for all stationary results in 3G Preferred technology. Airtel achieved the highest average HTTP upload throughput for all static points combined followed by CWS in descending order. For the maximum HTTP upload throughput, Airtel achieved the highest followed by CWS.

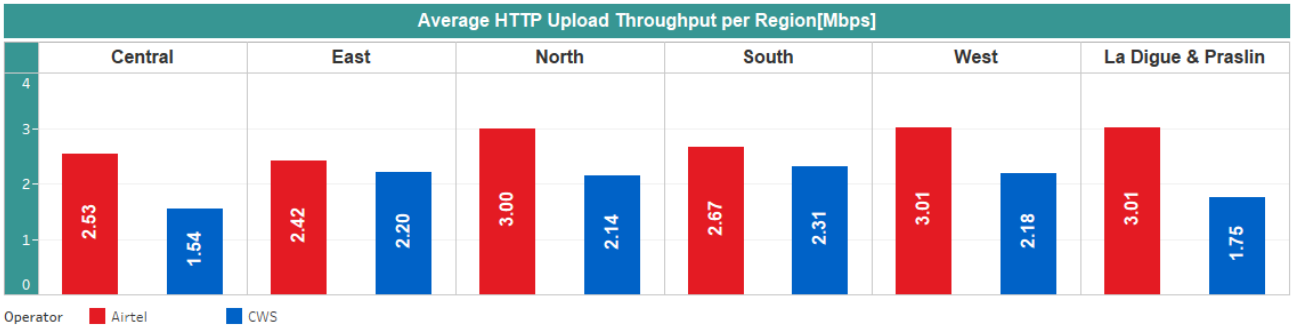

Figure 76. Stationary HTTP Upload Throughput Results (Mbps) per region

Figure 76. shows HTTP Upload Throughput results per region for all stationary points combined tested in 3G Preferred technology. Airtel achieved the highest results for average HTTP upload throughput in across all five tested regions of Mahé island—Central, East, North, South, and West—as well as in the combined La Digue & Praslin Islands region.

4.2.6.5. STATIONARY CAPACITY UPLOAD

Figure 77. Overall Stationary HTTP Capacity Upload Throughput Results (Mbps)

Figure 77. shows that for overall HTTP Capacity Upload Throughput results combined for all stationary points tested in 3G Preferred technology. Airtel achieved the highest average HTTP capacity upload throughput for all static points combined followed by CWS in descending order. Airtel achieved the highest for maximum HTTP Capacity upload throughput followed by CWS in descending order.

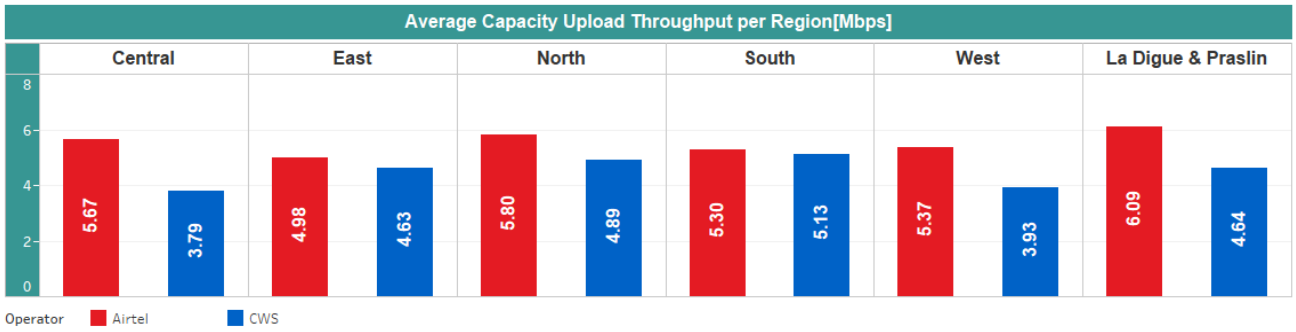

Figure 78. Stationary HTTP Capacity Upload Throughput Results per Region

Figure 78. shows HTTP Capacity Upload Throughput results per region for all stationary points combined & tested in 3G Preferred technology. Airtel achieved the highest results for average HTTP capacity download throughput in all six (6) tested regions: Central, East, North, South and West and La Digue & Praslin.

4.2.6.6. STATIONARY SFTP UPLOAD

Figure 79. Overall Stationary SFTP Upload Throughput Results (Mbps)

Figure 79 shows that for overall SFTP Upload Throughput results. Airtel achieved the highest stationary FTP upload average throughput followed by CWS in descending order. Airtel achieved the highest results for maximum FTP upload throughput followed by CWS in descending order.

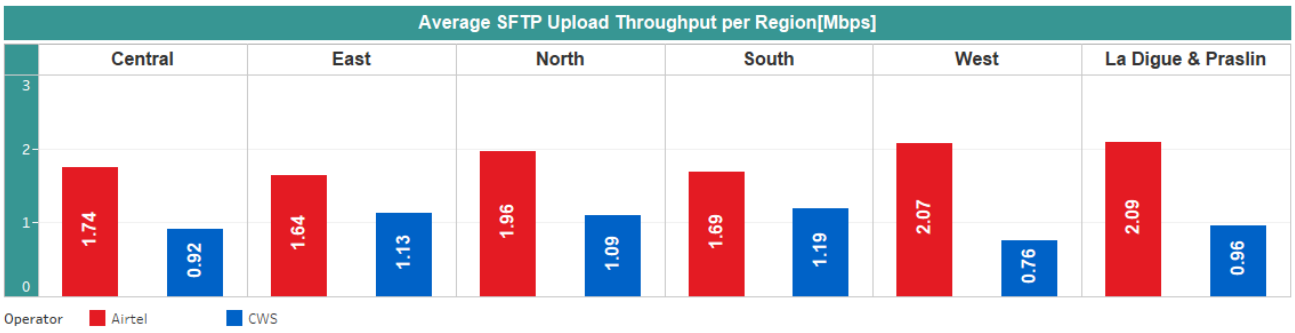

Figure 80. Stationary SFTP Upload throughput per Region (Mbps)

Figure 80. shows SFTP Upload Throughput results per region for all stationary points combined & tested in 3G Preferred technology. Airtel achieved the highest results for average SFTP upload throughput across all five tested regions of Mahé island—Central, East, North, South, and West—as well as in the combined La Digue & Praslin Islands region.

4.2.6.7. STATIONARY HTTP UNSUCCESSFUL FILE ACCESS RATIO

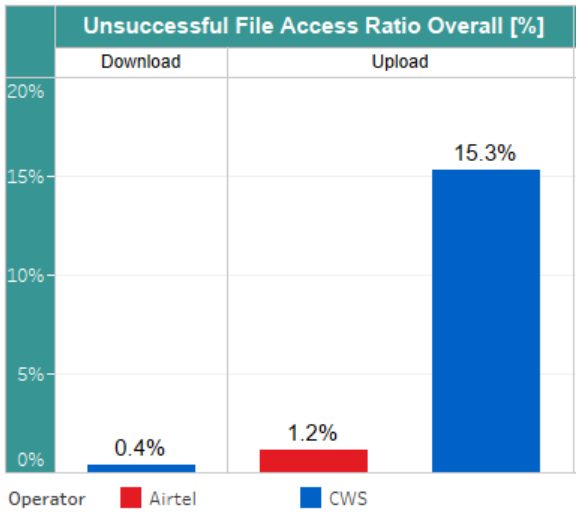

Figure 81. Stationary Unsuccessful File Access Ratio (%)

Figure 81 above provides a graphical view of the unsuccessful file access ratio Airtel performed better with no file access unsuccessful for download test and fewer file access unsuccessful for upload tests overall.

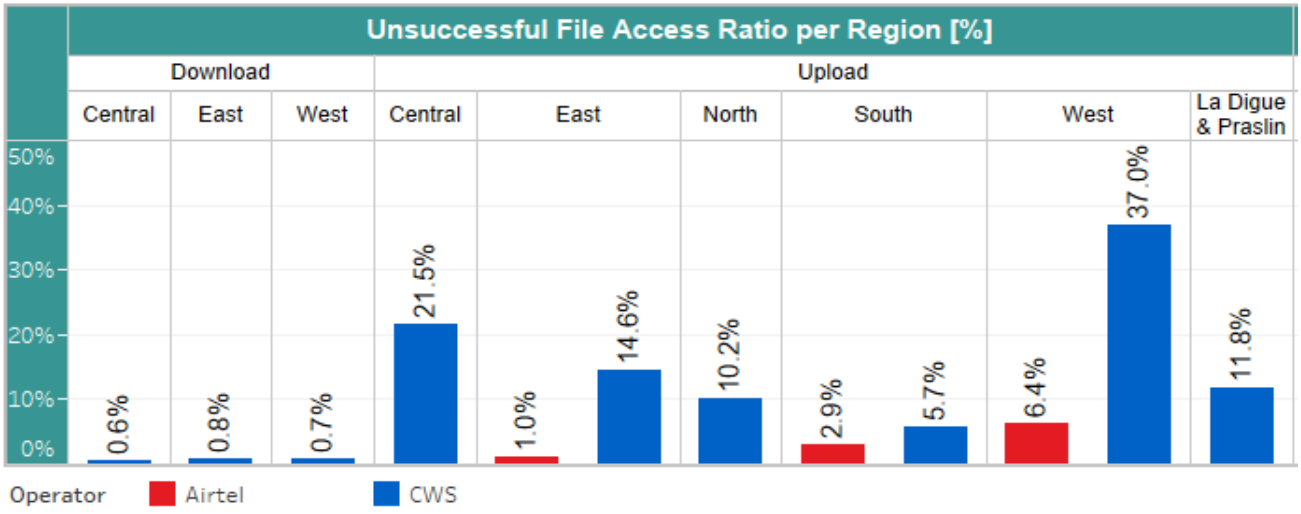

Figure 82. Stationary Unsuccessful File Access Ratio Results per Region (%)

Figure 82 shows the unsuccessful file access ratio per region. CWS had more unsuccessful file access ratio for both download and upload testes in all regions.

4.2.7. STATIONARY YOUTUBE RESULTS

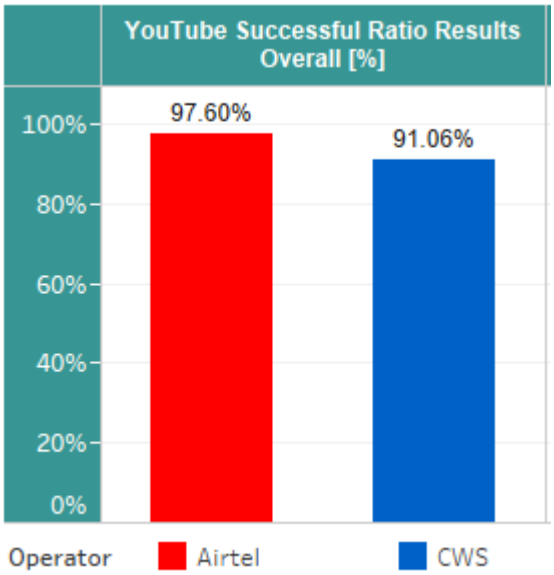

Figure 83. Overall Stationary YouTube Success Ratio Results (%)

Figure 83 shows results for YouTube Success Ratio combined for all stationary points tested in 3G preferred mode. Airtel achieved the best YouTube Overall Success ratio followed by CWS in descending order.

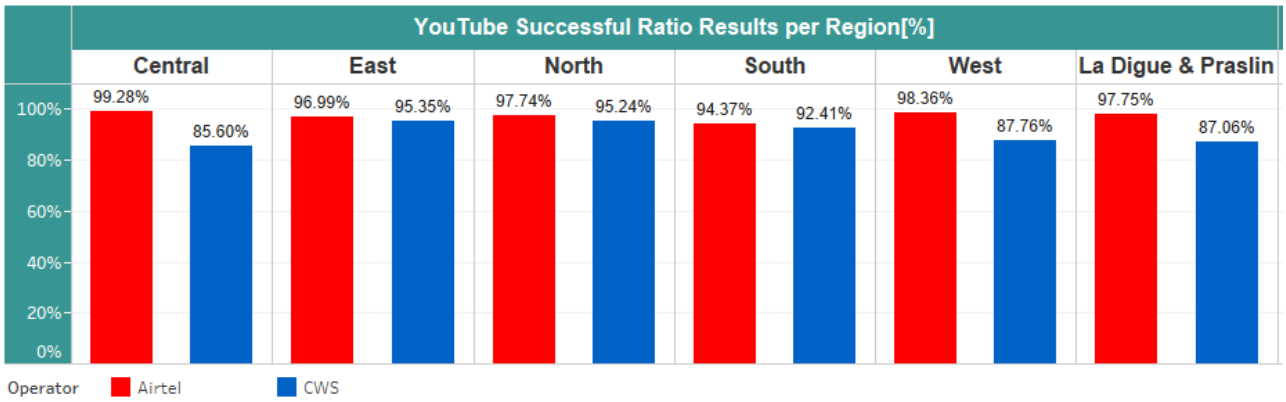

Figure 84. Stationary YouTube Success Ratio Results per Region

Figure 84 shows results for YouTube Success Ratio per region. Airtel Seychelles achieved the highest YouTube Success Ratio in all six (6) tested region in Seychelles: Central, East, North, South, West and La Digue & Praslin.

4.2.8. STATIONARY WEB BROWSING DOWNLOAD TIME

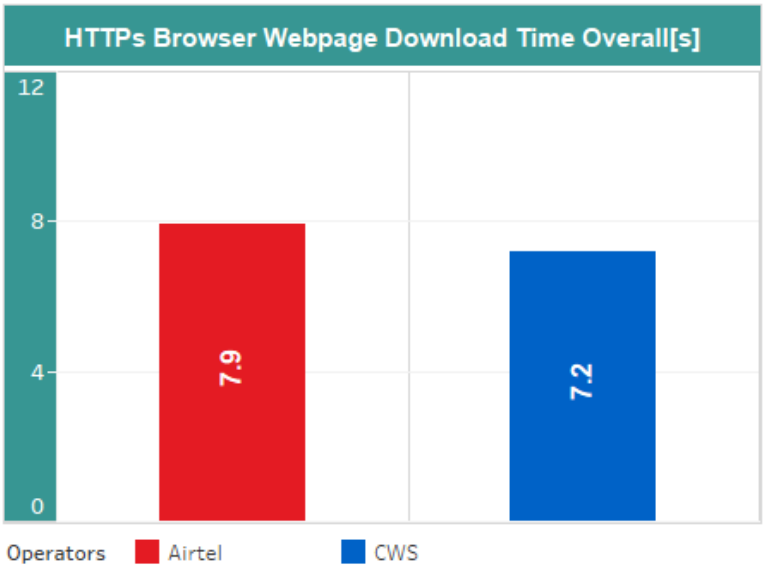

Figure 85. Overall Stationary HTTPS Web Browsing Results

Figure 85 depicts Overall HTTPS Web Browsing results combined for all stationary points tested in 3G preferred mode. CWS achieved the fastest web browsing page load time followed by Airtel.

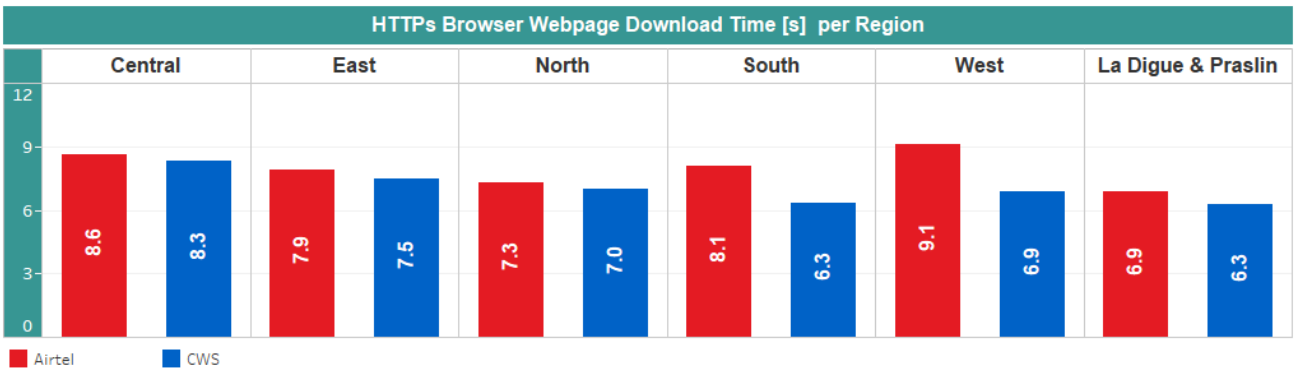

Figure 86. Stationary HTTPS Web Browsing Page Download time(s) per region

Figure 86. shows results for stationary web browsing page load time on HTTPS protocol per region. CWS achieved the fastest browsing time in all six (6) tested regions: Central, East, North, South and West & La Digue and Praslin Island.

4.2.9. STATIONARY LATENCY RESULTS

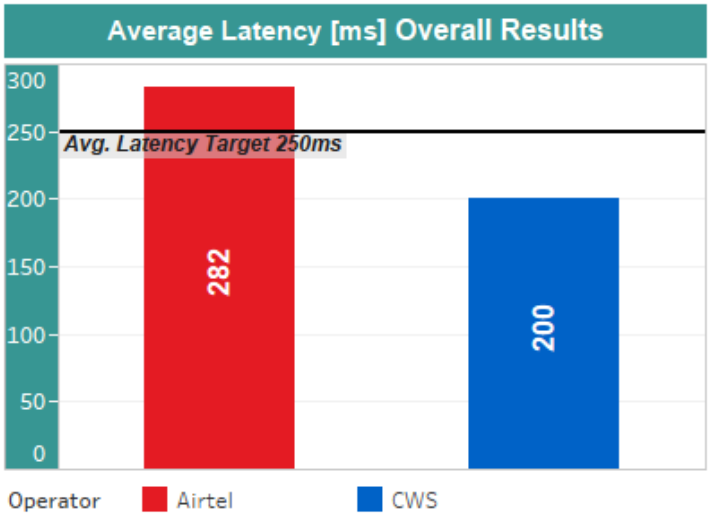

Figure 87. Average Latency Overall Result (ms)

Figure 87 depicts the Overall Latency results combined for all stationary points tested in 3G preferred mode. CWS achieved the lowest latency followed by Airtel. CWS achieved the overall latency results of not more than 250ms

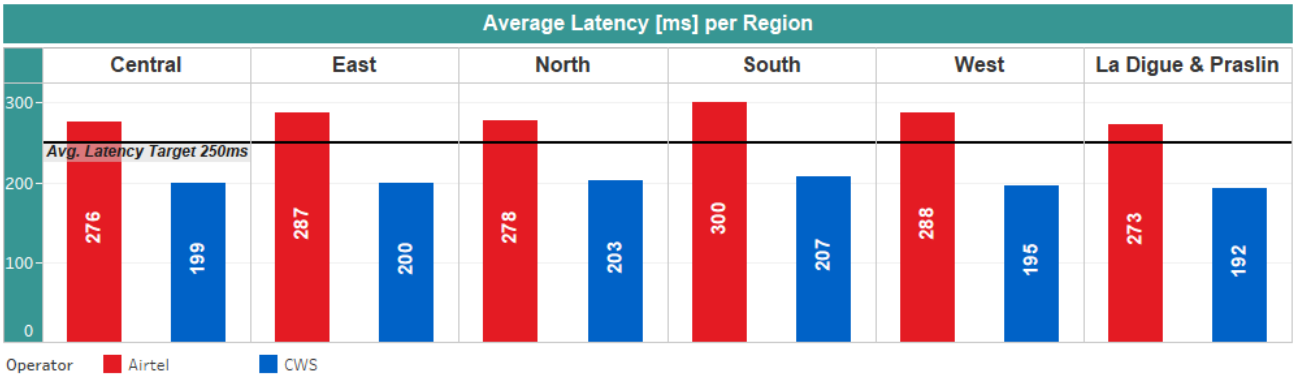

Figure 88. Stationary Latency Results per Region (ms)

Figure 88 shows the Ping/Latency Result per region. CWS had the lowest latency and the only operator to meet the target of 250ms in across all five tested regions of Mahé island—Central, East, North, South, and West—as well as in the combined La Digue & Praslin Islands region. Airtel did not meet the target of 250ms in all six (6) tested regions

4.2.10. STATIONARY PACKET LOSS RATIO [%]

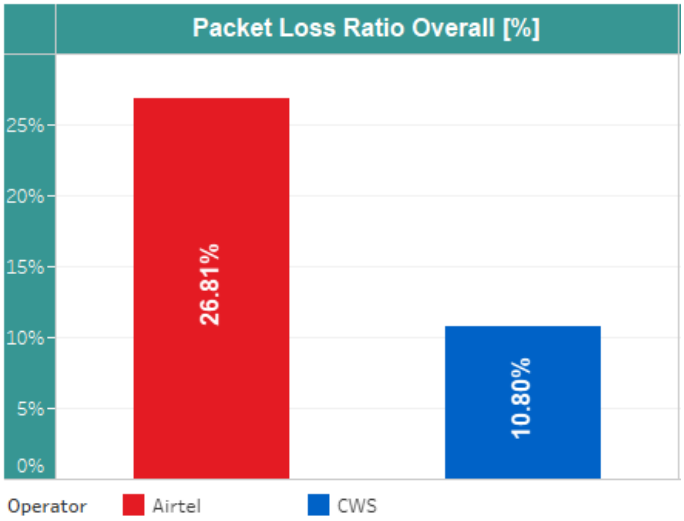

Figure 89. Packet Loss Ratio Overall Result (%)

Figure 89 depicts the Overall Packet Loss Ratio [%] results combined for all stationary points tested in 3G preferred mode. CWS achieved the lowest Packet Loss Ratio followed by Airtel.

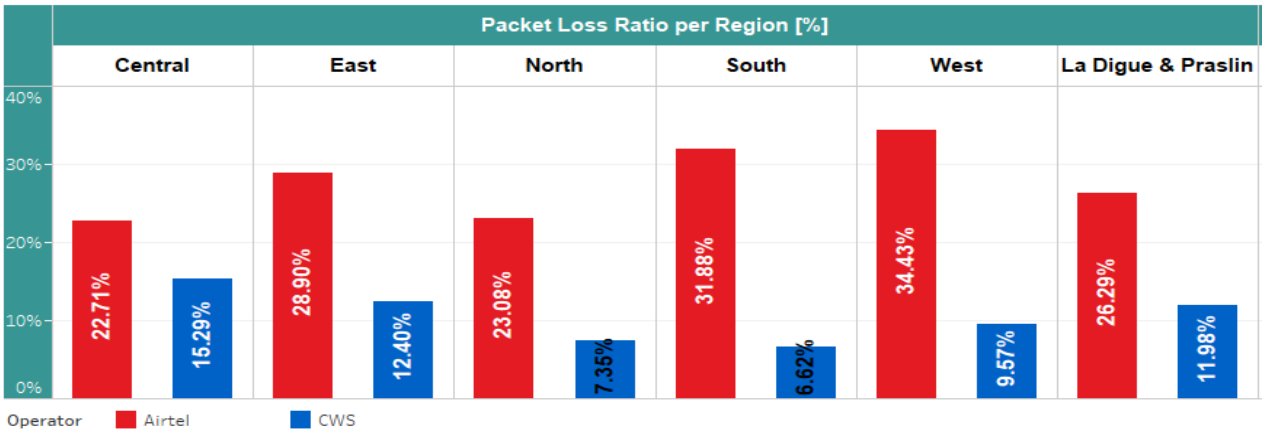

Figure 90. Stationary Packet Loss Ratio Results per Region (ms)

Figure 90 shows the Packet Loss Ratio [%] results combined for all stationary points per region CWS achieved the lowest Packet Loss Ratio followed by Airtel in all six (6) tested regions.

5. CONCLUSION

This section provides the summary and key findings of all measurements. The results illustrate a snapshot of the mobile network performance within the measured time and location. The results also indicate the end-user's quality of service and the operators' network performance.

5.1.SUMMARY OF RESULTS PER DISTRICT FOR MOBILE MEASUREMENTS

5.1.1. HTTP RESULTS

Below is the summary of the HTTP results for the regions covered, including Mahé Island and the combined areas of La Digue & Praslin Islands:

HTTP Download: Airtel achieved the highest results for average HTTP download throughput in all 6 regions tested in 4G preferred & 3G preferred mode.

HTTP Upload: Airtel achieved the highest results for average HTTP upload throughput in all 6 regions tested in 4G preferred & 3G preferred model.

Unsuccessful file access ratio: Airtel achieved better results for file access in line with their performance on the throughputs.

5.1.2. SFTP RESULTS

Below is the summary of SFTP results for each specific district covered:

SFTP Download: Airtel achieved the highest results for average SFTP download throughput in all 6 regions tested in 4G preferred & 3G preferred mode.

SFTP Upload: Airtel achieved the highest results for average SFTP upload throughput in all 6 regions tested in 4G preferred & 3G preferred mode.

5.1.3. YOUTUBE

Airtel Seychelles achieved the highest YouTube Success Ratio for 4G Preferred tests in four (4) tested regions: Central, East, North and South CWS achieved the highest YouTube Success Ratio in West Region of Mahé Island & in the combined La Digue & Praslin Islands region.

Airtel Seychelles achieved the highest YouTube Success Ratio for 3G preferred tests across all five tested regions of Mahé Island —Central, East, North, South, and West—as well as in the combined La Digue & Praslin Islands.

5.1.4. WEB BROWSING

CWS achieved the fastest browsing time for 4G Preferred test in four (4) tested regions: Central, East, North on Mahé & in the combined region of La Digue & Praslin Islands. Airtel achieved the fastest browsing time in two (2) tested regions on Mahé Island: South and West.

CWS achieved the fastest browsing time in four (4) tested regions: Central, North, South and West. Airtel achieved the fastest browsing time in one (1) tested district: East. Both operators had a tie in the combined La Digue & Praslin Islands region.

5.1.5. LATENCY & PACKET LOSS

In 4G preferred test mode, CWS had the lowest latency and the only operator to meet the target of 250ms in five (5) of six (6) tested regions Central, North, South, West and in the combined region of La Digue & Praslin Islands. Airtel did not meet the target of 250ms in any of the six (6) tested regions.

In 3G Preferred test mode, CWS had the lowest latency and the only operator to meet the target of 250ms in all six (6) tested regions. Airtel did not meet the target of 250ms in all six (6) regions.

In 4G preferred test mode, CWS achieved the lowest Packet Loss Ratio in five (5) tested regions: Central, East, South, West and on La Digue & Praslin combined Region. Airtel achieved the lowest Packet Loss Ratio in the North Region.

In 3G Preferred test mode, CWS achieved the lowest Packet Loss Ratio followed by Airtel in four (4) tested regions: Central, East, South & on La Digue and Praslin combined. Region. Airtel achieved the lowest Packet Loss Ratio followed by Airtel in two (2) tested regions: North and West.

5.2.SUMMARY OVERALL RESULTS FOR MOBILE MEASUREMENTS

5.2.1. HTTP

HTTP Download: In 4G Preferred mobility test, Airtel achieved highest results for overall average HTTP Download throughput (16.77 Mbps) followed by CWS (7.30 Mbps) in descending order.

In 3G Preferred mobility test, Airtel achieved highest results for overall average HTTP Download throughput (4.56 Mbps) followed by CWS (3.00 Mbps) in descending order.

HTTP Upload: In 4G Preferred mobility test, Airtel achieved highest results for overall average HTTP Upload throughput (9.07 Mbps) followed by CWS (6.25 Mbps) in descending order.

In 3G Preferred mobility test, Airtel achieved highest results for overall average HTTP Upload throughput (2.20 Mbps) followed by CWS (1.74 Mbps) in descending order.

Unsuccessful file access ratio: Airtel achieved better results for file access in line with their performance on the throughputs.

In 4G Preferred mobility test, Airtel had 1.0% unsuccessful File access ratio while CWS had 1.1% unsuccessful File access ratio for Download Test. In 4G Preferred mobility test, Airtel had 3.0% unsuccessful File access ratio while CWS had 5.0% unsuccessful File access ratio for Upload Test.

In 3G Preferred mobility test, Airtel had 0.6% unsuccessful File access ratio while CWS had 3.0% unsuccessful File access ratio for Download Test. In 3G Preferred mobility test, Airtel had 4.7% unsuccessful File access ratio while CWS had 17.7% unsuccessful File access ratio for Upload Test.

5.2.2. SFTP

SFTP Download: In 4G Preferred mobility test, Airtel achieved highest results for overall average SFTP Download throughput (12.05 Mbps) followed by CWS (5.91 Mbps) in descending order.

In 3G Preferred mobility test, Airtel achieved highest results for overall average SFTP Download throughput (4.57 Mbps) followed by CWS (3.29 Mbps) in descending order

SFTP Upload: In 4G Preferred mobility test, Airtel achieved highest results for overall average SFTP upload throughput (5.60 Mbps) followed by CWS (3.51 Mbps) in descending order.

In 3G Preferred mobility test, Airtel achieved highest results for overall average SFTP upload throughput (1.53 Mbps) followed by CWS (1.04 Mbps) in descending order

5.2.3. YOUTUBE

In 4G Preferred mobility test, Airtel achieved the best overall YouTube Success Ratio (93.79%) followed by CWS (93.53%) in descending order.

In 3G Preferred mobility test, Airtel achieved the best overall YouTube Success Ratio (92.00%) followed by CWS (71.86%) in descending order.

5.2.4. LATENCY

In 4G Preferred mobility test, CWS achieved the best latency for overall average latency results (242ms) followed by Airtel (274ms), in ascending order.

In 3G Preferred mobility test, CWS achieved the best latency for overall average latency results (204ms) followed by Airtel (285ms), in ascending order.

In 4G Preferred mobility test, CWS had 3.26% of overall Packet Loss Ratio [%] and Airtel has 3.59% of overall Packet Loss Ratio [%].

In 3G Preferred mobility test, CWS had 15.94% of overall Packet Loss Ratio [%] and Airtel has 22.04% of overall Packet Loss Ratio [%].

5.2.5. WEB BROWSING

In 4G Preferred mobility test, CWS achieved the fastest browsing time results (10.1 s) followed by Airtel (10.2 s), in ascending order.

In 3G Preferred mobility test, CWS achieved the fastest browsing time results (8.3 s) followed by Airtel (8.8 s), in ascending order.

5.3.SUMMARY OVERALL RESULTS FOR STATIC MEASUREMENTS

Airtel achieved the highest download and the highest upload throughput for the stationary measurements in 4G Preferred & 3G Preferred technology mode.

Airtel achieved the best overall YouTube Success Ratio in 4G Preferred & in 3G Preferred test mode. CWS achieved the highest for Video streaming resolution on YouTube in 4G Preferred mode & 3G Preferred technology mode.

CWS achieved the best YouTube Access time in 4G Preferred mode & 3G Preferred technology mode.

CWS had the fastest web browsing download time in 4G mode and 3G mode tests.

CWS was the best for overall latency in 4G mode and 3G mode tests.

Airtel excelled in download and upload throughput for stationary measurements in both 4G and 3G modes, along with the best YouTube success ratio.

CWS led in video resolution, YouTube access time, and web browsing download speed, and continued to outperform Airtel in latency.

In 4G Preferred stationary test, Airtel had less overall Packet Loss when compared to CWS

In 3G Preferred stationary test, CWS had less overall Packet Loss when compared to Airtel.

Airtel demonstrated superior performance in throughput-related metrics (HTTP and SFTP) and YouTube success ratios, establishing itself as a leader in data-intensive activities. CWS excelled in latency, web browsing, and streaming-related metrics, ensuring a faster and more responsive experience for users. Both operators showcase strengths in distinct areas, offering users diverse options based on specific service priorities.

6. APPENDIX 1 – PERFORMANCE PER REGION

6.1. MOBILE DATA TEST RESULTS TABLES

6.1.1. 4G PREFERRED AVERAGE THROUGHPUT

Table 10. Average Data throughput per region

		Central		East		North		South		West		La Digue & Praslin		Grand Total
		Phase 1	Phase 2	Phase 1	Phase 2	Phase 1	Phase 2	Phase 1	Phase 2	Phase 1	Phase 2	Phase 1	Phase 2	
HTTP DL Throughput - Avg [Mbps]	Airtel	14.12	12.35	17.26	17.84	14.96	15.32	18.38	15.01	17.84	18.94	21.21	18.53	16.77
	CWS	5.44	6.63	7.86	7.61	6.54	7.01	8.30	7.07	9.44	3.59	8.30	8.43	7.30
HTTP UL Throughput - Avg [Mbps]	Airtel	8.10	8.44	10.03	9.36	9.40	9.11	7.87	7.92	9.23	9.09	9.87	9.84	9.07
	CWS	4.78	6.30	7.39	6.16	6.96	6.10	6.23	5.62	6.29	3.04	6.81	6.77	6.25
HTTP DL Capacity Throughput - Avg [Mbps]	Airtel	19.20	21.36	40.74	42.34	32.32	34.60	43.72	42.18	43.22	52.49	53.67	45.83	39.25
	CWS	15.90	16.85	25.47	23.12	27.64	21.81	20.12	23.64	25.28	11.89	27.27	40.25	24.64
HTTP UL Capacity Throughput - Avg [Mbps]	Airtel	14.99	15.84	20.89	20.75	18.47	19.32	16.17	18.08	17.83	18.28	21.68	20.63	18.73
	CWS	13.13	17.21	24.30	20.84	21.05	18.15	13.72	15.59	12.20	11.56	19.72	20.35	18.00
SFTP DL Throughput - Avg [Mbps]	Airtel	10.13	9.67	12.40	12.57	11.39	10.48	12.70	10.59	13.05	14.02	13.96	13.69	12.05
	CWS	4.16	5.55	6.32	6.48	4.83	5.47	6.58	5.83	7.19	3.55	7.11	6.83	5.91
SFTP UL Throughput - Avg [Mbps]	Airtel	5.46	5.39	6.21	5.98	5.45	5.60	5.17	4.82	5.73	5.29	6.03	6.03	5.60
	CWS	2.66	3.43	3.79	3.37	3.53	3.42	3.69	3.59	3.86	2.10	3.78	3.84	3.51

6.1.2. 4G WEB PAGE DOWNLOAD TIME

Table 11. Data HTTPS Webpage download time per region

		Central		East		North		South		West		La Digue & Praslin		Grand Total
		Phase 1	Phase 2	Phase 1	Phase 2	Phase 1	Phase 2	Phase 1	Phase 2	Phase 1	Phase 2	Phase 1	Phase 2	
HTTPs Kepler	Airtel	4.58	4.72	4.5	4.65	4.68	4.62	4.64	5.22	4.22	4.26	4.38	4.44	4.58
	CWS	5.88	5.45	5.27	5.08	5	5.39	4.94	5.57	5.29	5.88	4.7	4.85	5.21
HTTPs Mobile Kepler	Airtel	2.12	1.87	1.72	1.85	1.9	1.98	2.19	2.26	1.72	1.81	1.83	1.85	1.93
	CWS	2.77	2.92	2.9	2.92	3	2.75	2.94	3.26	2.84	2.93	2.94	2.79	2.92
Shein	Airtel	8.28	7.55	7.01	7.52	7.5	6.96	7.04	8.05	7.01	6.52	7.51	7.18	7.37
	CWS	11.49	7.87	7.47	7.82	9.39	9.26	6.64	8.53	6.97	14.8	7.01	6.65	8.32
NBS	Airtel	20.06	19.25	17.43	17.98	18.49	18.79	18.35	17.56	18.02	17.64	17.75	17.68	18.21
	CWS	17.04	17.6	16.22	18.62	16.65	17.37	15.74	19.59	15.85	16.2	12.45	16.43	16.56
SBC	Airtel	22.64	20.4	20.1	17.22	20.15	20.69	18.43	17.6	17.85	16.2	16.38	16.49	18.51
	CWS	21.36	18.46	16.55	17.4	18.66	15.88	16.95	20.16	14.22	23.11	17.66	15.77	17.78

6.1.3. 4G PREFERRED YOUTUBE RESULTS

Table 12: Data YouTube Video KPIs results per region

		Central		East		North		South		West		La Digue & Praslin		Grand Total
		Phase 1	Phase 2	Phase 1	Phase 2	Phase 1	Phase 2	Phase 1	Phase 2	Phase 1	Phase 2	Phase 1	Phase 2	
YouTube Success Ratio [%]	Airtel	93.15	93.98	93.51	90.11	100.00	95.71	93.10	94.38	91.94	89.23	97.06	92.45	93.79
	CWS	92.42	92.41	92.00	85.00	98.57	96.67	92.77	91.14	96.61	95.56	92.78	98.08	93.53
YouTube Video Resolution [pixels]	Airtel	1022	1053	1066	1063	1025	1061	1071	1069	1075	1041	1074	1080	1060
	CWS	964	1042	1046	1049	1012	1003	1045	1032	1068	827	1061	1065	1027
YouTube Access Time [s]	Airtel	7.1	6.3	5.1	5.3	5.6	5.4	5.4	5.3	6.1	5.4	5.3	6.3	5.7
	CWS	2.6	2.2	2.3	2.4	2.0	2.4	2.4	2.2	1.9	3.5	1.8	1.7	2.2

6.1.4. 4G PREFERRED DATA PING RESULTS

Table 13. Data Latency results per region

		Central		East		North		South		West		La Digue & Praslin		Grand Total
		Phase 1	Phase 2	Phase 1	Phase 2	Phase 1	Phase 2	Phase 1	Phase 2	Phase 1	Phase 2	Phase 1	Phase 2	
Average Latency [ms]	Airtel	274	273	269	264	272	281	272	296	266	270	274	273	274
	CWS	236	256	282	257	248	251	226	235	199	230	227	244	242

6.1.5. 4G PREFERRED PACKET LOSS RATIO RESULTS

Table 14. Packet Loss Ratio results per region

		Central		East		North		South		West		La Digue & Praslin		Grand Total
		Phase 1	Phase 2	Phase 1	Phase 2	Phase 1	Phase 2	Phase 1	Phase 2	Phase 1	Phase 2	Phase 1	Phase 2	
Packet Loss Ratio [%]	Airtel	5.84	3.77	3.36	3.92	0.67	2.99	4.17	4.05	2.56	5.60	1.02	5.39	3.59
	CWS	2.42	2.61	2.13	2.21	5.15	4.24	2.52	6.45	3.42	2.27	3.78	1.94	3.26

6.1.6. *3G PREFERRED AVERAGE THROUGHPUT*

Table 15. Average 3G Data throughput per region

		Central		East		North		South		West		La Digue & Praslin		Grand Total
		Phase 1	Phase 2	Phase 1	Phase 2	Phase 1	Phase 2	Phase 1	Phase 2	Phase 1	Phase 2	Phase 1	Phase 2	
HTTP DL Throughput - Avg [Mbps]	Airtel	3.83	4.20	4.67	4.79	5.30	4.90	4.02	4.74	4.29	4.03	5.47	5.34	4.56
	CWS	3.31	2.85	3.26	2.85	2.91	3.07	2.88	3.26	3.11	2.87	2.90	2.82	3.00
HTTP UL Throughput - Avg [Mbps]	Airtel	2.28	1.97	2.21	2.20	2.19	2.28	1.91	1.84	2.16	2.44	2.43	2.39	2.20
	CWS	1.61	1.76	1.80	1.78	1.72	1.99	1.66	1.50	1.55	1.66	1.85	1.93	1.74
HTTP DL Capacity Throughput - Avg [Mbps]	Airtel	4.53	4.74	6.12	5.93	6.85	6.93	6.18	6.20	4.91	5.76	6.82	7.74	6.07
	CWS	7.11	6.48	7.81	6.80	9.59	7.84	6.57	6.26	8.91	8.01	8.01	9.51	7.71
HTTP UL Capacity Throughput - Avg [Mbps]	Airtel	5.28	4.58	4.58	4.75	4.88	4.77	4.14	4.30	4.36	4.98	4.53	4.92	4.68
	CWS	5.03	3.91	4.01	4.27	4.27	4.24	4.11	4.16	3.79	4.23	4.28	4.17	4.21
SFTP DL Throughput - Avg [Mbps]	Airtel	10.13	9.67	12.40	12.57	11.39	10.48	12.70	10.59	13.05	14.02	13.96	13.69	12.05
	CWS	4.16	5.55	6.32	6.48	4.83	5.47	6.58	5.83	7.19	3.55	7.11	6.83	5.91
SFTP UL Throughput - Avg [Mbps]	Airtel	4.53	4.74	6.12	5.93	6.85	6.93	6.18	6.20	4.91	5.76	6.82	7.74	6.07
	CWS	7.11	6.48	7.81	6.80	9.59	7.84	6.57	6.26	8.91	8.01	8.01	9.51	7.71

6.1.7. 3G PREFERRED WEB PAGE DOWNLOAD TIME

Table 16. Data HTTPS Webpage download times per region

		Central		East		North		South		West		La Digue & Praslin		Grand Total
		Phase 1	Phase 2	Phase 1	Phase 2	Phase 1	Phase 2	Phase 1	Phase 2	Phase 1	Phase 2	Phase 1	Phase 2	
HTTPs Kepler	Airtel	4.9	4.57	4.49	3.98	4.28	4.51	4.85	5.69	4.25	4.49	4.2	4.36	4.55
	CWS	6.59	7.71	6.38	5.83	6.35	6.9	6.37	5.71	5.45	5.85	5.56	5.87	6.19
HTTPs Mobile Kepler	Airtel	2.19	2.23	1.85	1.94	2.36	2.39	2.17	2.43	1.95	1.97	1.84	2.01	2.11
	CWS	3.05	3.91	2.92	2.63	2.79	2.88	2.83	2.61	3.17	2.84	2.54	2.71	2.88
Shein	Airtel	14.46	11.83	10.86	10.17	10.97	10.1	11.17	10.28	10.55	8.83	9.79	8.84	10.59
	CWS	12.39	11.14	9.39	10.18	11.29	9.04	9.85	9.34	10.98	8.23	8.51	8.51	9.8
NBS	Airtel	14.92	13.44	11.87	11.87	12.22	12.43	14.1	11.83	11.65	11.94	11.31	11.67	12.38
	CWS	11.01	11.36	9.84	11.74	9.46	10.23	9.44	9.52	10.02	8.43	9.06	11.16	10.1
SBC	Airtel	19.63	16.8	15.36	13.01	17.59	13.52	17.15	14.28	13.85	11.33	11.63	13.19	14.65
	CWS	14.93	14.37	13.87	14.08	11.96	12.29	11.38	11.26	12.57	10.03	11.18	12.25	12.44

6.1.8. 3G PREFERRED YOUTUBE RESULTS

Table 17. Data YouTube KPIs per region

		Central		East		North		South		West		La Digue & Praslin		Grand Total
		Phase 1	Phase 2	Phase 1	Phase 2	Phase 1	Phase 2	Phase 1	Phase 2	Phase 1	Phase 2	Phase 1	Phase 2	
YouTube Success Ratio [%]	Airtel	87.30	93.24	93.94	93.51	97.06	93.33	87.14	88.16	90.57	86.54	94.12	95.74	92.00
	CWS	79.37	73.13	82.76	53.33	80.95	71.43	70.59	63.89	68.75	80.00	78.48	66.67	71.86
YouTube Video Resolution [pixels]	Airtel	898	942	1007	1032	951	1020	1018	1022	1035	1042	1069	1020	1005
	CWS	935	1039	1024	1017	983	1068	1050	1045	1053	1059	1060	1058	1032
YouTube Access Time [s]	Airtel	4.9	4.2	3.8	4.1	4.2	4.4	3.6	4.0	3.6	3.5	3.7	3.8	4.0
	CWS	2.7	2.8	3.5	4.5	4.4	2.4	3.7	2.4	2.3	2.0	2.5	3.6	3.1

6.1.9. 3G PREFERRED LATENCY RESULTS

Table 18. Average Latency per region

		Central		East		North		South		West		La Digue & Praslin		Grand Total
		Phase 1	Phase 2	Phase 1	Phase 2	Phase 1	Phase 2	Phase 1	Phase 2	Phase 1	Phase 2	Phase 1	Phase 2	
Average Latency [ms]	Airtel	283	291	290	272	279	287	290	314	281	271	281	282	285
	CWS	201	207	193	203	194	212	211	206	200	211	203	204	204

6.1.10. 3G PREFERRED PACKET LOSS RATIO [%]

Table 19. Packet Loss Ratio results per region

		Central		East		North		South		West		La Digue & Praslin		Grand Total
		Phase 1	Phase 2	Phase 1	Phase 2	Phase 1	Phase 2	Phase 1	Phase 2	Phase 1	Phase 2	Phase 1	Phase 2	
Packet Loss Ratio [%]	Airtel	26.50	11.97	31.71	6.20	3.82	7.02	40.30	28.08	16.67	16.16	36.81	29.05	22.04
	CWS	6.14	9.52	10.91	25.23	16.26	14.95	21.71	23.19	17.39	17.35	16.56	12.72	15.94

6.2. DATA STATIONARY TEST RESULTS

6.2.1. 4G PREFERRED DATA THROUGHPUT

Table 20.Data Throughput per region combined for all stationary point

		Central	East	North	South	West	La Digue & Praslin	Grand Total
HTTP DL Throughput - Avg [Mbps]	Airtel	10.72	16.45	16.96	16.69	20.01	20.85	16.40
	CWS	8.85	9.75	9.54	8.52	10.51	9.30	9.35
HTTP UL Throughput - Avg [Mbps]	Airtel	8.66	11.52	12.67	9.21	12.74	13.56	11.34
	CWS	5.12	7.04	6.59	7.02	7.08	6.94	6.50
HTTP DL Capacity Throughput - Avg [Mbps]	Airtel	17.36	35.17	39.89	40.12	75.03	67.27	41.50
	CWS	37.48	50.37	44.49	54.65	45.20	41.36	45.25
HTTP UL Capacity Throughput - Avg [Mbps]	Airtel	15.75	24.71	23.90	19.97	26.10	33.99	23.63
	CWS	14.83	19.00	23.14	29.77	10.47	19.06	19.84
SFTP DL Throughput - Avg [Mbps]	Airtel	8.13	12.11	12.41	11.81	14.71	14.39	11.88
	CWS	6.90	7.30	7.64	6.74	7.33	7.14	7.19
SFTP UL Throughput - Avg [Mbps]	Airtel	5.62	6.88	7.62	5.70	7.58	7.78	6.85
	CWS	3.22	3.68	3.83	3.84	3.78	3.95	3.68

6.2.2. 4G PREFERRED DATA WEB PAGE DOWNLOAD TIME

Table 21. 4G Preferred HTTPS Webpage download time per region combined for all stationary points

		Central	East	North	South	West	La Digue & Praslin	Grand Total
HTTPs Kepler	Airtel	4.2	4.6	4.2	5.2	3.9	4.1	4.4
	CWS	5.5	5.5	4.9	5.2	5.9	4.7	5.3
HTTPs Mobile Kepler	Airtel	1.8	1.9	1.8	2.4	1.9	1.7	1.9
	CWS	3.2	3.1	2.9	2.9	3.5	2.9	3.1
Google	Airtel	7.2	6.4	6.7	6.7	7.1	6.2	6.7
	CWS	6.9	5.9	6.9	6.4	6.7	5.3	6.4
MSN	Airtel	17.9	17.4	16.8	18.0	18.1	17.2	17.5
	CWS	15.5	15.7	15.8	15.9	15.0	13.6	15.4
News24	Airtel	19.9	17.8	16.4	18.9	17.2	15.6	17.7
	CWS	14.0	15.0	13.0	15.7	14.4	14.8	14.4

6.2.3. 4G PREFERRED DATA YOUTUBE RESULTS

Table 22. Data YouTube KPIs per region combined for all stationary points

		Central	East	North	South	West	La Digue & Praslin	Grand Total
YouTube Success Ratio [%]	Airtel	98.04%	98.17%	98.70%	97.56%	94.52%	97.20%	97.68%
	CWS	100.00%	100.00%	96.32%	97.56%	98.04%	90.80%	97.50%
YouTube Video Resolution [pixels]	Airtel	1004	1069	1039	1058	1043	1080	1047
	CWS	1042	1074	1035	1062	1080	1080	1058
YouTube Access Time [s]	Airtel	5.7	5.2	5.3	6.0	5.5	5.2	5.4
	CWS	1.6	1.5	1.5	1.9	1.5	1.6	1.6

6.2.4. 4G PREFERRED DATA PING/RTT RESULTS

Table 23. Data Ping Latency results per region combined for all stationary points

		Central	East	North	South	West	La Digue & Praslin	Grand Total
Average Latency [ms]	Airtel	269	270	269	293	274	262	271
	CWS	195	245	215	284	196	207	224

6.2.5. 4G PREFERRED DATA PACKET LOSS RATIO RESULTS

Table 24. Data Packet Loss Ratio results per region combined for all stationary points

		Central	East	North	South	West	La Digue & Praslin	Grand Total
Packet Loss Ratio [%]	Airtel	1.00	0.00	1.00	3.77	0.70	0.48	0.98
	CWS	5.51	3.86	5.88	0.63	1.00	8.24	4.61

6.2.6. 3G PREFERRED DATA THROUGHPUT

Table 25. Average Data throughput per region combined for all stationary points

		Central	East	North	South	West	La Digue & Praslin	Grand Total
HTTP DL Throughput - Avg [Mbps]	Airtel	4.53	5.12	5.95	4.86	5.44	6.04	5.30
	CWS	2.94	3.27	3.13	3.20	3.22	3.18	3.14
HTTP UL Throughput - Avg [Mbps]	Airtel	2.53	2.42	3.00	2.67	3.01	3.01	2.73
	CWS	1.54	2.20	2.14	2.31	2.18	1.75	2.02
HTTP DL Capacity Throughput - Avg [Mbps]	Airtel	5.56	7.99	9.66	6.83	7.86	9.46	7.87
	CWS	7.76	10.74	11.19	13.67	11.39	13.54	11.06
HTTP UL Capacity Throughput - Avg [Mbps]	Airtel	5.67	4.98	5.80	5.30	5.37	6.09	5.54
	CWS	3.79	4.63	4.89	5.13	3.93	4.64	4.52
SFTP DL Throughput - Avg [Mbps]	Airtel	4.49	5.09	6.15	4.91	5.24	6.25	5.34
	CWS	3.23	3.59	3.77	4.07	3.67	3.73	3.65
SFTP UL Throughput - Avg [Mbps]	Airtel	1.74	1.64	1.96	1.69	2.07	2.09	1.84
	CWS	0.92	1.13	1.09	1.19	0.76	0.96	1.04

6.2.7. 3G PREFERRED DATA WEB PAGE DOWNLOAD TIME

Table 26. Data Webpage download timer per region combined for all stationary points

		Central	East	North	South	West	La Digue & Praslin	Grand Total
HTTPs Kepler	Airtel	3.8	4.0	3.5	4.2	4.1	3.6	3.8
	CWS	6.8	6.3	5.5	5.3	6.4	5.3	5.9
HTTPs Mobile Kepler	Airtel	1.7	1.8	1.7	2.0	2.6	1.6	1.8
	CWS	3.3	3.4	2.6	2.4	3.2	2.5	2.9
Google	Airtel	10.5	8.7	8.8	8.9	11.3	8.1	9.3
	CWS	10.4	7.8	8.9	6.2	7.4	6.2	8.1
MSN	Airtel	11.3	11.0	10.7	11.0	13.7	10.4	11.2
	CWS	9.0	8.3	8.3	7.7	7.5	7.9	8.2
News24	Airtel	16.2	14.0	11.6	14.2	14.1	10.7	13.5
	CWS	12.1	11.6	9.7	10.1	9.8	9.3	10.6

6.2.8. 3G DATA YOUTUBE RESULTS

Table 27. Data YouTube KPIs per region combined for all stationary points

		Central	East	North	South	West	La Digue & Praslin	Grand Total
YouTube Success Ratio [%]	Airtel	99.28%	96.99%	97.74%	94.37%	98.36%	97.75%	97.60%
	CWS	85.60%	95.35%	95.24%	92.41%	87.76%	87.06%	91.06%
YouTube Video Resolution [pixels]	Airtel	1005	1057	1038	1046	1006	1080	1038
	CWS	1006	1065	1039	1080	1072	1080	1052
YouTube Access Time [s]	Airtel	3.6	3.4	3.2	3.8	3.6	3.2	3.5
	CWS	2.2	2.0	1.8	1.9	2.0	2.0	2.0

6.2.9. 3G DATA PING/RTT RESULTS

Table 28. Data Ping Latency results per region combined for all stationary points

		Central	East	North	South	West	La Digue & Praslin	Grand Total
Average Latency [ms]	Airtel	276	287	278	300	288	273	282
	CWS	199	200	203	207	195	192	200

6.2.10. 3G DATA PACKET LOSS RATIO [%]

Table 29. Data Packet Loss Ratio per region combined for all stationary points

		Central	East	North	South	West	La Digue & Praslin	Grand Total
Packet Loss Ratio [%]	Airtel	22.71	28.90	23.08	31.88	34.43	26.29	26.81
	CWS	15.29	12.40	6.97	6.62	9.57	11.98	10.80

7. APPENDIX 2 – RF MEASUREMENTS

7.1.DATA MAP PLOTS

7.1.1. DATA TECHNOLOGY

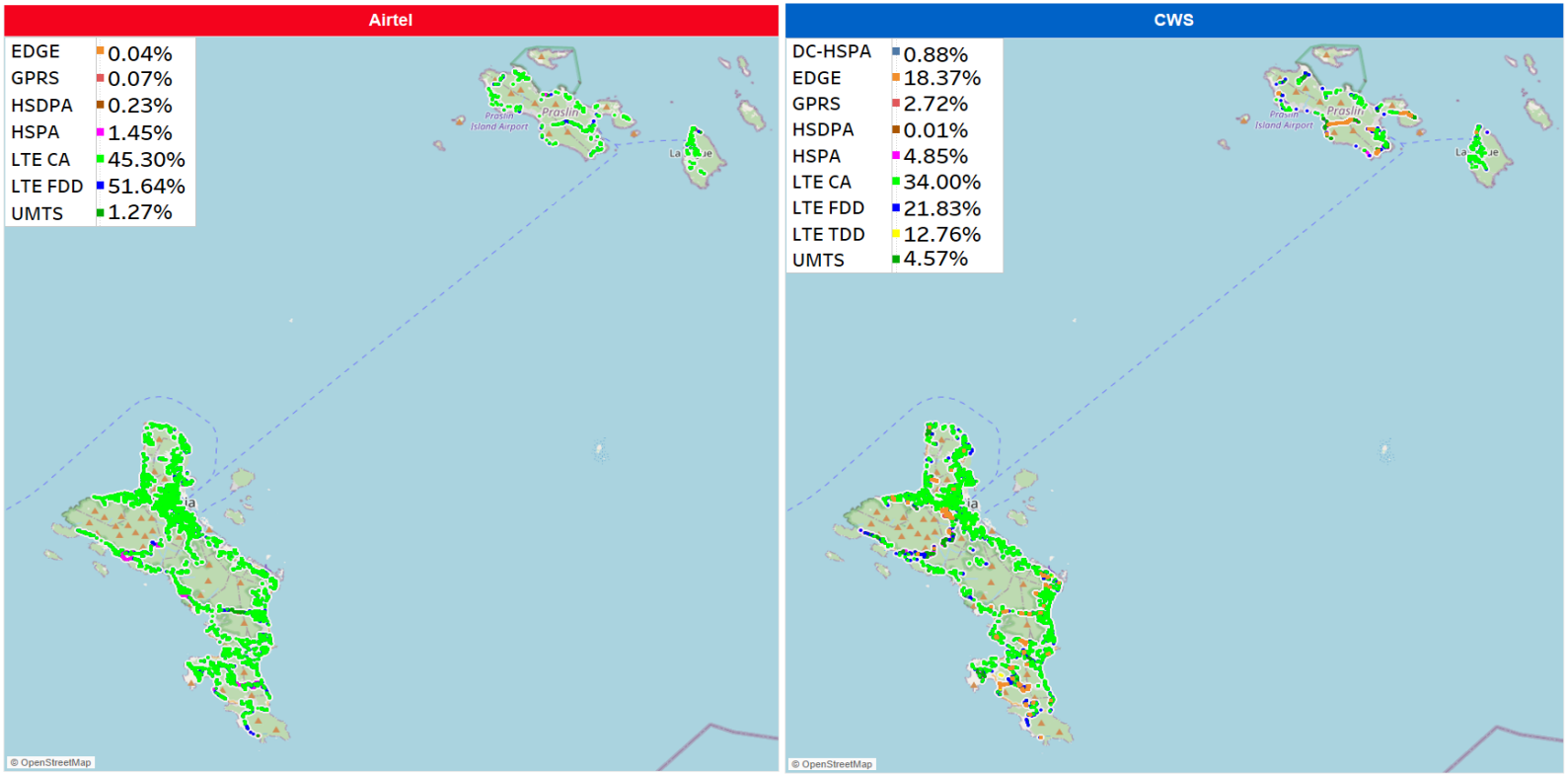

Figure 91. Packet Technology Plot

7.1.2. LTE RSRP PLOT

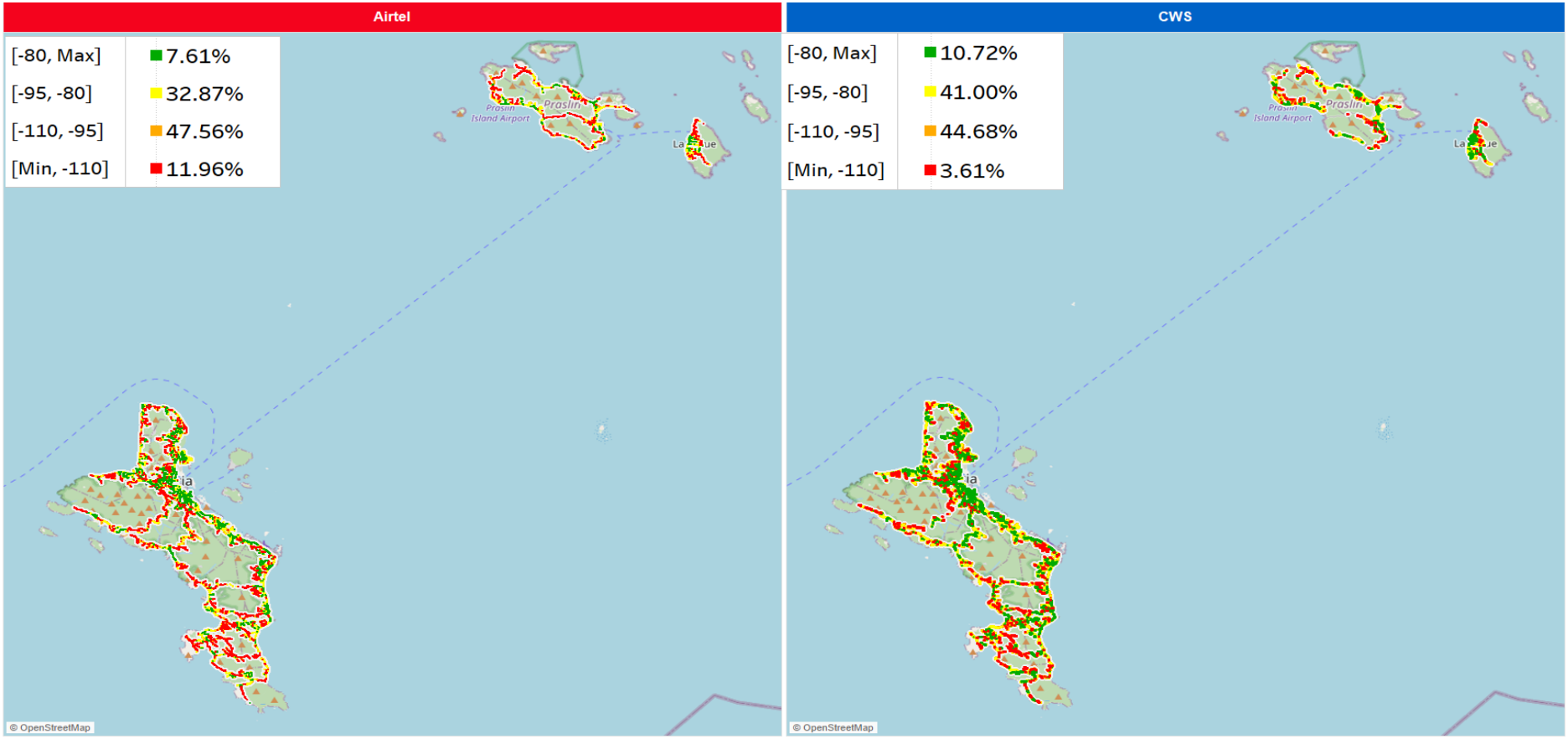

Figure 92. LTE RSRP Plot

7.1.3. LTE SINR

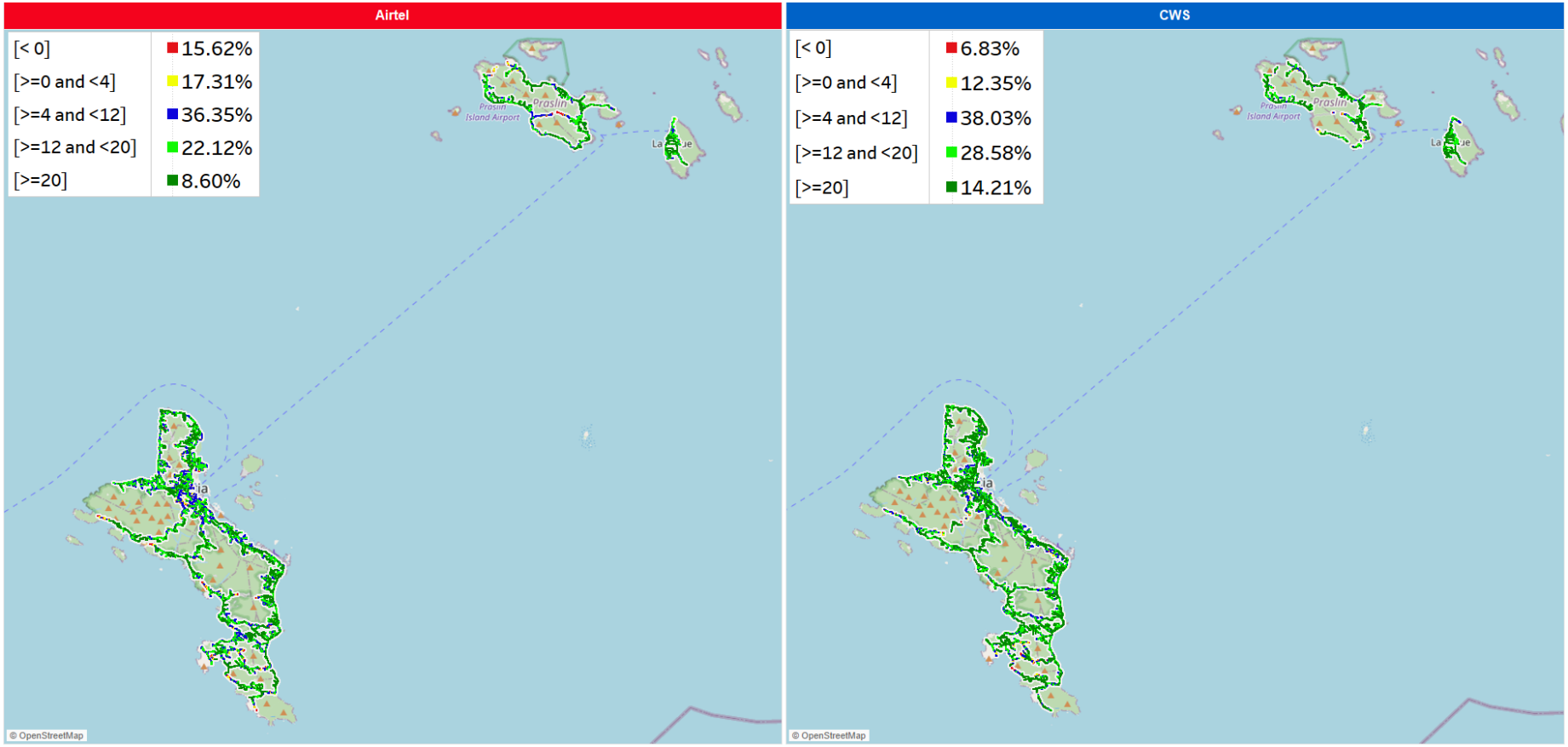

Figure 93. LTE SINR Plot

7.1.4. LTE EARFCN

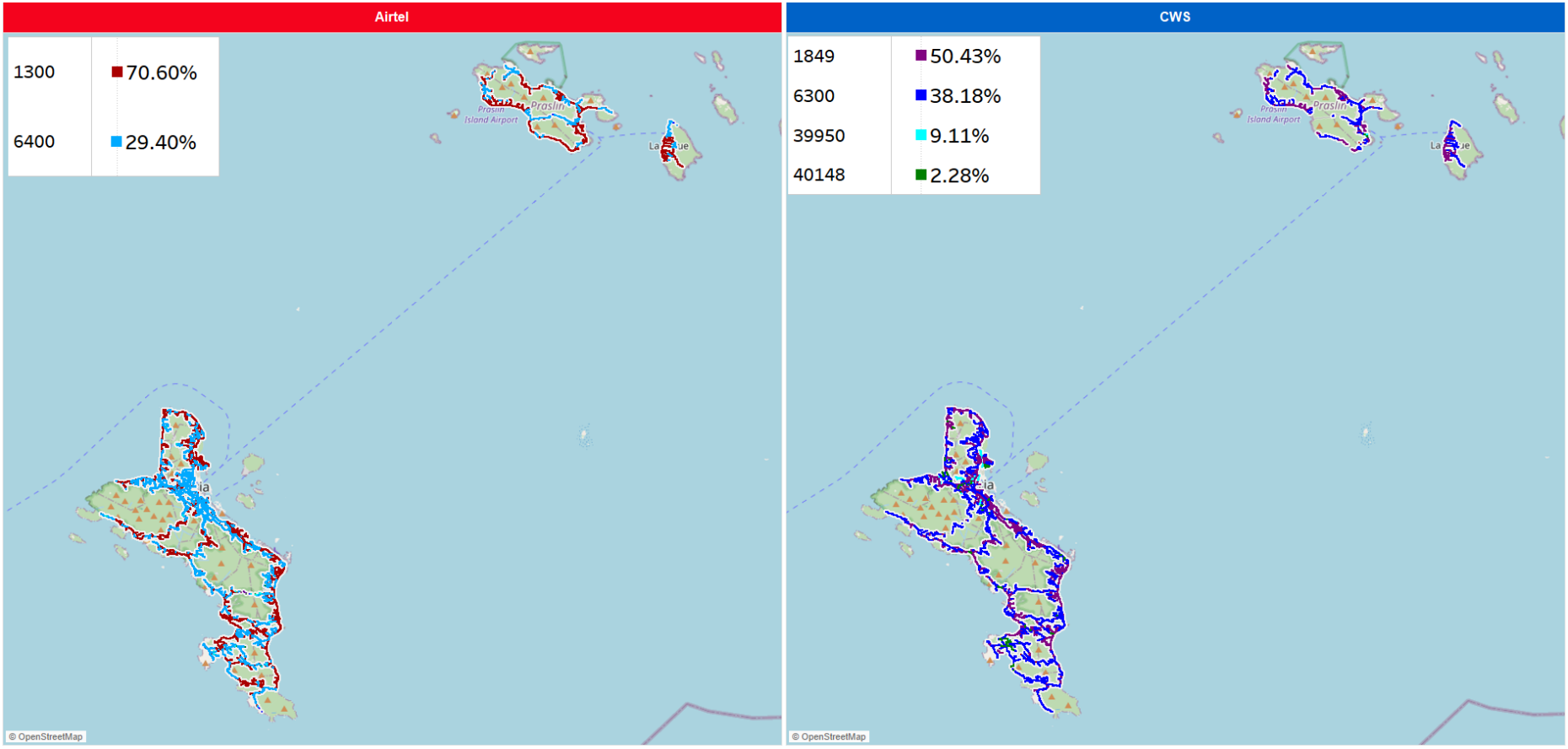

Figure 94. LTE EARFCN Plot

7.1.5. DATA TECHNOLOGY 3G PREFERRED

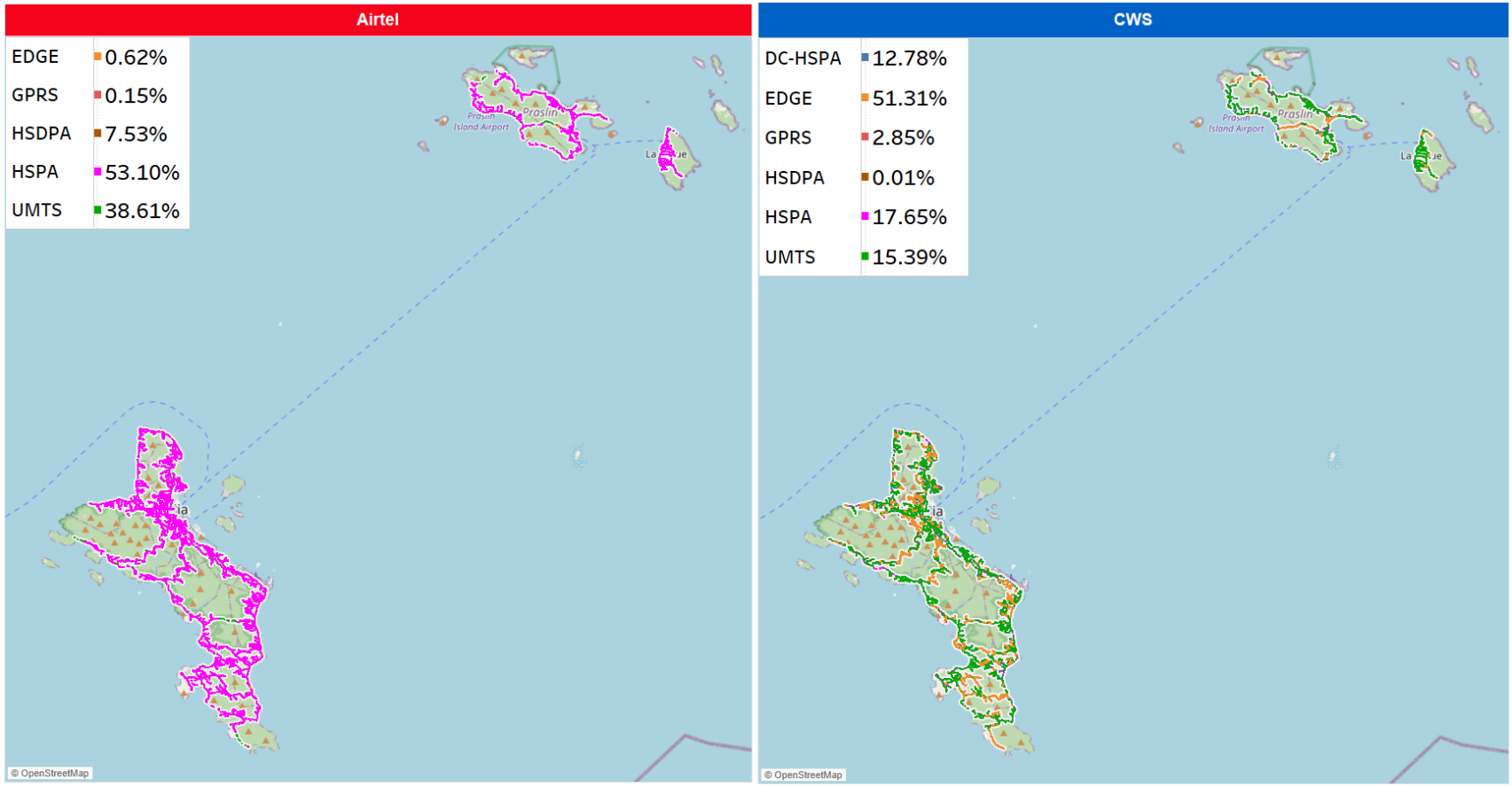

Figure 95. Packet Technology Plot

7.1.6. UMTS RSCP

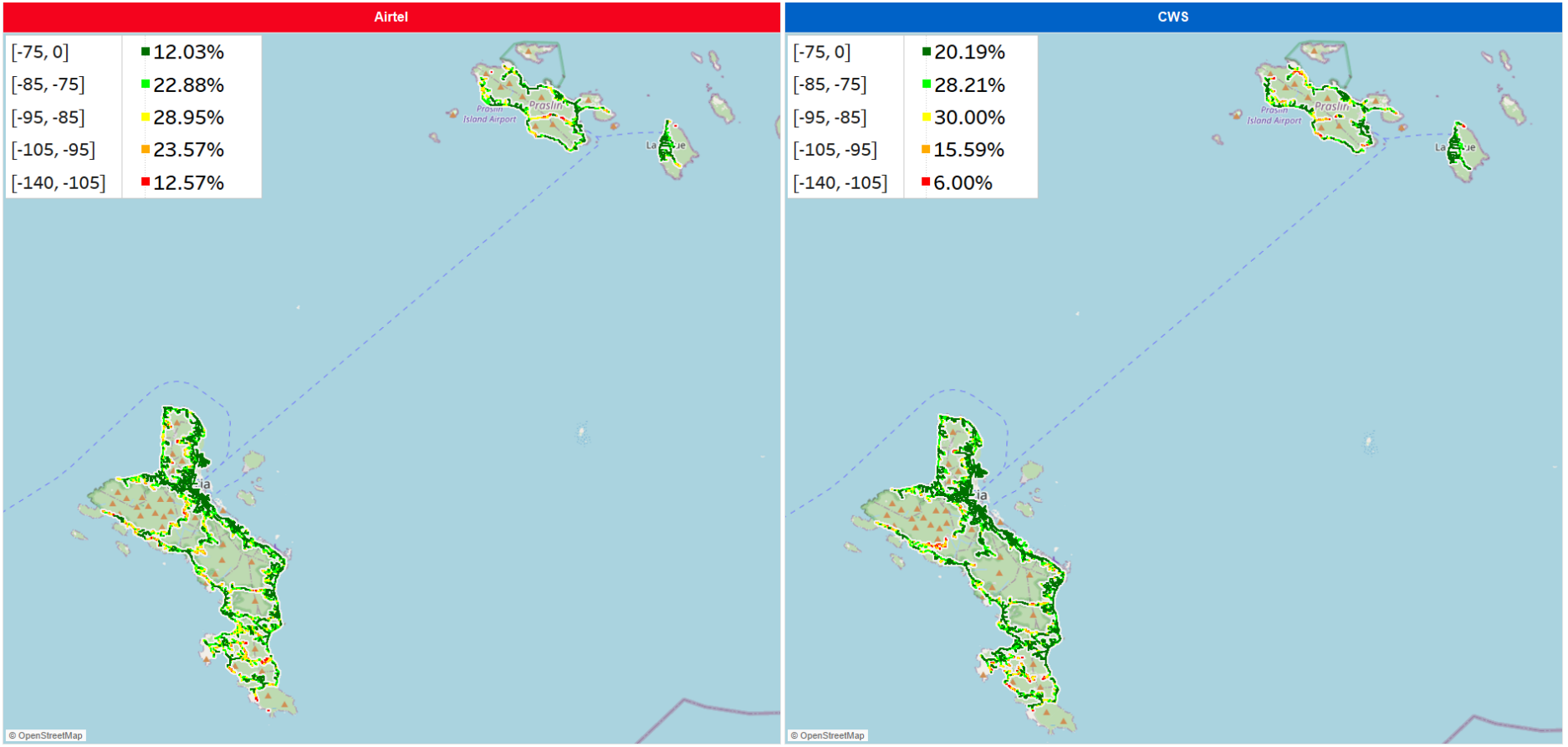

Figure 96. UMTS RSCP Plot

7.1.7. UMTS ECIO

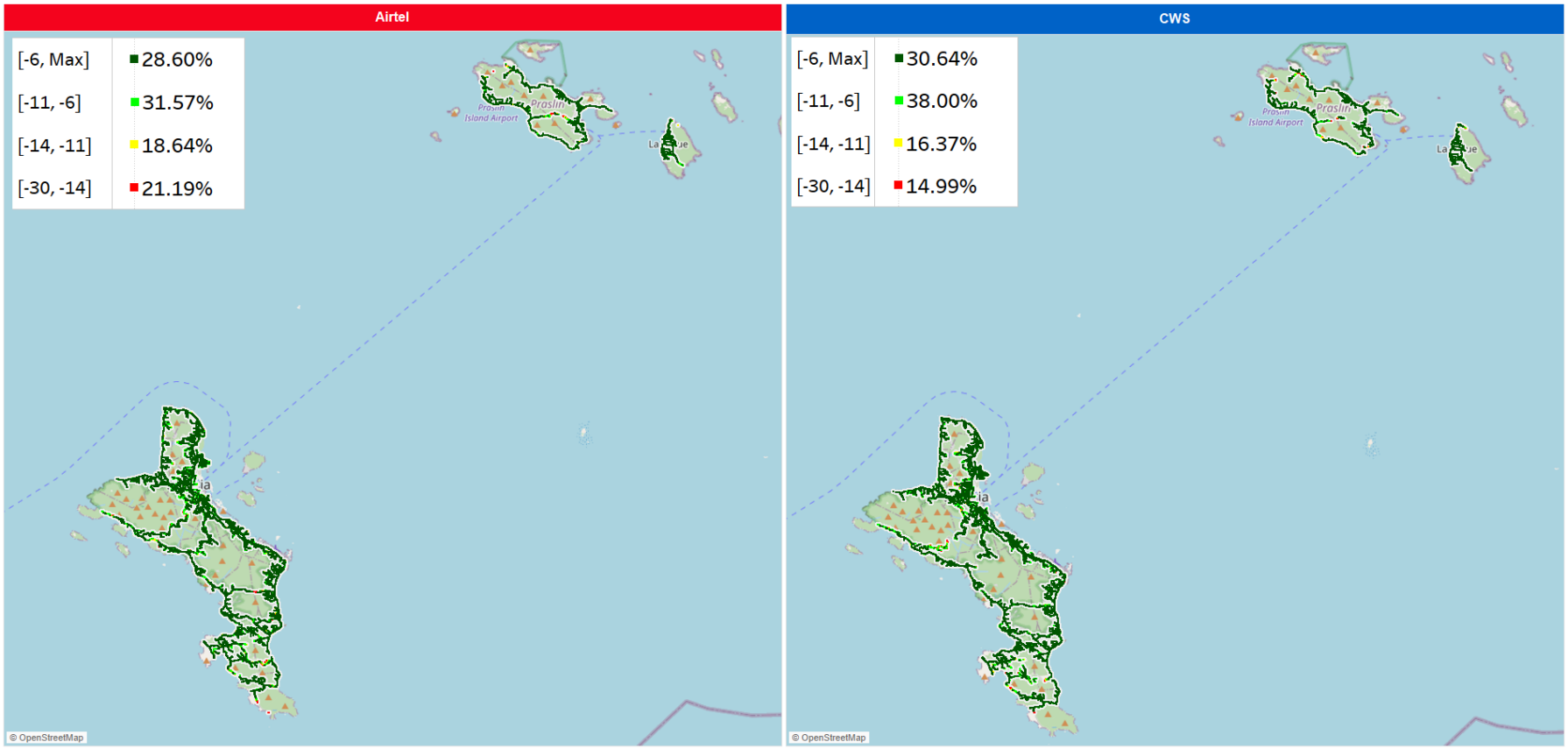

Figure 97. UMTS Eclo Plot

7.1.8. UMTS UARFCN

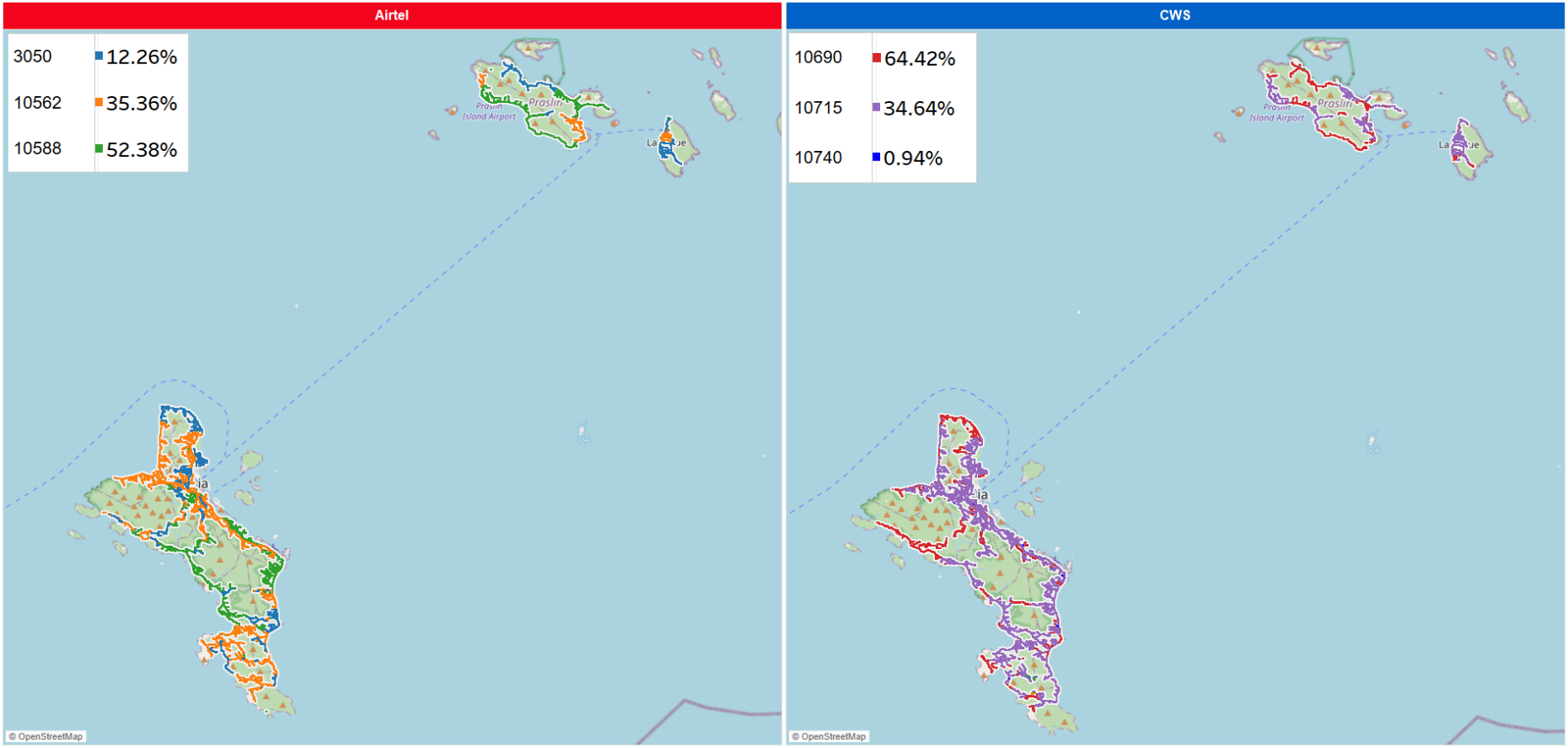

Figure 98. UMTS UARFCN Plot

8. APPENDIX 3 – STATISTICAL COUNTS

8.1. MOBILE DATA DRIVE TEST SAMPLES COUNT

Table 30. Statistical Count - Mobile Data Test

		4G Preferred		3G Preferred	
		Airtel	CWS	Airtel	CWS
File Transfer	HTTP Download	1,055	950	876	748
	HTTP Upload	1,068	971	911	845
	Capacity Download	956	885	797	721
	Capacity Upload	969	873	807	755
	SFTP Download	1,038	919	823	652
	SFTP Upload	1,042	929	859	699
Browser	Kepler Page	936	858	779	697
	Mobile Kepler Page	897	827	746	677
	MSN	931	851	775	677
	Google	924	840	766	685
	News24	913	838	755	674
Latency & Packet Loss	ICMP Ping (32 Bytes)	9,078	8,269	7,292	6,396
YT	YouTube	983	897	838	789

8.2. STATIC DATA DRIVE TEST SAMPLES COUNT

Table 31. Statistical Count - Stationary Data Test

		4G Preferred		3G Preferred	
		Airtel	CWS	Airtel	CWS
File Transfer	HTTP Download	730	636	619	576
	HTTP Upload	732	641	633	591
	Capacity Download	688	601	584	548
	Capacity Upload	683	604	584	544
	SFTP Download	724	647	618	537
	SFTP Upload	734	644	620	552
Browser	Kepler Page	717	624	611	564
	Mobile Kepler Page	700	607	592	556
	MSN	716	624	615	562
	Google	714	621	610	559
	News24	709	616	611	560
Latency & Packet Loss	ICMP Ping (32 Bytes)	7,126	6,147	5,745	5,489
YT	YouTube	733	640	626	593