NETWORK PERFORMANCE REPORT 2020

Measuring Malaysia Broadband and Voice Performance

Suruhanjaya Komunikasi & Multimedia Malaysia
Malaysian Communication & Multimedia Commission

CONTENTS

1. OVERVIEW

This report contains result of measurements conducted by the Malaysian Communication and Multimedia Commission ("MCMC") on performance of the telecommunication network in delivering broadband and voice services to consumers in Malaysia. The results obtained were from measurements and analysis conducted by the MCMC from January to December 2020 on the network performance for wireless (mobile) broadband, wired (fixed) broadband and public cellular (voice) services.

This report is intended to provide consumers and the public with useful information with regards to the network performance of the services, which are presented at a nationwide level. The publishing of this report is also in accordance with the MCMC's effort to conduct and publish research on quality of service experienced by consumers.

Key parameters measured

Wireless & Wired Broadband Access Services:

Throughput – refers to how much data can be transferred per unit of time across a network from one location to another, experienced by end user as internet speed. Higher throughput means better internet speeds. Measured in Megabits per second (Mbps).

Latency – refers to the Return Trip Time (RTT) of data transfers on a network, how long it takes for the data to travel to and fro its destination. Lower latency is considered better. Measured in millisecond (ms).

Packet Loss – refers to amount of data which was sent but unable to reach its intended destination. Low packet loss percentage indicates the network ability to transfer data from the user end to the destination host with high reliability.

Public Cellular Service:

Call Setup Success Rate (CSSR) – refers to voice calls made by user and successfully established, allowing communication. High CSSR indicates good network accessibility.

Dropped Call Rate (DCR) – refers to voice calls made by user and successfully established but was cut off before the speaking parties are able to complete the intended call or before any one of them hang up. Low DCR indicates good network retainability.

<u>Additional information on the data:</u>

The data collected and presented in this report concerning wireless and wired broadband only relates to throughput, latency and packet loss. Consumer experience for Over-the-Top (OTT) applications are visualized through the broadband test results. Other factors relating to the consumer experience of using broadband services (such as traffic management policies, data allowances, customer service, billing etc.) are not covered in this report.

In terms of mobile broadband and voice performance experience, the results may vary which is dependent on a number of factors including distance from the base station, whether the user is within a building or outdoors, and whether the user is stationary or moving. The number of users concurrently accessing a network in the same location or area can affect service performance. Hence, the performances available to any individual consumer will vary both by time and location.

In terms of fixed broadband, measurement was taken directly from the customer premise equipment (router) via LAN connection to avoid any discrepancy of data due to WiFi connection.

This report represents information on recorded results of the related service performances during the measurement period at locations in which tested by the MCMC. Due to the pandemic situation of Covid-19 and movement control order implemented by the government, measurements were not able to be conducted in all states for the year 2020.

2. WIRELESS BROADBAND ACCESS SERVICE

Wireless broadband access service network performance measurements were conducted by MCMC between February and December 2020. All states in Malaysia were measured except for Sarawak due to the mentioned pandemic situation and the restrictions imposed by the movement control order (MCO) which affected the planned measurement schedule for the year. Although there were months of travelling restrictions imposed during the MCO, MCMC managed to compress the schedules in order to go on-site and gauge the wireless broadband network performance in all other states.

The measurements carried out by MCMC simulated real user experience by measuring at test locations using mobile smartphones or user equipment (UE). The test involved measuring quality of service (QoS) of the network throughput – download (DL), latency and packet loss rate performance. The quality of service (QoS) of the network would directly translate into the quality of experience (QoE) of the end user. Therefore, it was imperative for the network QoS to be at an optimum level to ensure good QoE.

2.1 Overall Aggregated Network Performance QoS for Wireless Broadband

- **Average download throughput ranking**

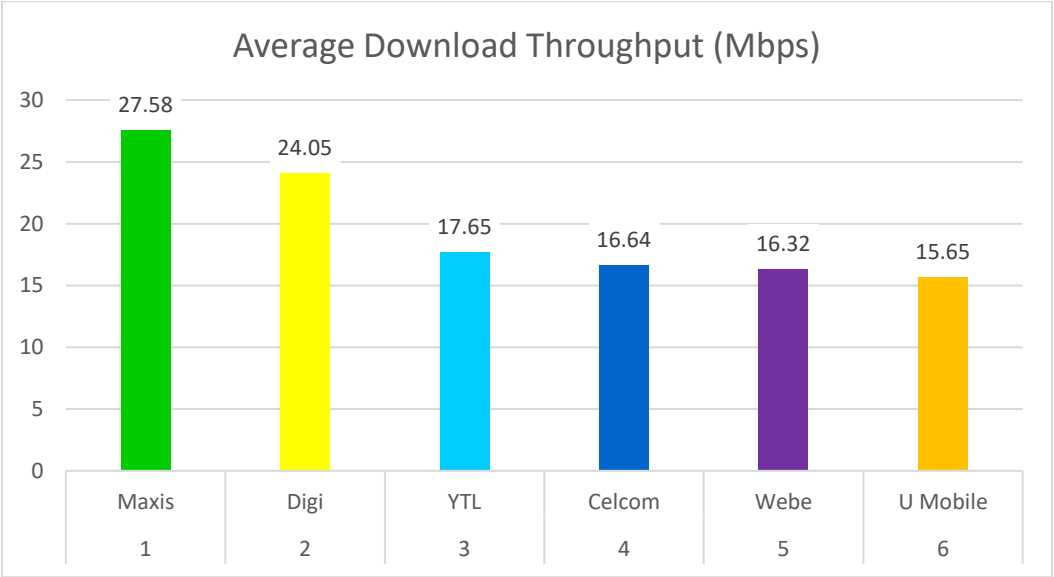


Figure 1: Average download throughput ranking by service provider

Higher average download throughput indicated that the service provider is able to provide consistent higher throughput for most test locations. Based on data collected, Maxis produced the highest average throughput with 27.58 Mbps. While Maxis maintained their position as the best service provider in providing high average download throughput based on measurement, overall average mobile broadband speed for all service providers still lagged behind the average speed target of 35 Mbps set under the Jalinan Digital Negara (JENDELA). In order for service providers to achieve the JENDELA target, aggressive network rollout and enhancement of the existing network would be necessary and the progress shall be monitored so that the target could be realized for the benefit of the end users.

- **Download throughput consistency**

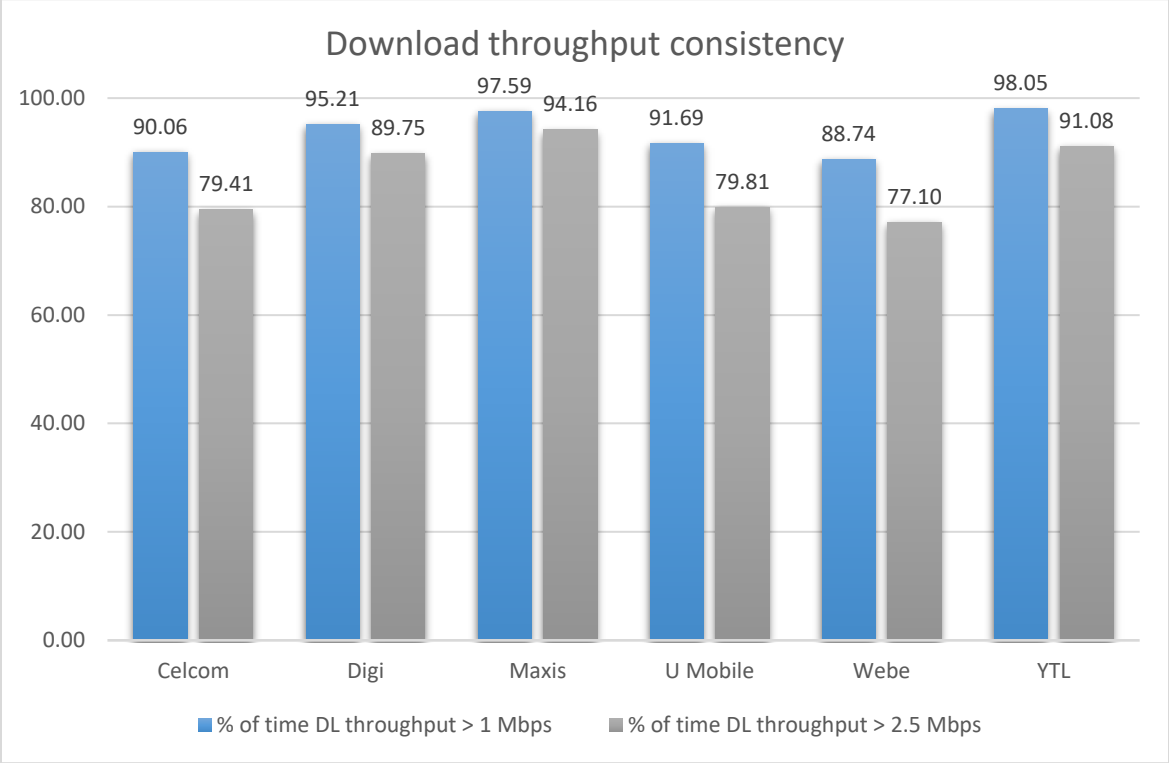


Figure 2: Percentage of time download throughput more than 1 Mbps and 2.5 Mbps

To ensure end user or consumer satisfaction with the basic internet service provided by the service providers, the minimum requirement of download throughput of at least 1 Mbps was mandatory. This would enable consumers to use basic applications that required internet connection without any problems, such as messaging apps, web browsing and standard definition (SD) low resolution (480p) video streaming. Based on data collected, all service providers were able to provide more than 1 Mbps, at least 90% of the time except for Webe which recorded 88.74% of the time.

In order to enjoy a high definition (HD 720p) video streaming on the mobile screen, a download throughput of at least 2.5 Mbps would be required. Based on data collected, Maxis was able to provide download throughput more than 2.5 Mbps consistently for 94.16% of the time.

- **Average latency ranking**

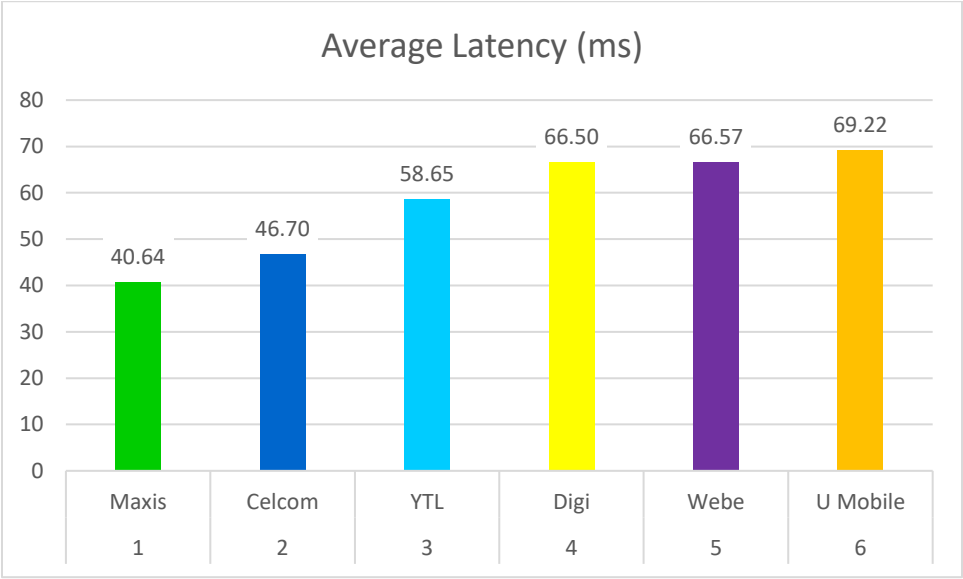


Figure 3: Average latency ranking by service provider

Maxis also recorded the lowest latency amongst the wireless broadband service providers in all of the measured states with an average time of 40.64 ms. Low latency would be critical for interactive online gaming, voice over IP calls and video calls. Basic latency of lower than 250 ms would be required to achieve this and based on the measurement conducted, Maxis was able to provide latency of less than 250 ms for 99.66% of the time.

- **Packet Loss Rate**

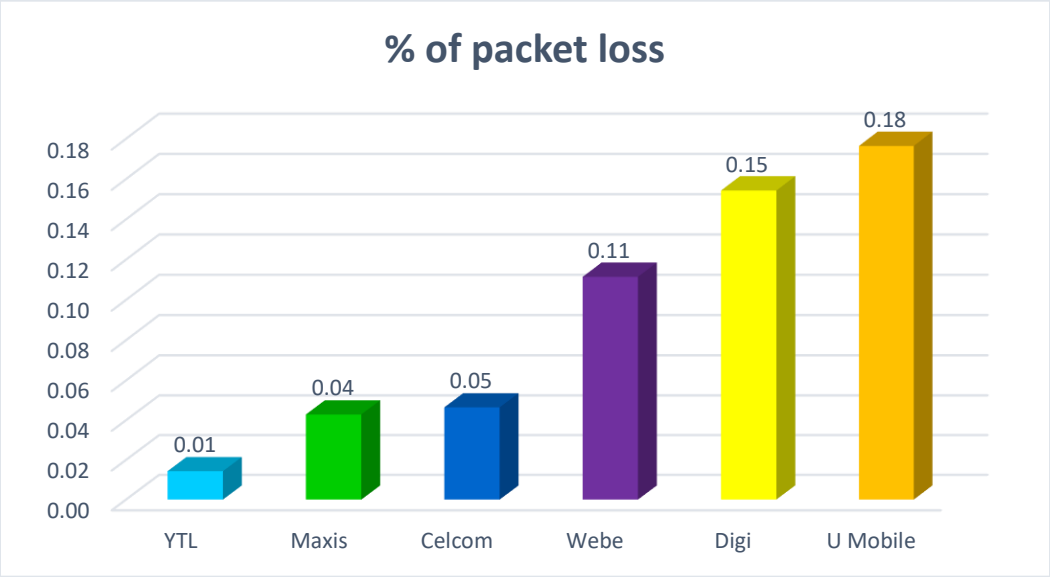


Figure 4: Percentage of packet loss

In terms of packet loss, all service providers recorded low packet loss percentage. Even though packet loss may disrupt user experience when the loss rate is tremendously high, typically networks are designed to retransmit loss data packets that will ensure end user have minimal to no disruptions and unaware of the loss packets. Basically high packet loss will disrupt voice or video calls on over-the-top applications. If users encountered high packet loss during a two-way communication such as during a video call, the video will get disrupted with pixel loss or slow motions and stuttered voice. When this happens, it indicates that some data packets did not reach its intended destination. Based on the measurement conducted, all service providers showed low packet loss rate indicating that their networks were well managed thus avoiding congestions that could affect the packet loss rate.

2.2 Regional Network Performance – Wireless Broadband

This section will delve into the regional results to better understand the level of network performance and service provided to consumers at each relevant states within the region. The measurement focused on areas where complaints have been reported with reference to wireless broadband services. These areas included but not limited to, commercial areas, industrial areas, residential and township areas.

- ### Central Region

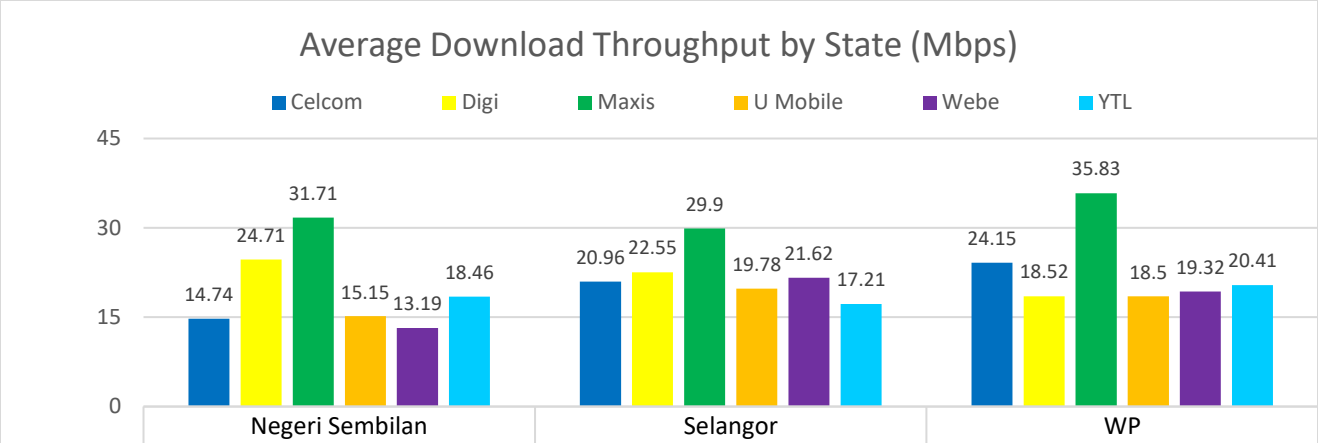
Measurement in central region included the state of Negeri Sembilan, Selangor and Wilayah Persekutuan (WP) Kuala Lumpur & Putrajaya.

Service Provider	Average Download Throughput (Mbps)	Average latency (ms)	Percentage of packet loss (%)
Celcom	20.37	34.87	0.00
Digi	21.92	43.04	0.13
Maxis	31.97	33.16	0.00
U Mobile	18.36	45.54	0.08
Webe	19.18	49.41	0.06
YTL	18.36	50.83	0.04

Table 1: Central region aggregated network performance for 2020

State level insights

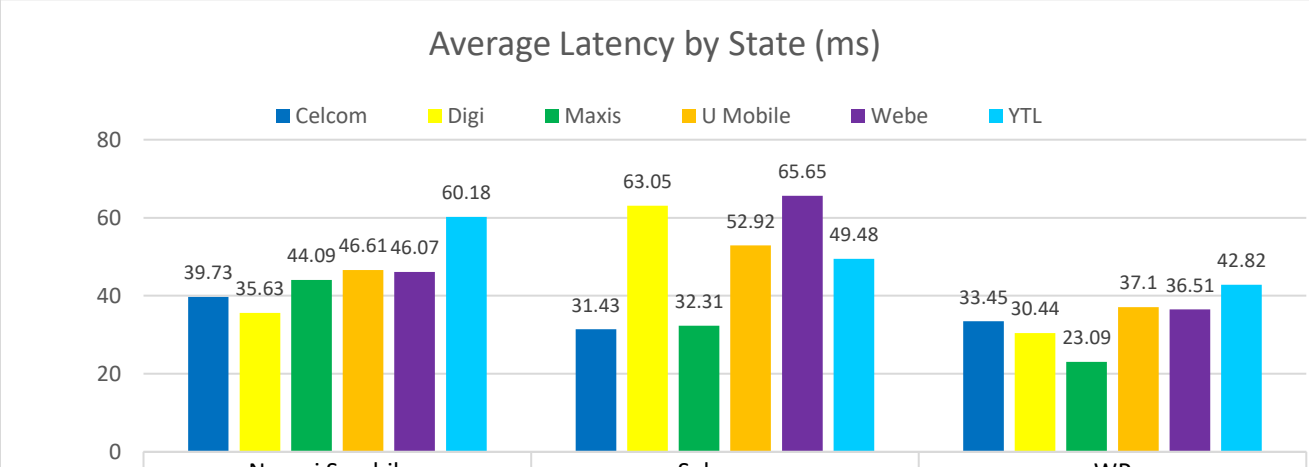
Maxis recorded highest average download throughput in central region with 31.97 Mbps. All three states in central region had Maxis as the best service provider in terms of average download throughput.



	Negeri Sembilan	Selangor	WP
Celcom	14.74	20.96	24.15
Digi	24.71	22.55	18.52
Maxis	31.71	29.9	35.83
U Mobile	15.15	19.78	18.5
Webe	13.19	21.62	19.32
YTL	18.46	17.21	20.41

Figure 5: Average download throughput for states in Central Region

As for latency round-trip time (RTT) in central region, Maxis had the lowest overall average latency with 33.16 ms. At state level, Digi recorded the lowest average latency in Negeri Sembilan, while Celcom had the lowest average latency in Selangor. Maxis recorded the lowest average latency in WP Kuala Lumpur and Putrajaya.



	Negeri Sembilan	Selangor	WP
Celcom	39.73	31.43	33.45
Digi	35.63	63.05	30.44
Maxis	44.09	32.31	23.09
U Mobile	46.61	52.92	37.1
Webe	46.07	65.65	36.51
YTL	60.18	49.48	42.82

Figure 6: Average latency for states in Central Region

• Southern Region

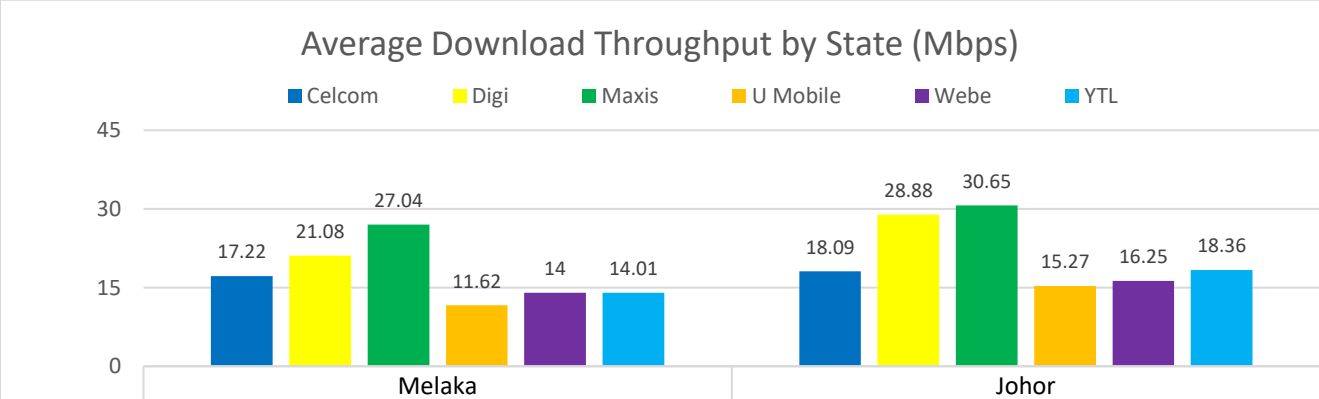
Measurement in southern region covers the state of Melaka and Johor.

Service Provider	Average Download Throughput (Mbps)	Average latency (ms)	Percentage of packet loss (%)
Celcom	17.67	42.04	0.02
Digi	24.92	52.47	0.10
Maxis	28.87	38.50	0.01
U Mobile	13.45	91.70	0.34
Webe	15.13	62.75	0.16
YTL	16.20	58.50	0.02

Table 2: Southern region aggregated network performance for 2020

State level insights

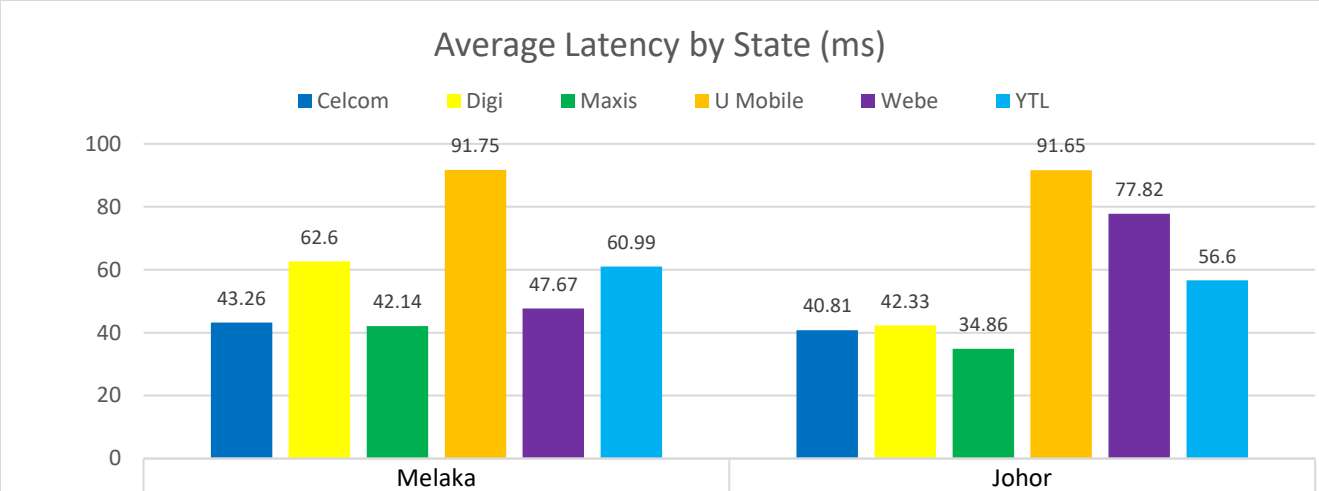
Maxis had the highest average download throughput in southern region with 28.87 Mbps. Maxis led both states in terms of providing the best average download throughput.



	Melaka	Johor
Celcom	17.22	18.09
Digi	21.08	28.88
Maxis	27.04	30.65
U Mobile	11.62	15.27
Webe	14	16.25
YTL	14.01	18.36

Figure 7: Average download throughput for states in Southern Region

Maxis recorded the lowest average latency in southern region with 38.50 ms. The average latency of RTT for both states showed that Maxis had the lowest average latency.



	Melaka	Johor
Celcom	43.26	40.81
Digi	62.6	42.33
Maxis	42.14	34.86
U Mobile	91.75	91.65
Webe	47.67	77.82
YTL	60.99	56.6

Figure 8: Average latency for states in Southern Region

• Eastern Region

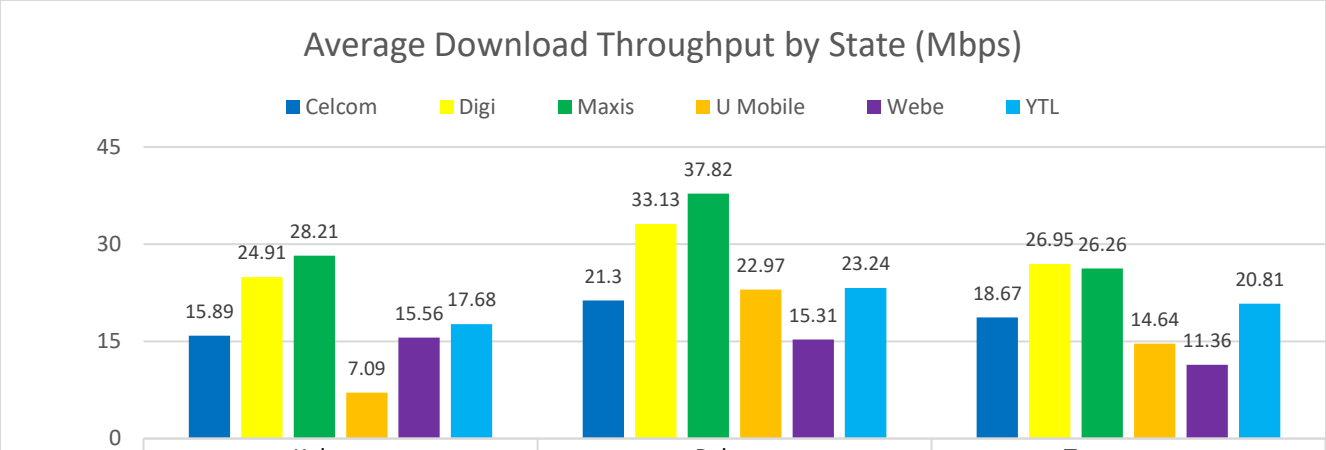
Measurement in eastern region covered the state of Kelantan, Terengganu and Pahang.

Service Provider	Average Download Throughput (Mbps)	Average latency (ms)	Percentage of packet loss (%)
Celcom	18.53	40.14	0.08
Digi	28.22	117.35	0.21
Maxis	30.60	35.79	0.00
U Mobile	14.63	60.71	0.26
Webe	14.08	46.64	0.10
YTL	20.58	63.76	0.00

Table 3: Eastern region aggregated network performance for 2020

State level insights

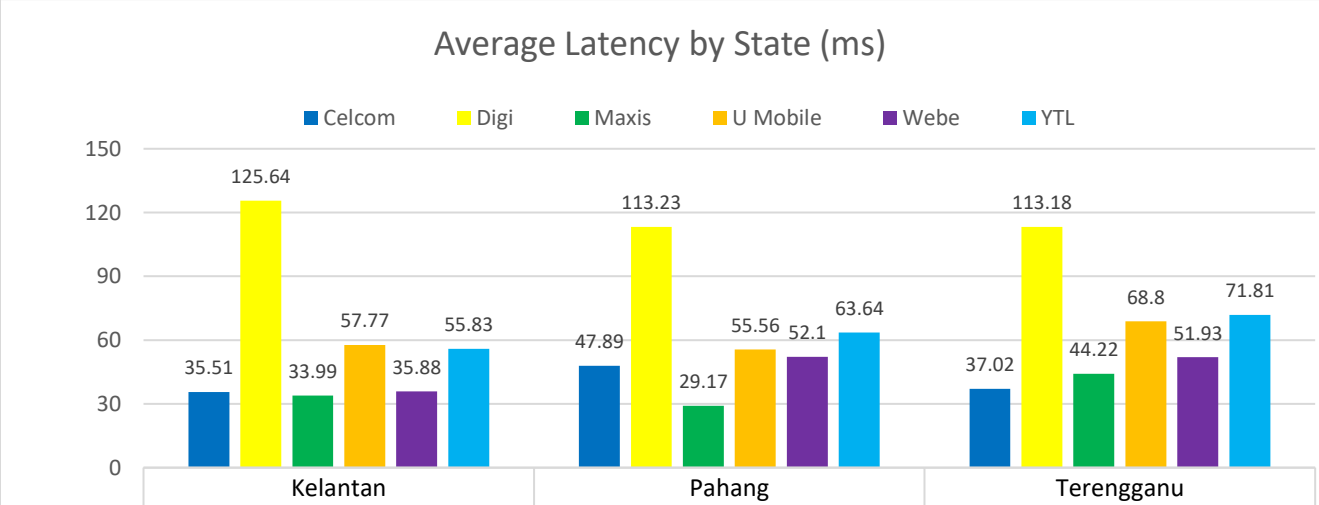
Maxis had the highest average download throughput in eastern region with 30.60 Mbps. Maxis recorded the highest average download throughput in Kelantan and Pahang states, while Digi had the highest average download throughput recorded in Terengganu.



	Kelantan	Pahang	Terengganu
Celcom	15.89	21.3	18.67
Digi	24.91	33.13	26.95
Maxis	28.21	37.82	26.26
U Mobile	7.09	22.97	14.64
Webe	15.56	15.31	11.36
YTL	17.68	23.24	20.81

Figure 9: Average download throughput for states in Eastern Region

Maxis recorded the lowest average latency in eastern region with 35.79 ms, and had the lowest average latency in Kelantan and Pahang. Celcom had the lowest average latency recorded in Terengganu.



	Kelantan	Pahang	Terengganu
Celcom	35.51	47.89	37.02
Digi	125.64	113.23	113.18
Maxis	33.99	29.17	44.22
U Mobile	57.77	55.56	68.8
Webe	35.88	52.1	51.93
YTL	55.83	63.64	71.81

Figure 10: Average latency for states in Eastern Region

• Northern Region

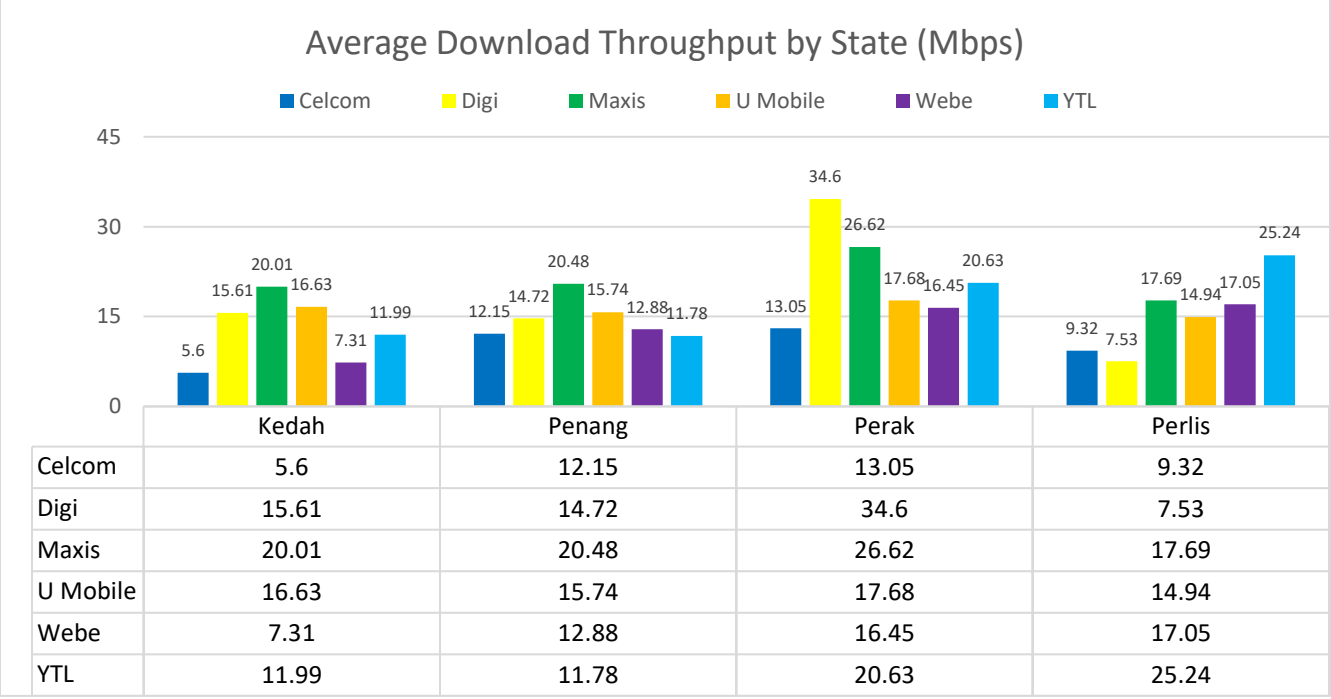
Measurement in northern region covered the state of Perak, Pulau Pinang, Kedah and Perlis.

Service Provider	Average Download Throughput (Mbps)	Average latency (ms)	Percentage of packet loss (%)
Celcom	10.75	47.03	0.03
Digi	21.96	53.67	0.23
Maxis	22.55	33.60	0.05
U Mobile	16.65	65.66	0.04
Webe	13.07	88.89	0.19
YTL	15.96	52.30	0.01

Table 4: Northern region aggregated network performance for 2020

State level insights

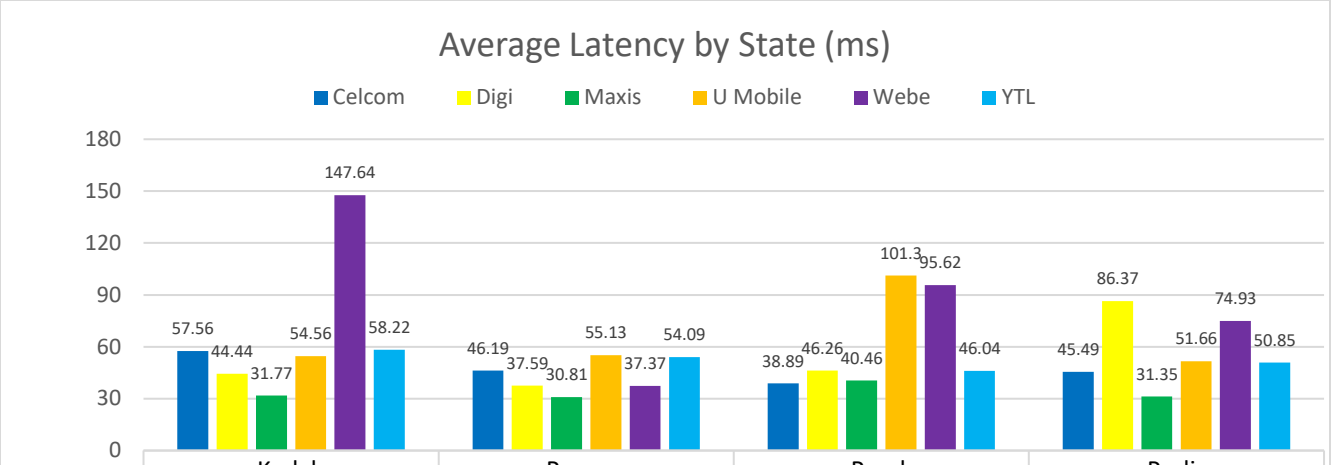
Maxis recorded the highest average download throughput in northern region with 22.55 Mbps. Maxis led in terms of average throughput in Kedah and Pulau Pinang, while Digi had the best average throughput in Perak. YTL recorded the highest average throughput in Perlis.



	Kedah	Penang	Perak	Perlis
Celcom	5.6	12.15	13.05	9.32
Digi	15.61	14.72	34.6	7.53
Maxis	20.01	20.48	26.62	17.69
U Mobile	16.63	15.74	17.68	14.94
Webe	7.31	12.88	16.45	17.05
YTL	11.99	11.78	20.63	25.24

Figure 11: Average download throughput for states in Northern Region

As for latency RTT, Maxis had the lowest average in northern region with 33.60 ms. Results showed Maxis had the lowest latency in Kedah, Pulau Pinang and Perlis, while Celcom had the best latency in Perak.



	Kedah	Penang	Perak	Perlis
Celcom	57.56	46.19	38.89	45.49
Digi	44.44	37.59	46.26	86.37
Maxis	31.77	30.81	40.46	31.35
U Mobile	54.56	55.13	101.3	51.66
Webe	147.64	37.37	95.62	74.93
YTL	58.22	54.09	46.04	50.85

Figure 12: Average latency for states in Northern Region

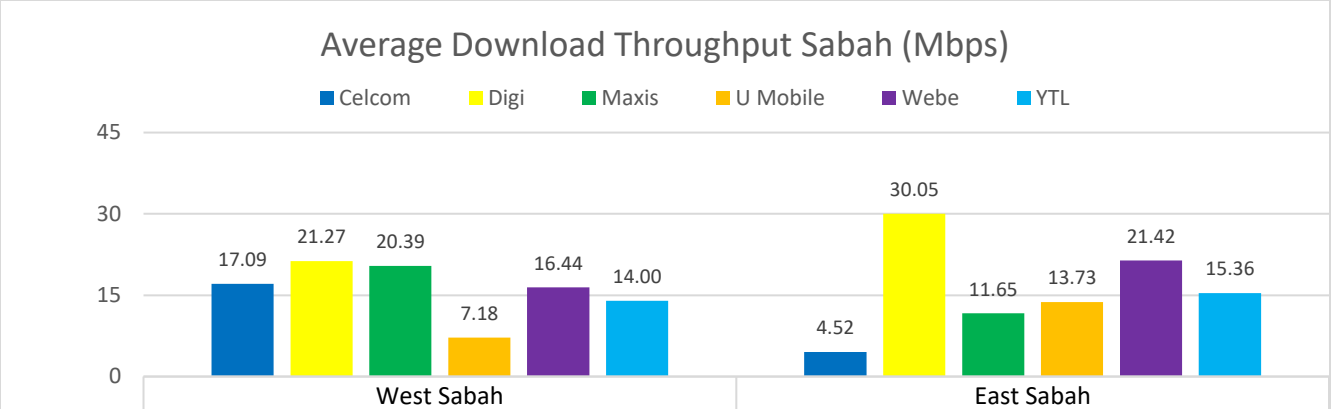
• Sabah Region

The measurement covered both West and East of Sabah.

Service Provider	Average Download Throughput (Mbps)	Average latency (ms)	Percentage of packet loss (%)
Celcom	11.20	78.30	0.13
Digi	25.40	65.10	0.00
Maxis	16.31	75.35	0.20
U Mobile	10.04	102.16	0.32
Webe	18.82	81.39	0.01
YTL	14.64	75.29	0.01

Table 5: Sabah region aggregated network performance for 2020

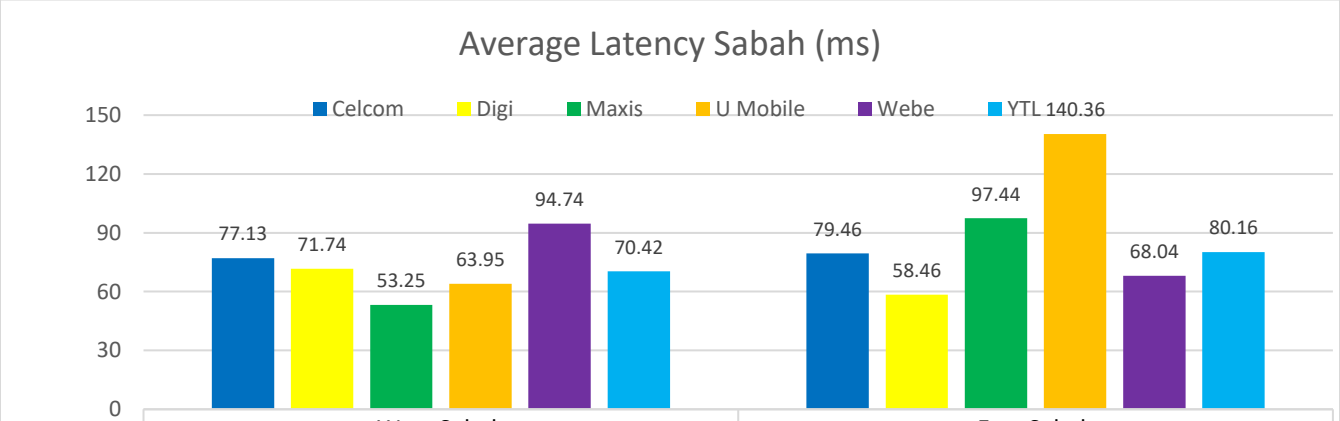
Based on results, Digi recorded the best average download throughput in both West and East of Sabah. Overall, Digi had the highest average download throughput recorded in Sabah with 25.40 Mbps.



	West Sabah	East Sabah
Celcom	17.09	4.52
Digi	21.27	30.05
Maxis	20.39	11.65
U Mobile	7.18	13.73
Webe	16.44	21.42
YTL	14	15.36

Figure 13: Average download throughput for Sabah

Results also shows Digi had the lowest average network latency in Sabah with 65.10 ms. Digi recorded best network latency in East of Sabah, while Maxis recorded the best latency in West of Sabah.



	West Sabah	East Sabah
Celcom	77.13	79.46
Digi	71.74	58.46
Maxis	53.25	97.44
U Mobile	63.95	140.36
Webe	94.74	68.04
YTL	70.42	80.16

Figure 14: Average latency for Sabah

3. WIRED BROADBAND ACCESS SERVICE

Wired broadband measurements were segregated into two different technologies; Gigabit Passive Optical Networks (GPON) or fibre, and Digital Subscriber Line (DSL) or copper. Measurements were conducted at home premises subscribing to home internet packages offered by service providers. The test location focused on home subscribers that have lodged complaints to the service providers or MCMC with regards to network performance. The numbers of locations audited varies between service providers. Due to the pandemic, the number of locations tested for the year 2020 was lower, compared to previous year and the period of tests also different for each service providers. The test simulated real user experience by measuring at the end user using probe connected directly via LAN cable to the residential gateway or router to monitor the throughput performance, latency and packet loss.

3.1 Overall Aggregated Network Performance QoS for Wired Broadband

Measurements were performed on TM, TIME and Maxis for fibre-optic technologies as a last mile, while test on copper (DSL) involved Maxis and TM. The measurement conducted was based on various consumers' subscribed packages ranging from 1 Mbps to 30 Mbps for DSL and 30 Mbps to 1 Gbps for fibre. Therefore, no average throughput for nationwide was recorded due to the variations of throughput limits.

Figure 15, depicts the average latency (RTT) performance measured nationwide based on access technologies for each service provider.

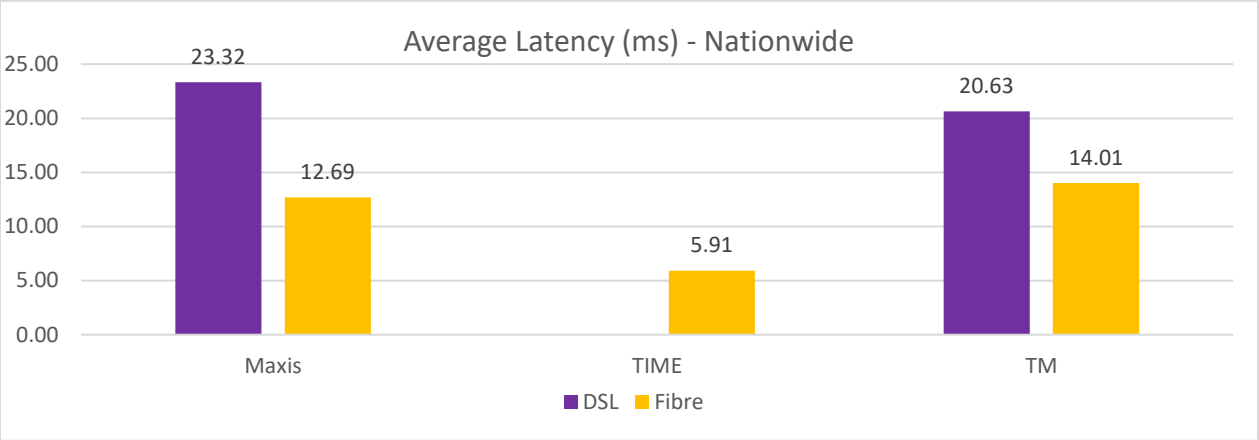


Figure 15: Wired broadband average latency – Nationwide

3.2 Regional Network Performance – Wired Broadband

This part of the report describes the aggregated measurement results of throughput, latency and packet loss for each state within the respective regions. The measurement took samples from areas where users had complaints with regards to wired broadband services. The following sections show the wired broadband service performance by states according to the respective parameters.

Throughput shown in this section was the percentage of time subscribers were able to experience more than 90% of the subscribed speed for their fibre package and 70% of the subscribed speed for their DSL package. The latency data shown in this section was the percentage of time when the data packet round-trip was less than 85ms.

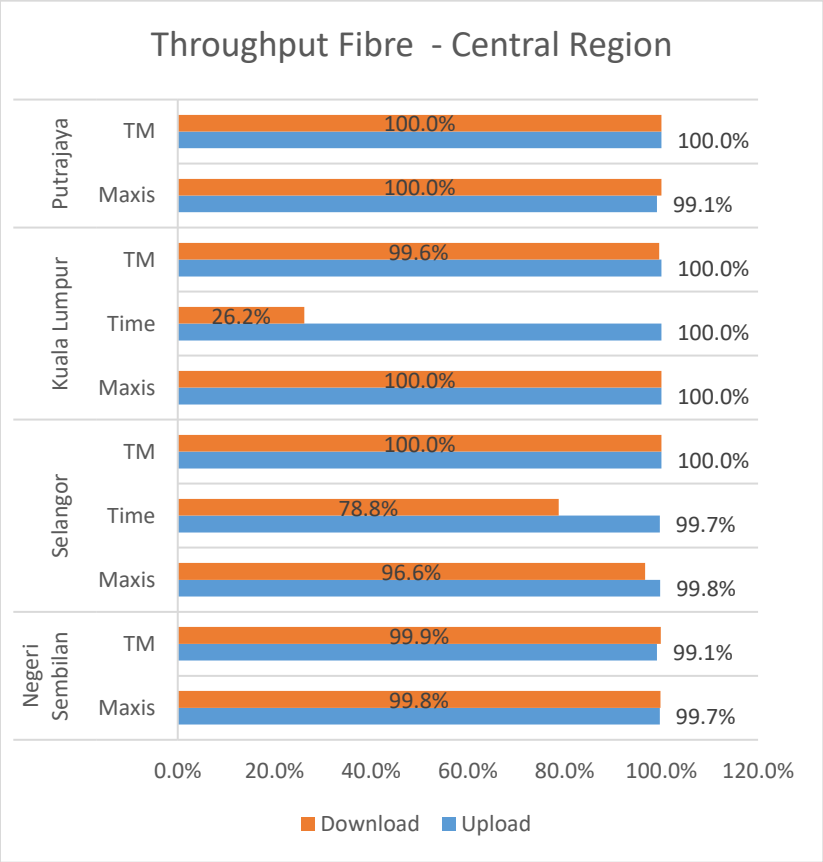
• Central Region

Measurement in central region included the state of Negeri Sembilan, Selangor, Wilayah Persekutuan (WP) Kuala Lumpur and Putrajaya.

Service Provider	Fibre				DSL			
	Percentage of time (%)			Packet loss %	Percentage of time (%)			Packet loss %
	Uplink throughput ≥ 90% subscribed speed	Download throughput ≥ 90% subscribed speed	Latency ≤ 85 ms		Uplink throughput ≥ 70% subscribed speed	Download throughput ≥ 70% subscribed speed	Latency ≤ 85 ms	
TM	99.55	99.88	100.00	0.00	100.00	100.00	100.00	0.07
Time	99.70	75.23	100.00	0.00				
Maxis	99.75	98.05	96.25	0.08	99.30	93.35	100.00	6.81

Table 6: Central region aggregated network performance for 2020

Figure 16: Throughput results for fibre and DSL in Central Region



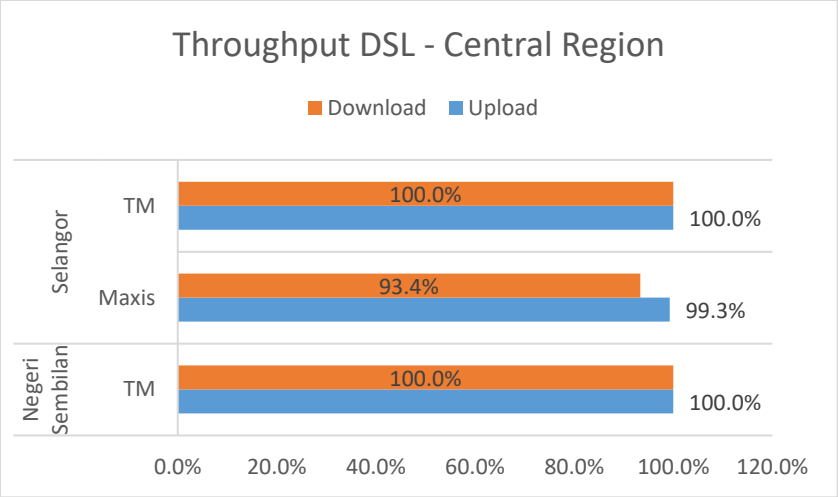
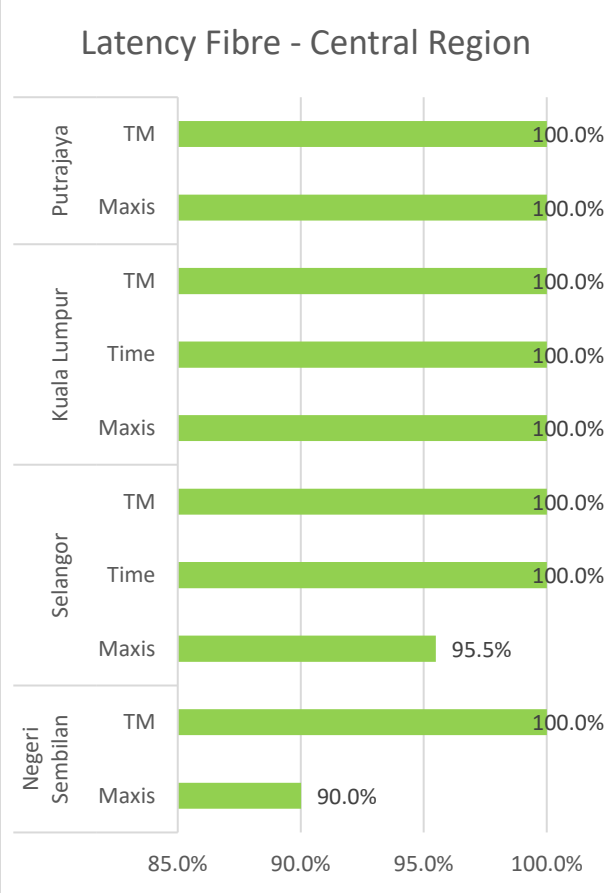


Figure 17: Latency results for fibre and DSL in Central Region



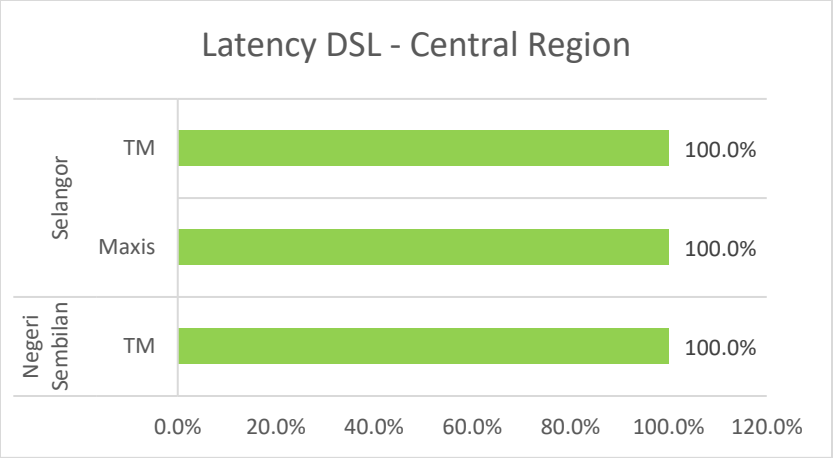


Table 7: Packet Loss results for fibre and DSL in Central Region

	SELANGOR	KUALA LUMPUR	NEGERI SEMBILAN	PUTRAJAYA
MAXIS				
DSL	6.81%	N/A	N/A	N/A
FIBRE	0.14%	0.00%	0.00%	0.00%
TIME				
FIBRE	0.00%	0.00%	N/A	N/A
TM				
DSL	0.19%	N/A	0.03%	N/A
FIBRE	0.00%	0.00%	0.00%	0.00%

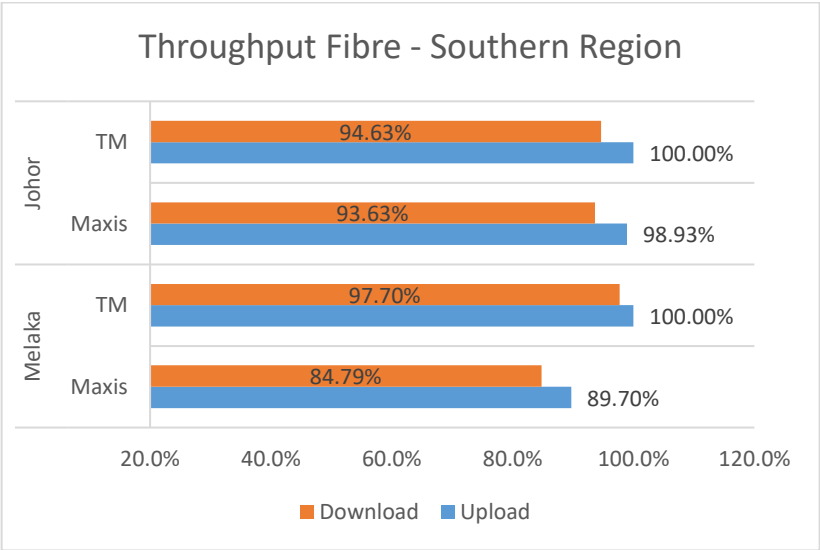
• Southern Region

Measurement in southern region included the state of Melaka and Johor.

Service Provider	Fibre				DSL			
	Percentage of time (%)			Packet loss %	Percentage of time (%)			Packet loss %
	Uplink throughput ≥ 90% subscribed speed	Download throughput ≥ 90% subscribed speed	Latency ≤ 85 ms		Uplink throughput ≥ 70% subscribed speed	Download throughput ≥ 70% subscribed speed	Latency ≤ 85 ms	
TM	100.00	95.87	100.00	0.04	100.00	100.00	100.00	0.12
Maxis	93.85	88.27	100.00	0.04				

Table 8: Southern region aggregated network performance for 2020

Figure 18: Throughput results for fibre and DSL in Southern Region



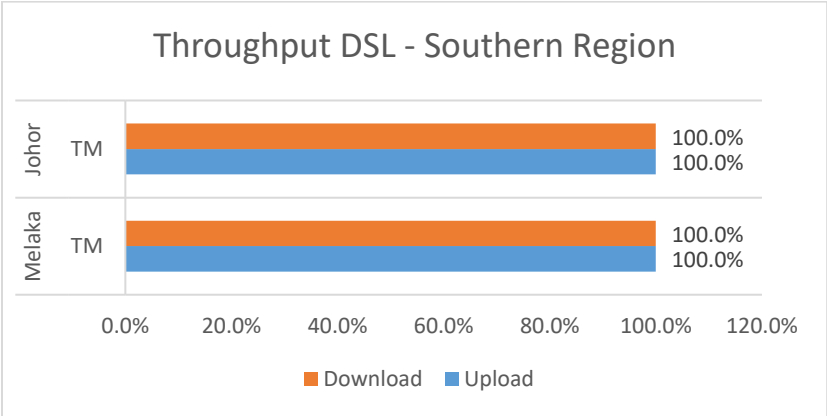
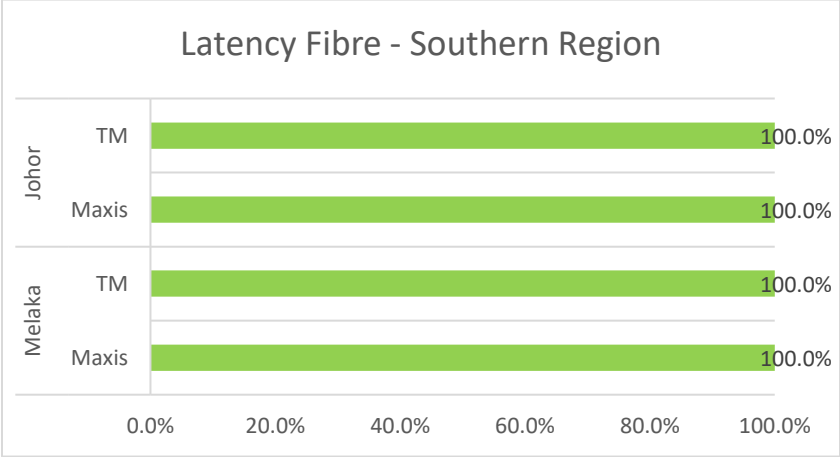


Figure 19: Latency results for fibre and DSL in Southern Region



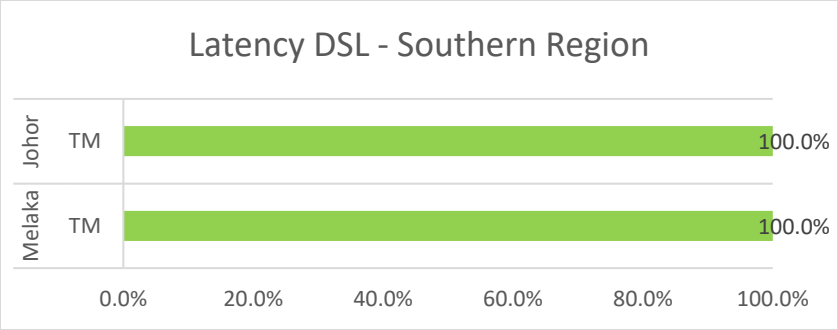


Table 9: Packet Loss results for fibre and DSL in Southern Region

	JOHOR	MELAKA
MAXIS		
FIBRE	0.00%	0.07%
TM		
DSL	0.37%	0.00%
FIBRE	0.00%	0.10%

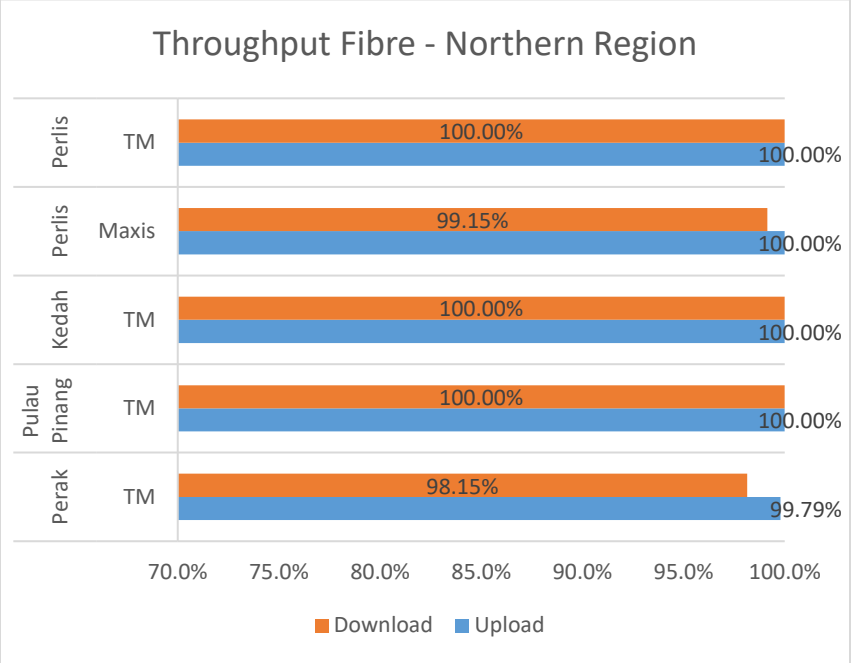
• Northern Region

Measurement in northern region included the state of Perak, Pulau Pinang, Kedah and Perlis.

Service Provider	Fibre				DSL			
	Percentage of time (%)			Packet loss %	Percentage of time (%)			Packet loss %
	Uplink throughput ≥ 90% subscribed speed	Download throughput ≥ 90% subscribed speed	Latency ≤ 85 ms		Uplink throughput ≥ 70% subscribed speed	Download throughput ≥ 70% subscribed speed	Latency ≤ 85 ms	
TM	99.95	99.57	100.00	0.00	100.00	99.83	100.00	0.04
Maxis	100.00	99.15	100.00	0.21				

Table 10: Northern region aggregated network performance for 2020

Figure 20: Throughput results for fibre and DSL in Northern Region



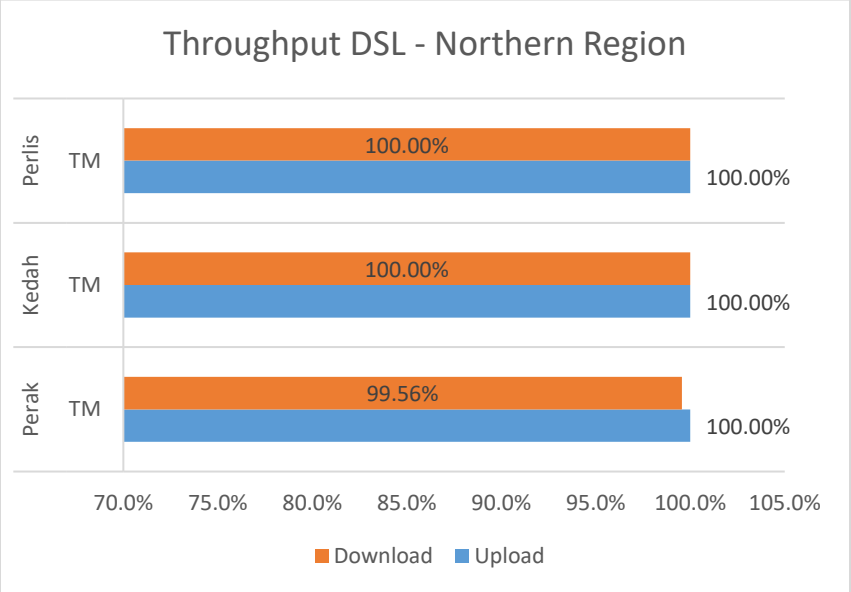
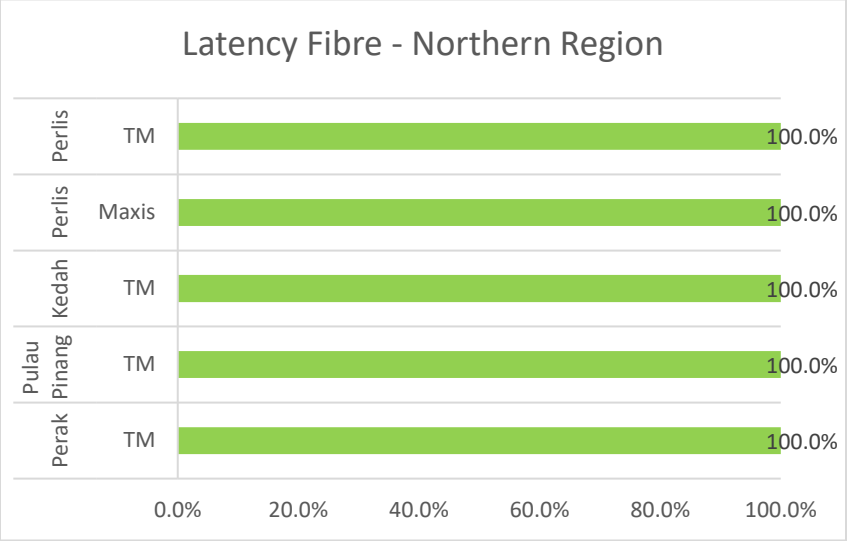


Figure 21: Latency results for fibre and DSL in Northern Region



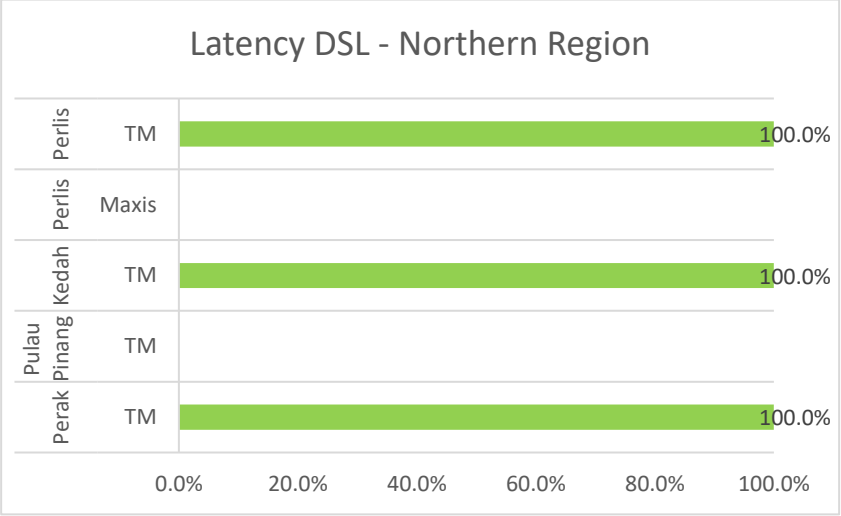


Table 11: Packet Loss results for fibre and DSL in Northern Region

	KEDAH	PULAU PINANG	PERAK	PERLIS
MAXIS				
FIBRE	N/A	N/A	N/A	0.21%
TM				
DSL	0.11%	N/A	0.00%	0.00%
FIBRE	0.00%	0.00%	0.00%	0.00%

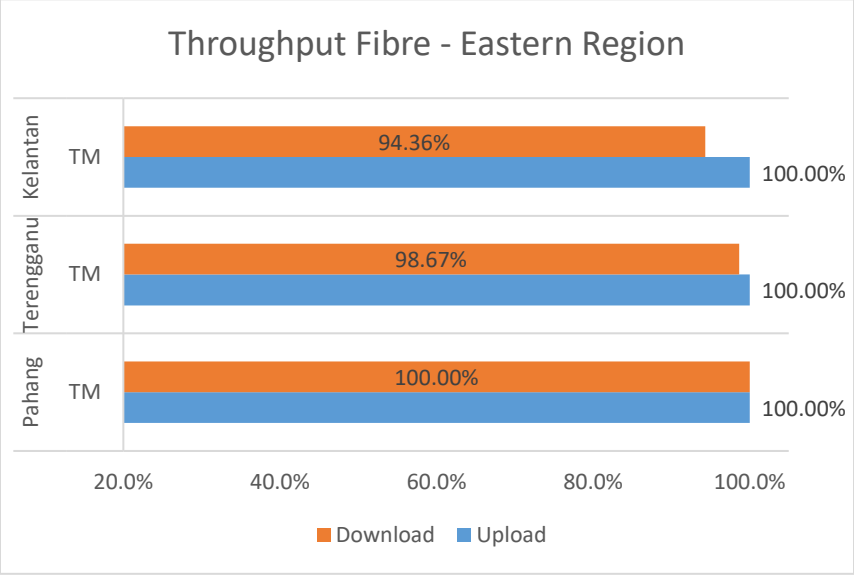
• Eastern Region

Measurement in eastern region included the state of Pahang, Terengganu and Kelantan.

Service Provider	Fibre				DSL			
	Percentage of time (%)			Packet loss %	Percentage of time (%)			Packet loss %
	Uplink throughput ≥ 90% subscribed speed	Download throughput ≥ 90% subscribed speed	Latency ≤ 85 ms		Uplink throughput ≥ 70% subscribed speed	Download throughput ≥ 70% subscribed speed	Latency ≤ 85 ms	
TM	100.00	97.70	100.00	0.05	100.00	100.00	100.00	0.00

Table 12: Eastern region aggregated network performance for 2020

Figure 22: Throughput results for fibre and DSL in Eastern Region



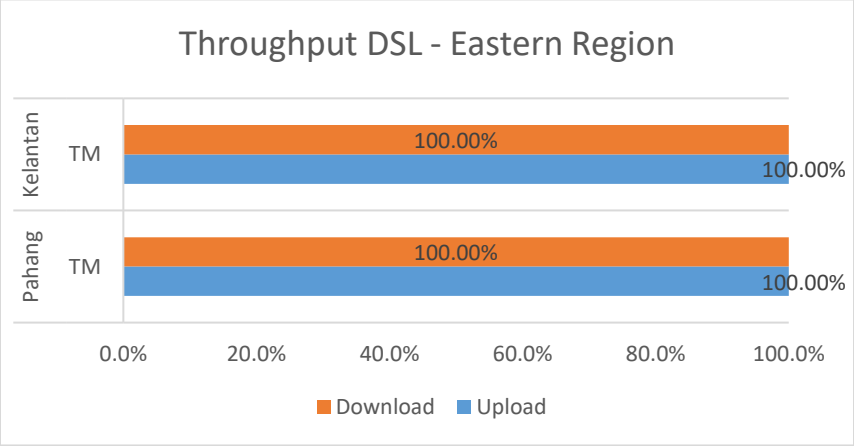
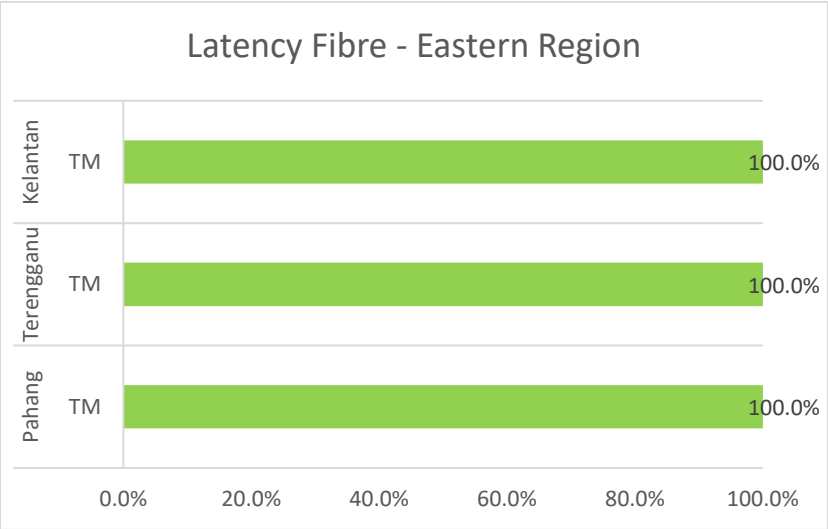


Figure 23: Latency results for fibre and DSL in Eastern Region



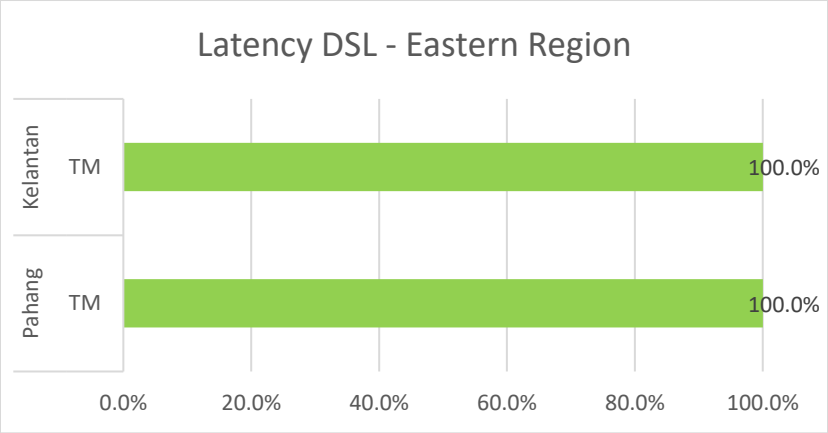


Table 13: Packet loss results for fibre and DSL in Eastern Region

	PAHANG	KELANTAN	TERENGGANU
TM			
DSL	0.00%	0.00%	N/A
FIBRE	0.00%	0.14%	0.00%

Sabah

Service Provider	Fibre			
	Percentage of time (%)			Packet loss %
	Uplink throughput ≥ 90% subscribed speed	Download throughput ≥ 90% subscribed speed	Latency ≤ 85 ms	
TM	98.6	98.7	98.48	0.00

Table 14: Sabah region aggregated network performance for 2020

Figure 24: Throughput results for fibre in Sabah

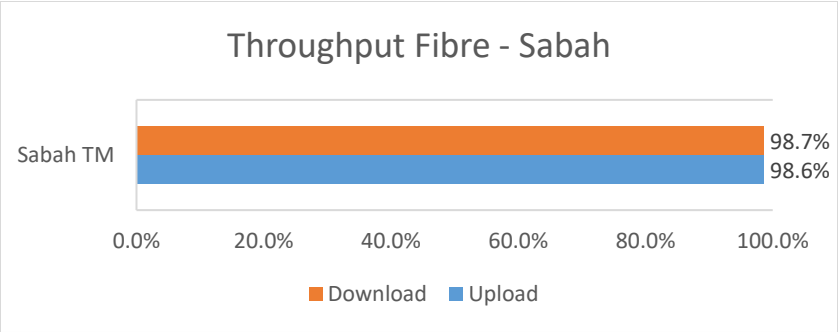


Figure 25: Latency results for fibre in Sabah

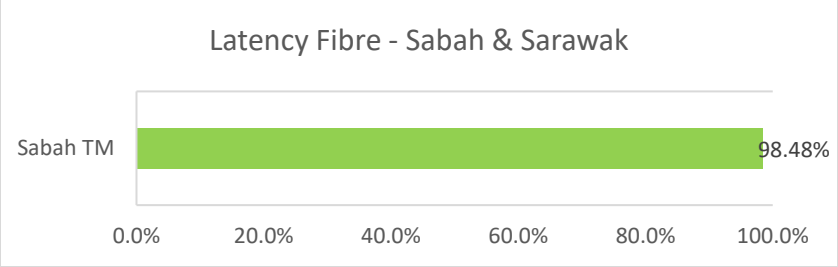


Table 15: Packet Loss results for fibre in Sabah

	SABAH
TM	
FIBRE	0.00%

4. PUBLIC CELLULAR SERVICE (PCS)

Public Cellular Service (PCS) is a voice service assessment conducted on the relevant PCS providers by way of drive test and static measurement methods. Voice calls were assessed by simulating real user experience using mobile phones to make calls to another party (B-party) and assessed the accessibility and the retainability. Both of these were measured by means of Call Setup Success Rate (CSSR) and Dropped Call Rate (DCR) respectively. The headline results shown here are for the key metrics aggregated level across Malaysia for PCS measured from January to December 2020.

4.1 Overall Aggregated Network Performance QoS for Public Cellular Service

Table 16 shows the overall results for nationwide route for Public Cellular Services (PCS) on Dropped Call Rate (DCR) and Call Setup Success Rate (CSSR).

	celcom	digi	maxis	umobile
Dropped Call Rate (≤ 3%)	**1.72**	**2.51**	**1.98**	**2.03**
Call Setup Success Rate (≥ 95%)	**98.59**	**98.76**	**99.28**	**98.08**

Table 16: Overall result of Public Cellular Service for Nationwide Assessment 2020

Overall performance based on results, Celcom showed the best dropped call rate performance with lowest percentage of DCR nationwide with 1.72% compared to other service providers. The CSSR criteria showed all service providers were able to deliver more than 95% of call setup success rate for year 2020. Maxis recorded the highest average CSSR with 99.28%.

4.2 Regional Network Performance – Public Cellular

This part of the report shows Dropped Call Rate (DCR) and Call Setup Success Rate (CSSR) according to region and states.

• Central Region

Measurement in central region included the state of Negeri Sembilan, Selangor and Wilayah Persekutuan (WP) Kuala Lumpur.

Service Provider	Dropped Call Rate	Call Setup Success Rate
Celcom	1.17%	99.12%
Digi	1.56%	99.46%
Maxis	1.80%	99.56%
U Mobile	1.29%	98.83%

Table 17: Overall results in Central Region

Based on results, Celcom recorded the best DCR with 1.17%. The CSSR criteria showed all service providers were able to deliver more than 95% of CSSR for year 2020 and Maxis showed the best CSSR with 99.56% in central region.

State level insights

Based on results, Celcom had the best DCR in all states while Maxis recorded the worst DCR in all states within central region. In terms of CSSR, Maxis had the best CSSR in KL and Selangor, while Digi recorded the best CSSR in Negeri Sembilan and shared the best spot with Maxis in KL.

Figure 26: DCR in Central Region

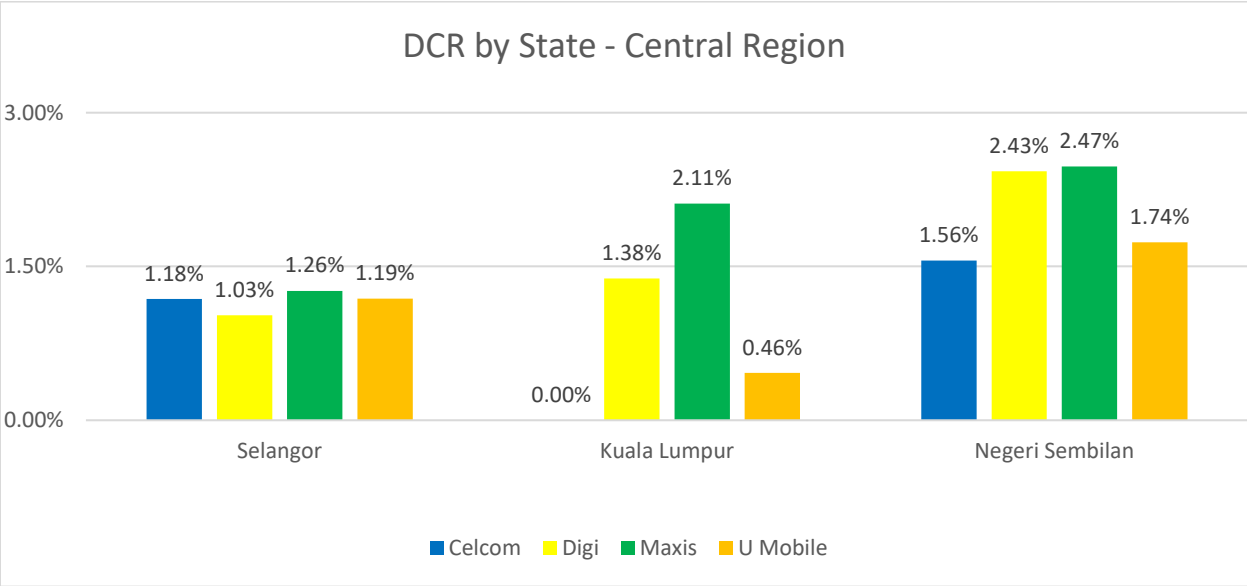
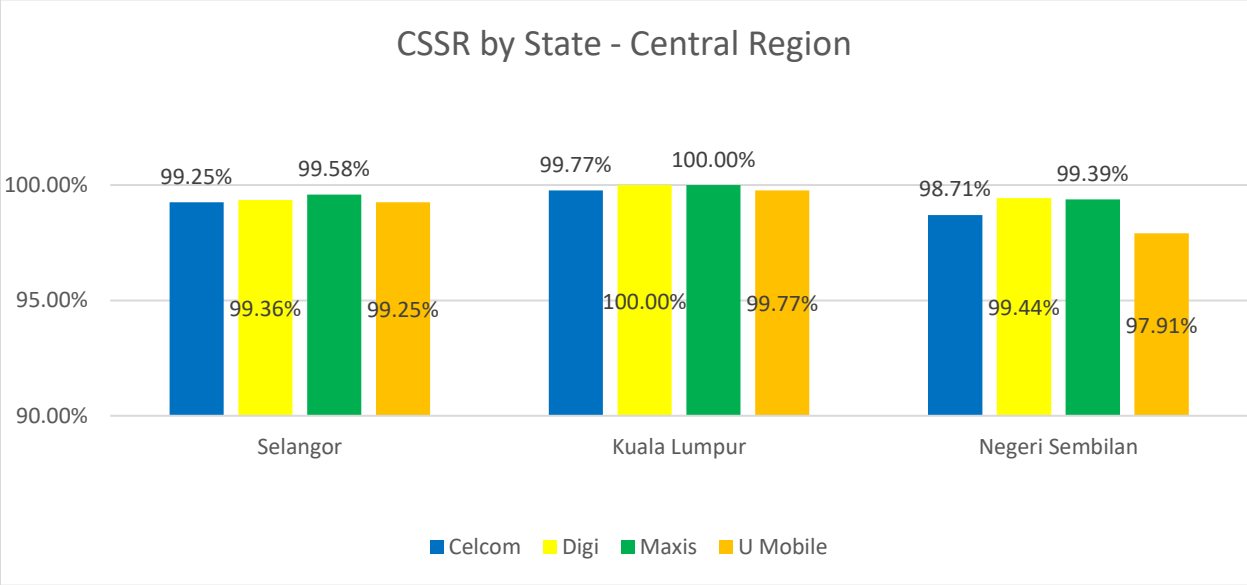


Figure 27: CSSR in Central Region



• Northern Region

Measurement in Northern region included the state of Kedah, Perak, Perlis and Pulau Pinang

Service Provider	Dropped Call Rate	Call Setup Success Rate
Celcom	1.86%	98.01%
Digi	2.79%	99.20%
Maxis	2.47%	98.91%
U Mobile	2.68%	97.87%

Table 18: Overall results of Northern Region

For overall performance, all service providers were able to meet the requirement for both DCR and CSSR for year 2020 in Northern region. Celcom showed the best DCR performance with the lowest percentage of 1.86% and Digi recorded the highest CSSR with 99.20%

State level insights

Results showed that Celcom had the best DCR in Kedah, Perlis and Perak, while Digi recorded the best DCR in Pulau Pinang. In terms of CSSR, Digi had the best CSSR in Perlis, Perak and Pulau Pinang, while Maxis recorded the highest CSSR in Kedah.

Figure 28: DCR in Northern Region

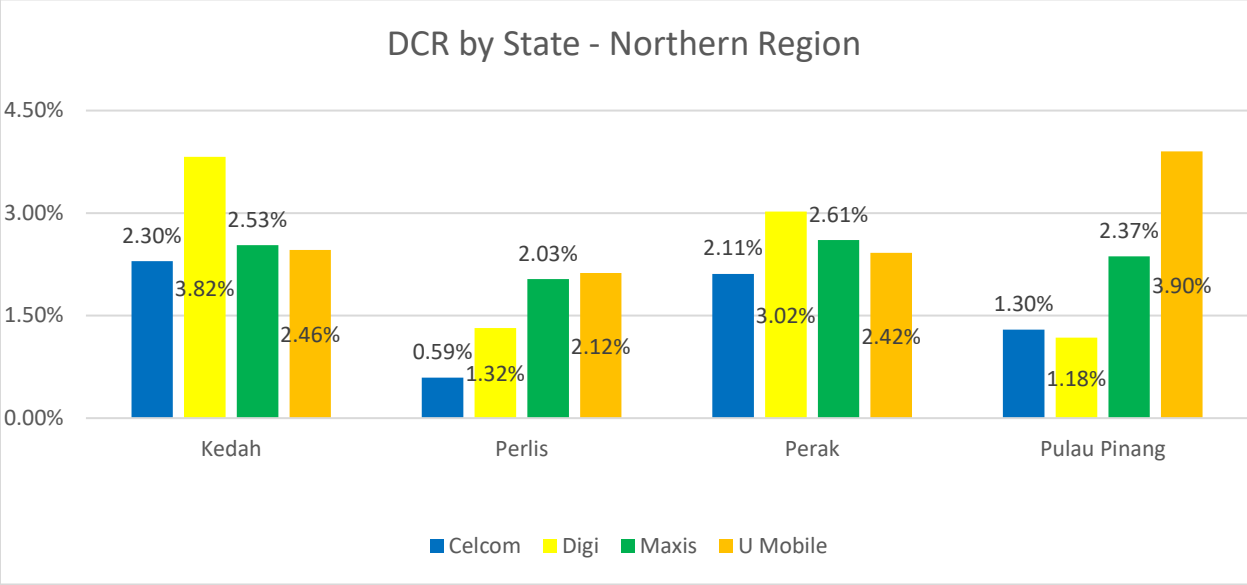
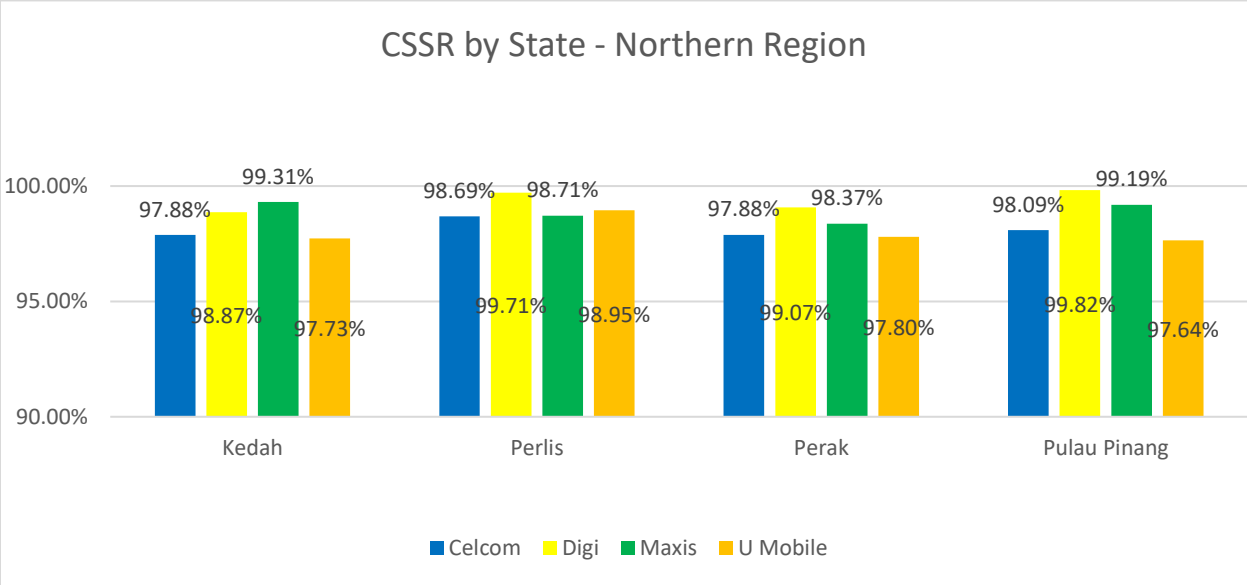


Figure 29: CSSR in Northern Region



• Eastern Region

Measurement in Eastern region included the state of Kelantan, Pahang and Terengganu

Service Provider	Dropped Call Rate	Call Setup Success Rate
Celcom	2.05%	98.58%
Digi	3.97%	97.88%
Maxis	2.26%	99.33%
U Mobile	2.61%	97.20%

Table 19: Overall results in Eastern Region

Based on the results above, Celcom recorded the best DCR with 2.05%, while Digi recorded the worst DCR with 3.97%. The CSSR criteria showed all service providers were able to deliver more than 95% and Maxis showed the best CSSR with 99.33%

State level insights

In Eastern region, Maxis recorded the best DCR in Kelantan and Terengganu, while Celcom recorded the best DCR in Pahang. In terms of CSSR, Maxis had the best CSSR in all three states.

Figure 30: DCR in Eastern Region

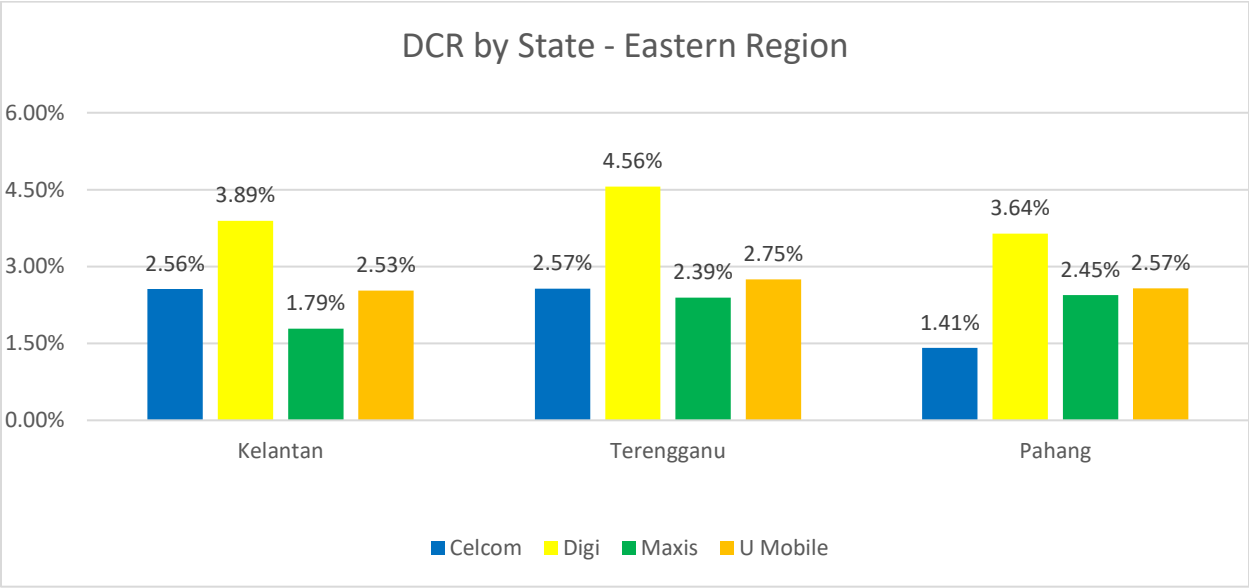
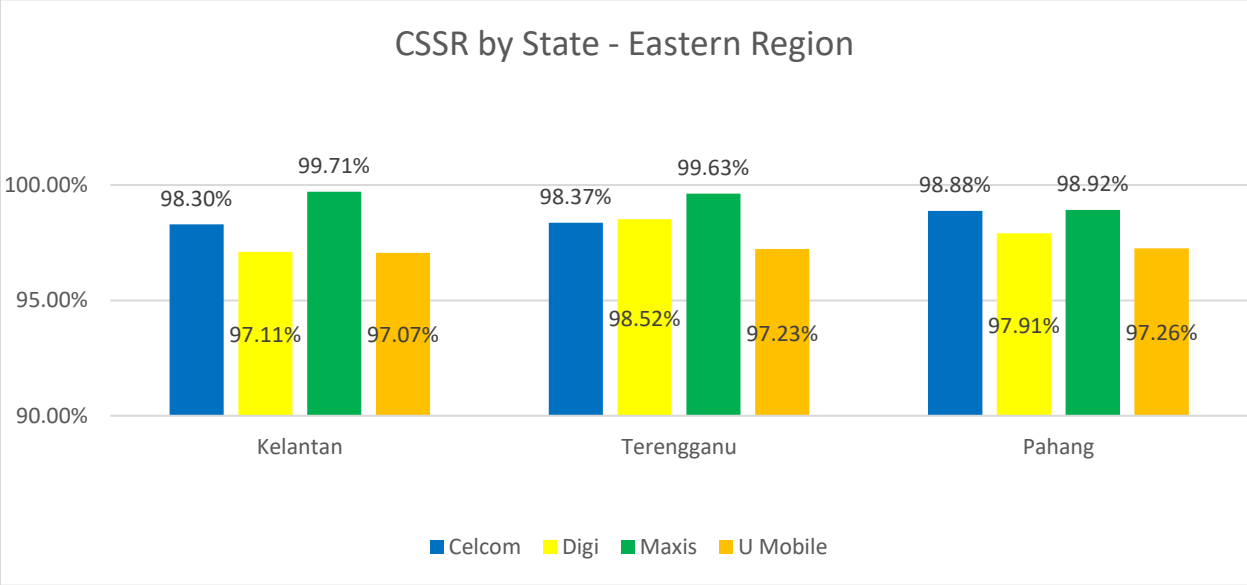


Figure 31: CSSR in Eastern Region



• Southern Region

Measurement in Southern region included the state of Johor and Melaka.

Service Provider	Dropped Call Rate	Call Setup Success Rate
Celcom	2.00%	97.83%
Digi	1.85%	98.80%
Maxis	1.21%	99.63%
U Mobile	1.37%	98.89%

Table 20: Overall results in Southern Region

For overall performance, Maxis recorded the lowest DCR with 1.21%, while also delivering the highest CSSR with 99.63% in Southern region.

State level insights

Maxis had the best DCR in Johor, while Digi had the best DCR in Melaka. In terms of CSSR, Maxis recorded the highest rate in both states.

Figure 32: DCR in Southern Region

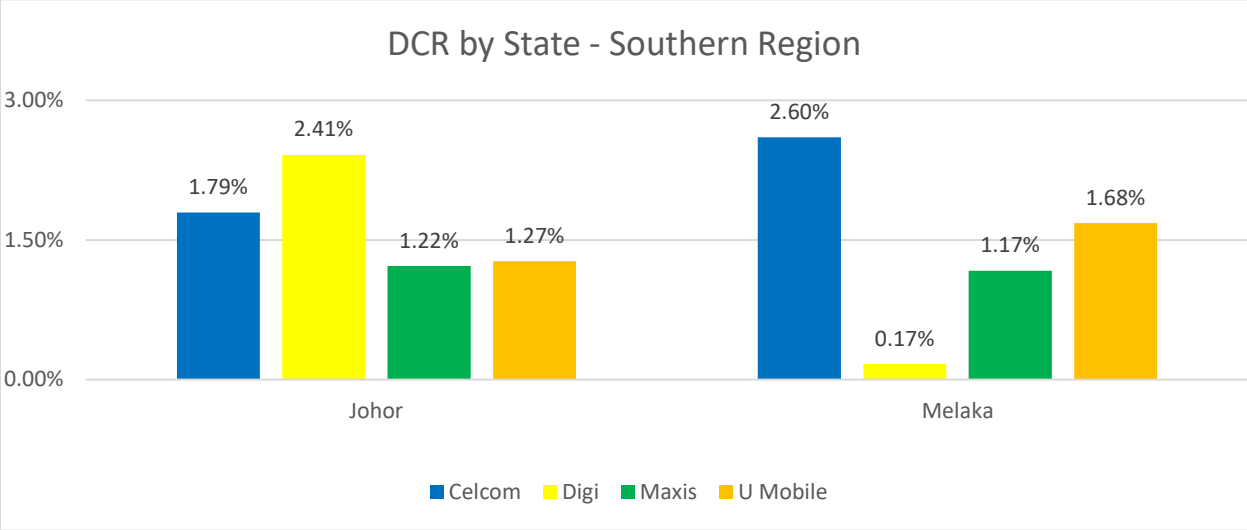
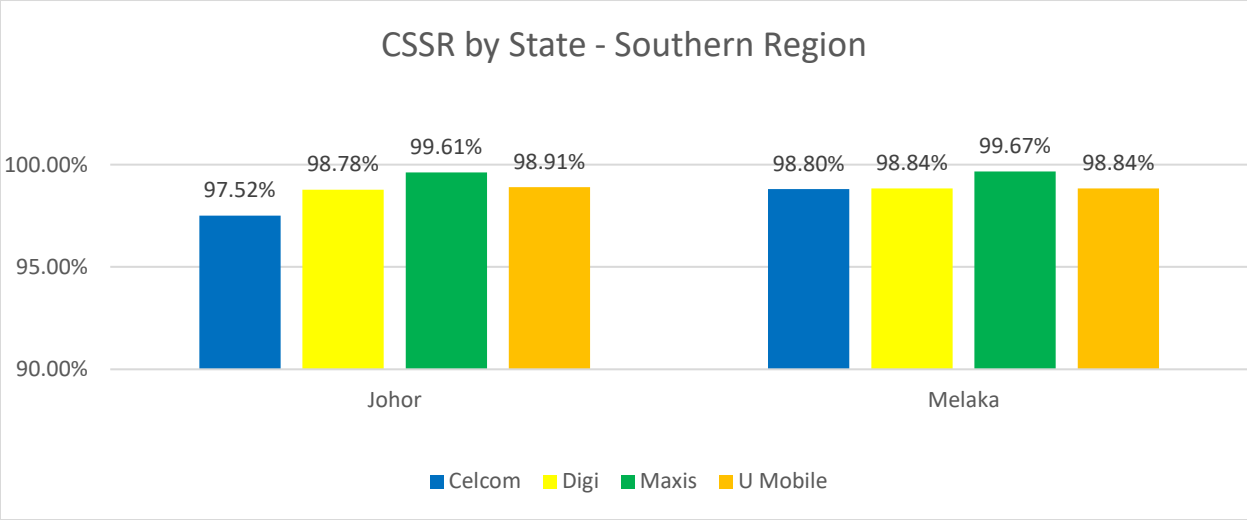


Figure 33: CSSR in Southern Region



- Sabah

Service Provider	Dropped Call Rate	Call Setup Success Rate
Celcom	2.06%	98.93%
Digi	1.84%	98.62%
Maxis	2.14%	99.04%
U Mobile	1.77%	98.41%

Table 21: Overall results of Sabah state

Based on results U Mobile recorded the best DCR with 1.77%, while Maxis had the highest CSSR in Sabah. All service providers were able to meet the requirement of DCR and CSSR.

Figure 34: DCR in Sabah state

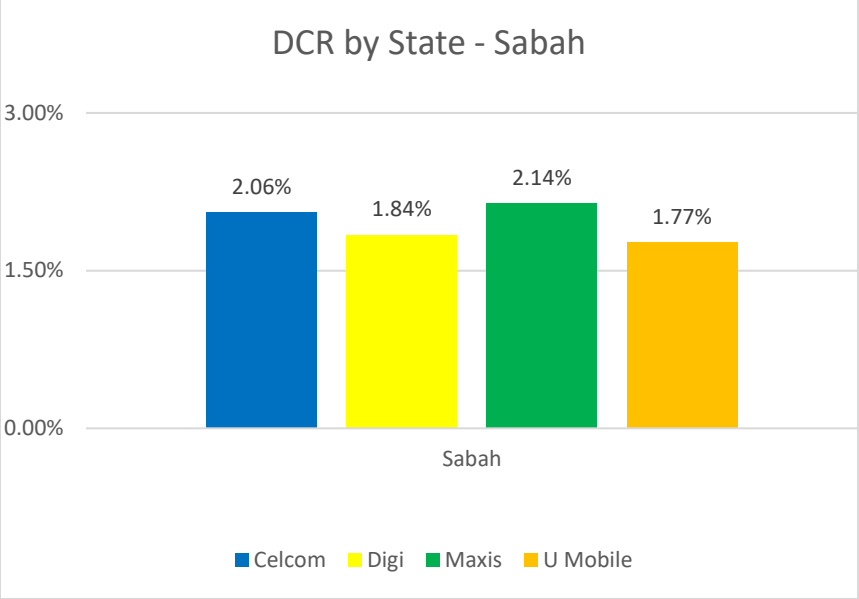
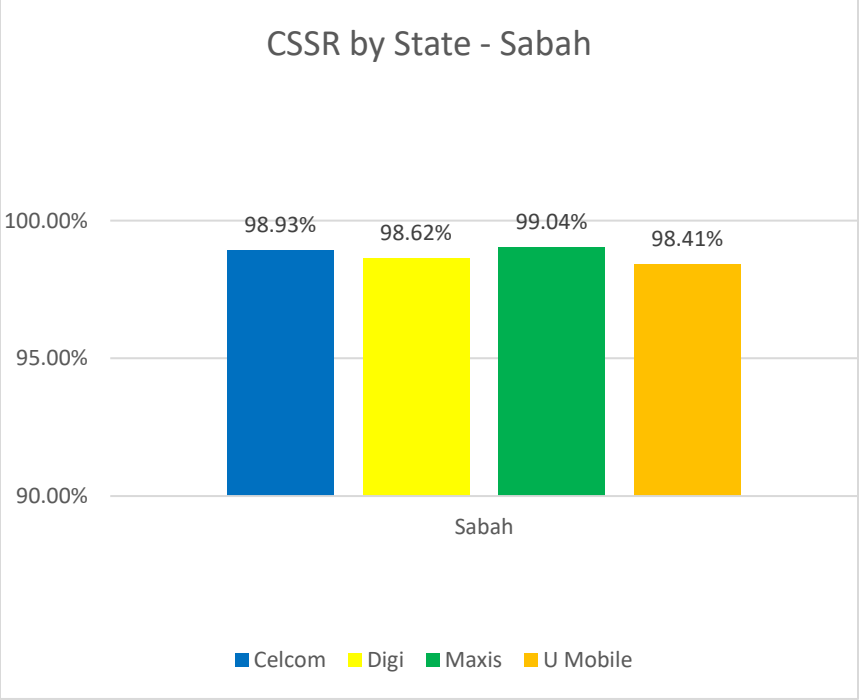


Figure 35: CSSR in Sabah state



5. SUMMARY

This report represents the network performance for the year 2020, and based on results obtained, in terms of wireless broadband services, Maxis once again established itself as the best service provider for average download throughput and average latency nationwide. All service providers recorded very low packet loss rate indicating their networks were reliable in delivering data to the intended destination.

Table 22 below shows the year on year comparison of average download throughput for wireless broadband between 2020 and 2019. Three service providers, Celcom, Digi and Maxis showed a decline in average download throughput while the others showed a commendable increase. This trend could be due to the movement restrictions imposed, which changed the usage pattern from areas of commercial premises to residential. Combined with online learning, this change of pattern had impacted service providers with high number of subscribers such as Celcom, Digi and Maxis.

Service Provider	2020 (Mbps)	2019 (Mbps)	+/- YOY Download throughput
Celcom	16.64	23.17	-28.18%
Digi	24.05	25.32	-5.02%
Maxis	27.58	32.32	-14.67%
U Mobile	15.65	14.4	+8.68%
Webe	16.32	11.26	+44.94%
YTL	17.65	16.24	+8.68%

Table 22: Wireless broadband average download throughput year-over-year comparison

Due to travel restrictions posed by Covid-19 pandemic, there was no report for Sarawak in 2020. The majority of locations tested in 2020 comprised of complaint areas. Service providers were required to close the gap in order to fulfill the demands of the end users in the era of new norm which has made good data connectivity and service more essential.

As for wired broadband service, fibre technology will provide better performance in terms of throughput and latency. Higher speed subscription packages offered by the service providers also rely on fibre as the last mile. Based on the results obtained for the year 2020, TM and Maxis were able to provide at least 90% of the subscribed speed for more than 90% of the time for both download and upload throughput for fibre technology. TIME could provide the required upload throughput but unable to meet the standards for download throughput. This was mainly due to the higher subscription packages of up to 1Gbps offered by TIME, which some subscribers failed to get at least 900 Mbps throughput for 90% of the time due to router incompatibility. Results for DSL technology showed TM and Maxis, were able to provide the required throughput and latency as mandated. However, Maxis recorded more than 1% of packet loss for DSL technology.

For public cellular voice call performance, all service providers were able to provide services within the required rate for both DCR and CSSR. At the moment, the voice call performance is inclusive of all calls made through 2G, 3G and LTE network. Service providers are expected to deploy and expand the Voice over LTE (VoLTE) service and coverage as 3G network is planned to be shut down by end of 2021.

The year 2020 was an unprecedented year, in which the use of electronic communication has become ever more important in people's everyday life due to the global pandemic. The traffic pattern shifted for many, as more people were required to work from home, while in education sector, online classes became a norm. This change of trend at times put more stress on the network in delivering the best quality of service to the end user. MCMC through the JENDELA initiative aims to provide greater digital connectivity by expanding mobile broadband coverage, upgrading mobile broadband speed and enabling more premises with gigabit fixed broadband.

End of Report