QUALITY OF SERVICE NETWORK PERFORMANCE RESULTS FOR 2017

FUNDAMENTALS

- The results shown are with accordance to the Mandatory Standards (MS) set forth effective Feb 2016. Click (a) for details of the MS.

- The MS QoS for Wireless Broadband and Public Cellular Services is not in force in the year 2017 due to the re-allocation of spectrum exercise involving the mobile operators

Definition and Abbreviations

Throughput – It refers to how much data can be transferred per unit of time across a network from one location to another. In our measurement context, download throughput refers to the internet speed experienced by the end user when data is transferred from a server to the end user equipment. While upload throughput refers to the internet speed experienced by the end user when transferring data to the server. Higher throughput means better internet speeds.

Network Latency – It refers to the timing of data transfers on a network, how long it takes for the data to travel to its destination. Round trip time (RTT) refers to the time taken for a packet to travel and return across the network between end user and the server. Low latency is considered better than high latency.

Packet Loss – It refers to amount of data sent which are unable to reach its intended destination. Low packet loss indicates the network able to transfer data from the user end towards the destination host with high reliability.

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

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

Public Cellular Service (PCS) - Voice Overall 2017

Identified and Designated Routes

Service Provider	Dropped Call Rate (DCR)	Call Setup Successful Rate (CSSR)
celcom	0.51%	99.72%
digi	1.16%	99.50%
maxis	0.44%	99.56%
mobile	0.50%	99.78%

Nationwide Routes

Service Provider	Dropped Call Rate (DCR)	Call Setup Successful Rate (CSSR)
celcom	1.22%	99.09%
digi	1.30%	99.29%
maxis	1.54%	99.10%
mobile	1.97%	98.59%

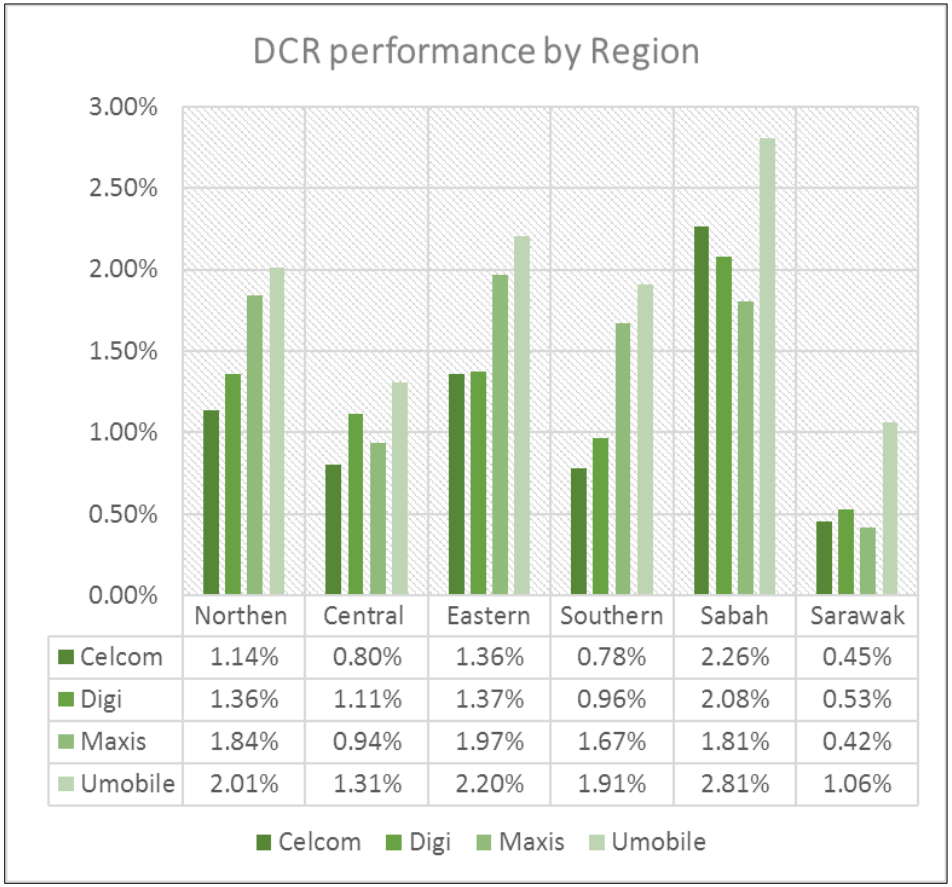
Identified and Designated Routes : Putrajaya, Cyberjaya, MEX Highway, KLIA to Subang Airport via ELITE highway, Subang Airport to Jalan Duta via NKVE highway

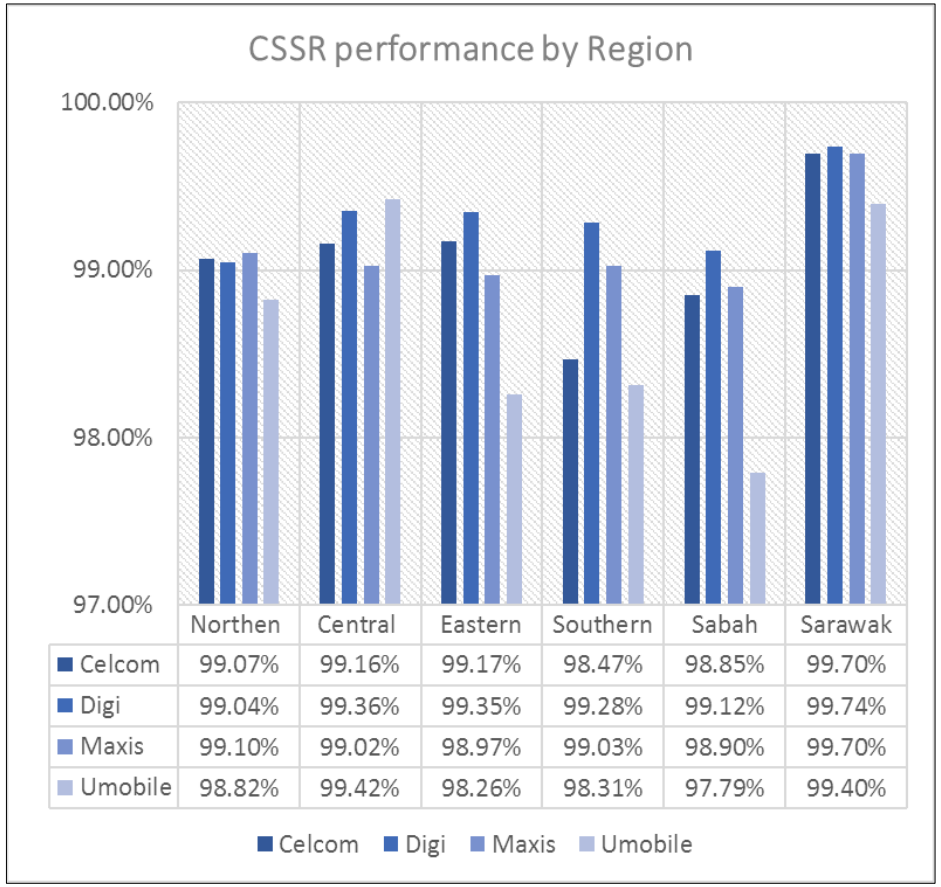
Nationwide: All states averaged in whole of Malaysia

Drop call rate (**DCR**) : **Not more than 2%** for Identified and Designated Routes; and **not more than 3%** for Nationwide

Call Setup/network availability (**CSSR**): **At least 95%**

PCS results by Region





Wired Broadband (BB) Overall 2017

Service Provider	No of Locations	Throughput (DSL)		Network Latency	
		Upload	Download	Latency	Packet Loss
TM	42	99.84%	96.01%	77.34%	1.27%
Maxis	4	100.00%	99.58%	99.04%	0.05%

Wired BB for DSL

Service Provider	No of Locations	Throughput (Fibre)		Network Latency	
		Upload	Download	Latency	Packet Loss
TM	57	99.19%	99.01%	92.23%	0.29%
Maxis	65	96.37%	96.94%	91.86%	0.23%
TIME	24	98.02%	96.23%	100%	0.10%

Wired BB for Fibre

Wired BB Overall 2017 by Location

Service Provider (SP)	Total Location	Throughput Comply	RTT Comply	Packet Loss Comply
TM	99	96 (96.97%)	69 (69.70%)	73 (73.74%)
Maxis	69	66 (95.65%)	59 (85.51%)	63 (91.30%)
TIME	24	22 (91.67%)	24 (100.00%)	23 (95.83%)
Overall	192	184 (95.83%)	152 (79.17%)	159 (82.81%)

Compliance of Wired Broadband Access per test location

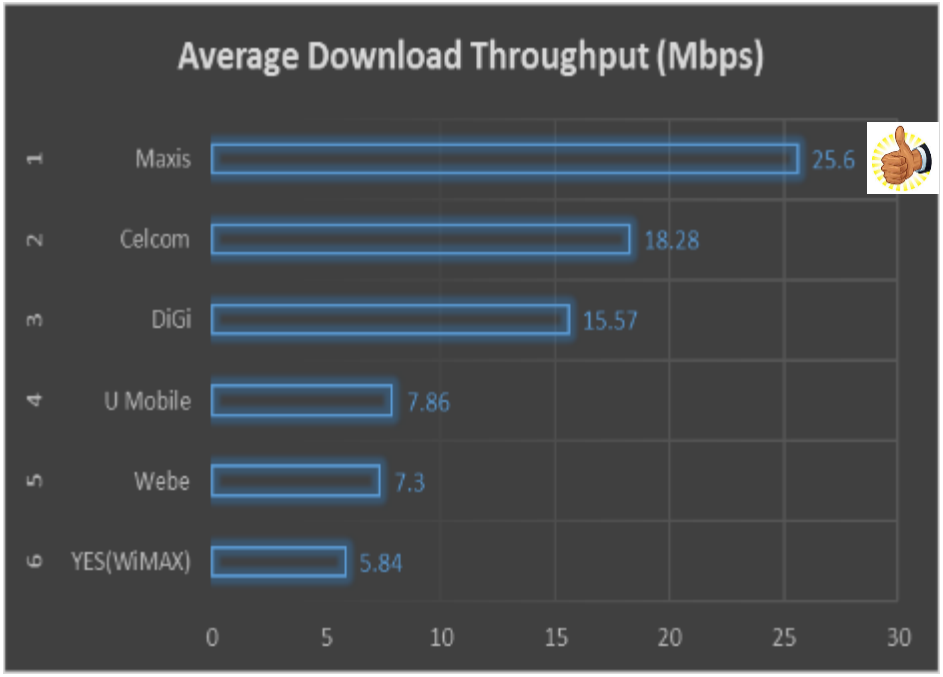
Wireless Broadband (BB) Overall 2017

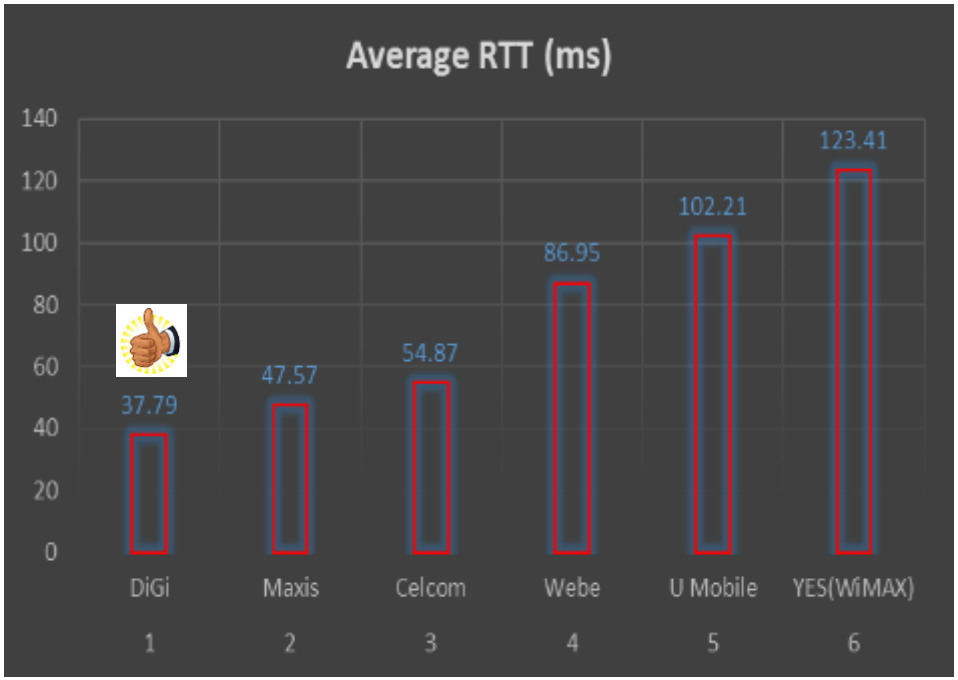
Service Provider	Throughput	Network Latency	
	Speeds over 650 kbit/s	% of the time latency ≤ 250 ms	Packet Loss
Celcom	98.48%	99.12%	0.53%
DiGi	98.80%	99.61%	0.52%
Maxis	99.66%	99.51%	0.13%
U Mobile	94.77%	92.48%	0.99%
Webe	96.67%	97.13%	1.42%
YES (LTE)*	99.39%	99.91%	2.37%
YES (WiMAX)	87.01%	96.70%	1.04%

Scorecard for cellular mobile broadband - Nationwide

*YES (LTE) measurements only cover certain states (Kelantan, Terengganu, Johor, Kedah, Perlis, Sabah and Sarawak), therefore does not represent actual nationwide results

Wireless BB Overall Ranking





SP	Download Throughput (Mbps)	Average RTT (ms)
YES (LTE)	8.06	63.08

Performance Summary

- **PCS** (voice call) - all operators met with the MS QoS on identified routes and nationwide for both DCR and CSSR requirements
- **Wireless broadband -** all operators met all metrics in MS QoS for both TDD and FDD
- **Wired broadband** - TM failed latency and packet loss for DSL. Both TM and Maxis failed to meet latency requirement for fibre.

THANK YOU