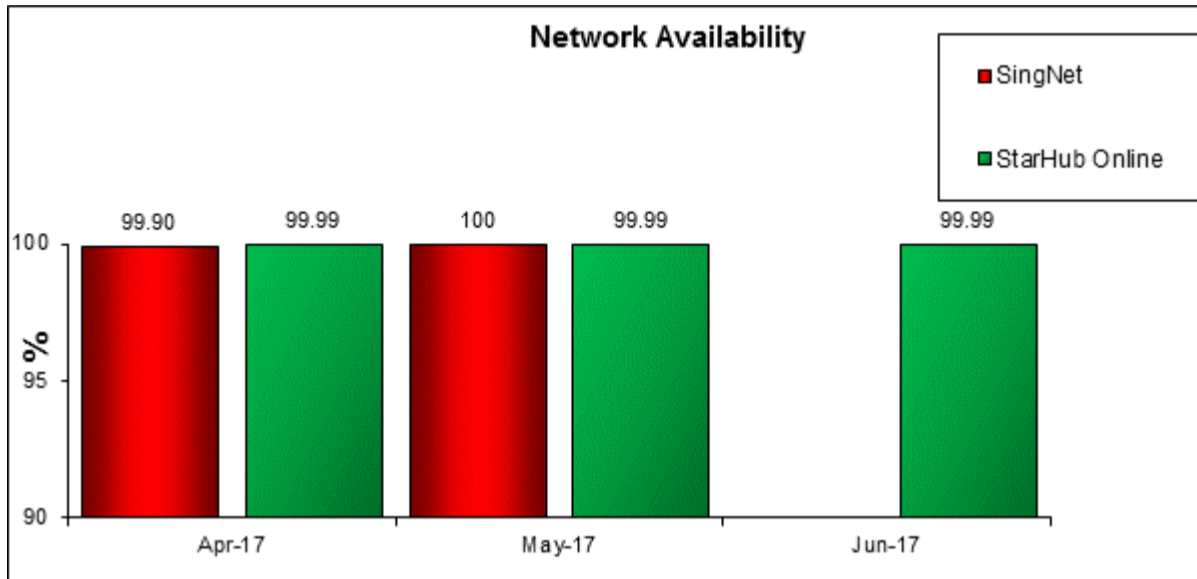


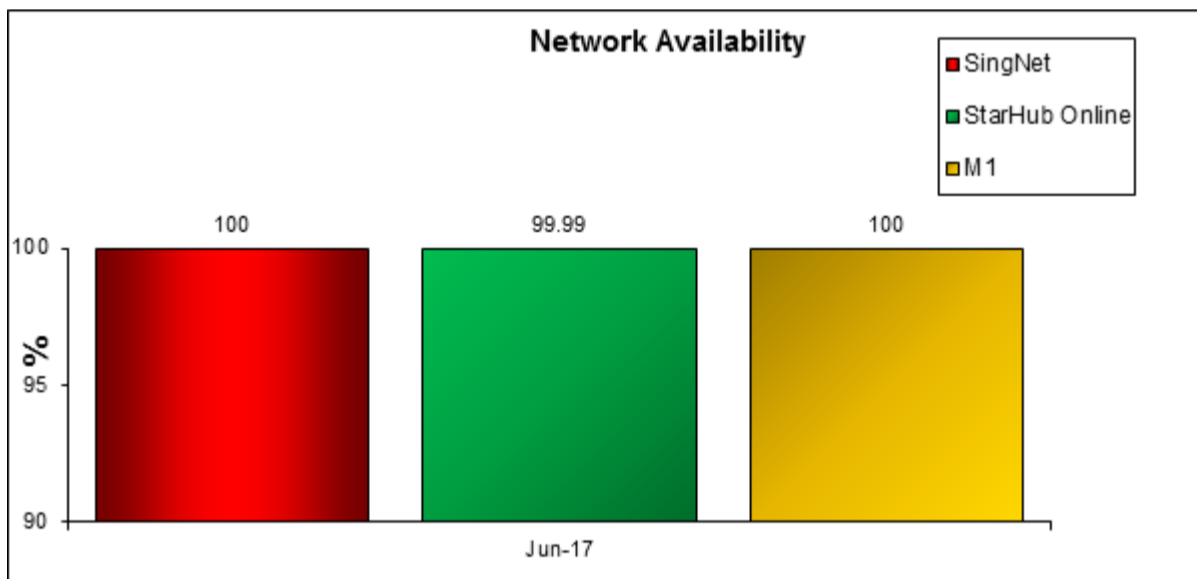
# Broadband QoS Performance for Q2 2017

Quality of Service (QoS) Standards for Broadband Services for the Apr - Jun 2017 Quarter

## 1. Network Availability (For ADSL and Cable Modem Broadband Services)



## Network Availability (For Fibre Broadband Services)

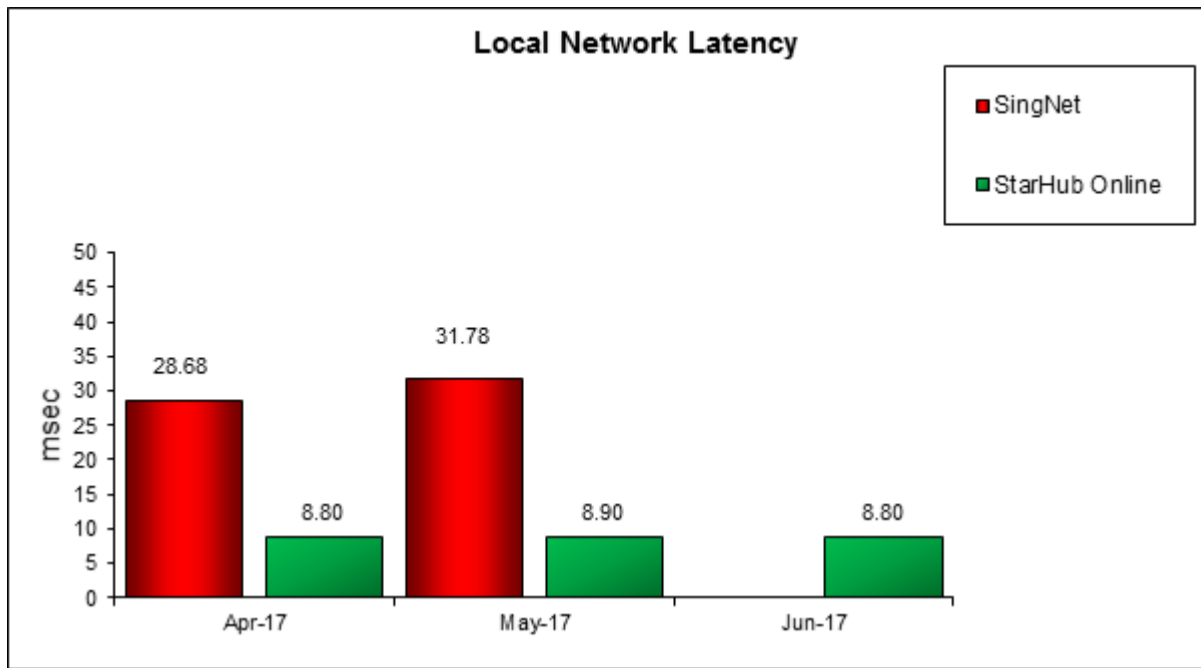


Network Availability is the measure of the degree to which the access network is operable and not in a state of failure or outage at any point of time. That is, it measures the total downtime of the network, including the ATM switches, multiplexers, routers, e-mail facilities (if provided) and connection to 1-NET and Internet backbone over a month. All scheduled downtime for the purposes of maintenance and upgrading of the network system will be excluded from the calculation. However, all access network operators must keep their users informed of such maintenance times.

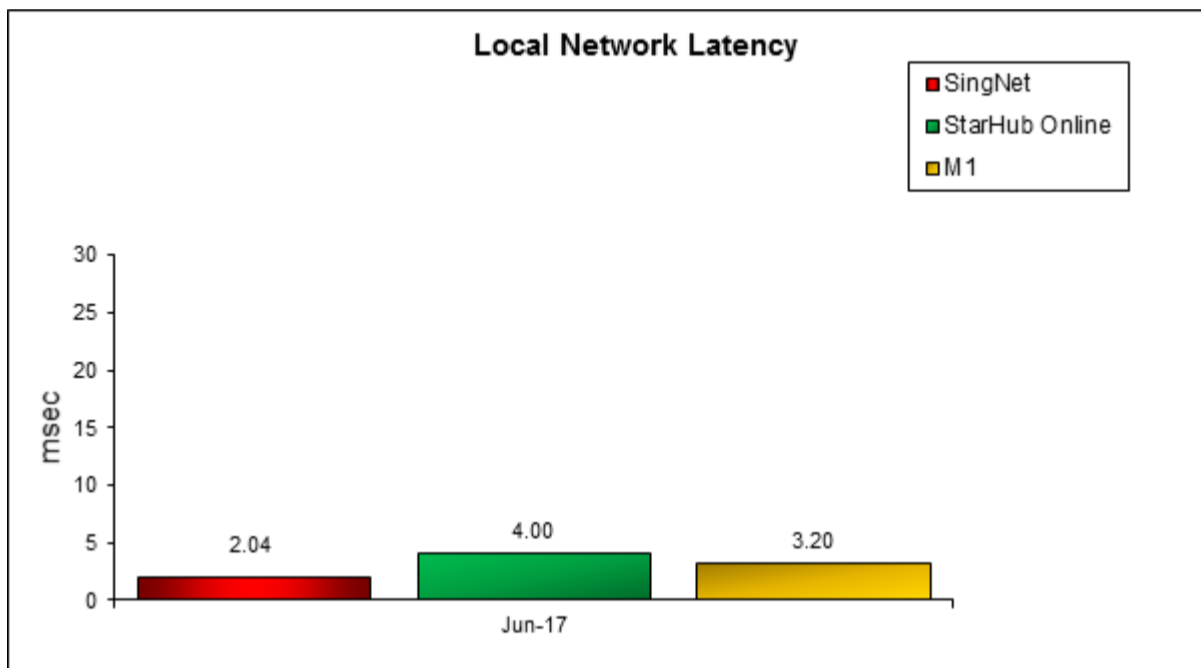
Network Availability = [(Total Operational minutes - Total minutes of service downtime) / Total operational minutes] x 100%

Results are rounded off to two decimal places. Therefore, a result of "100%" does not necessarily reflect that there was no service downtime in that month.

## 2. Local Network Latency (For ADSL and Cable Modem Broadband Services)



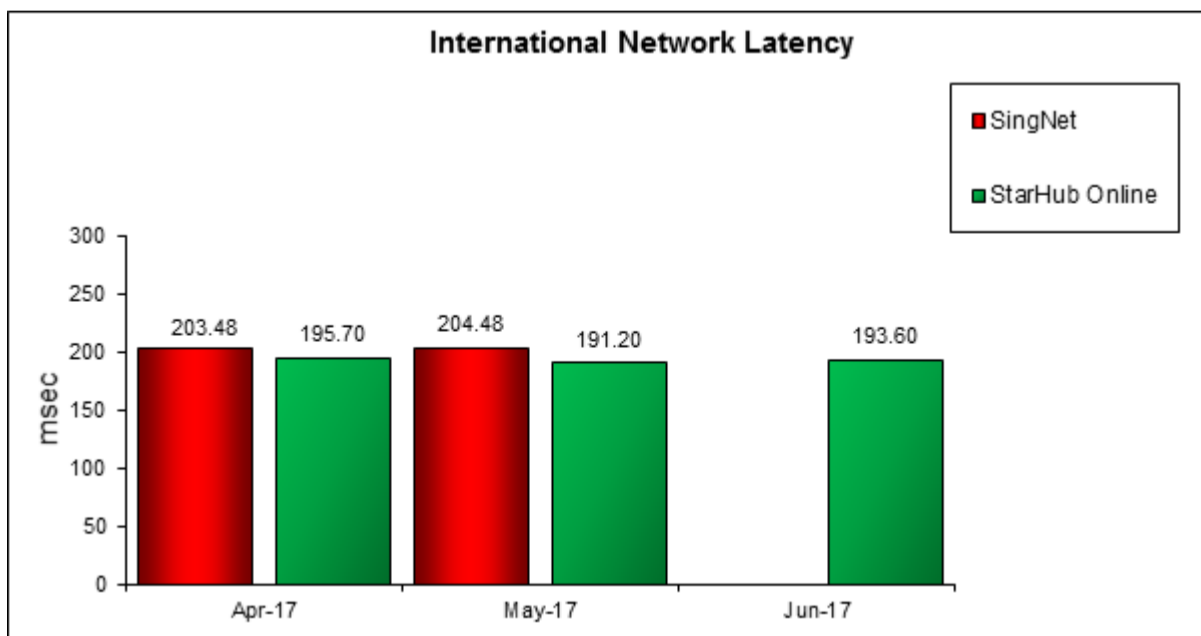
**Local Network Latency (For Fibre Broadband Services)**



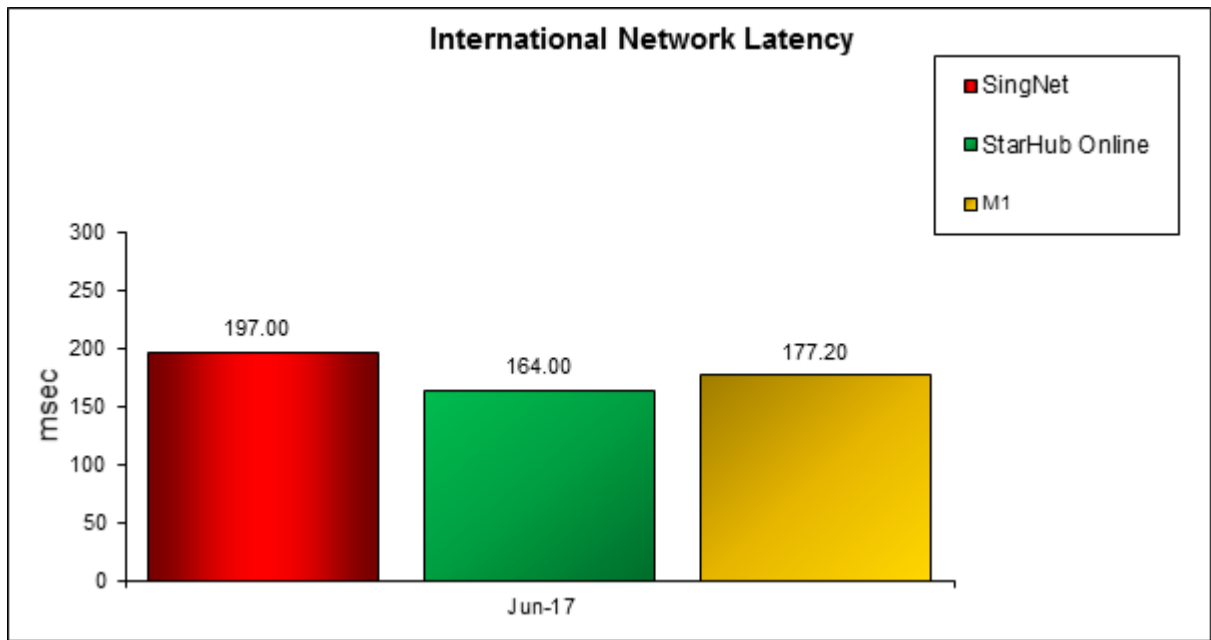
Local latency measures the round-trip time for PING packets to travel between the test clients in Singapore and the Broadband Access Service Provider's ("BASP's") test node(s) in its local Point-of-Presence ("PoP").

Results are rounded off to two decimal places.

### 3. International Network Latency



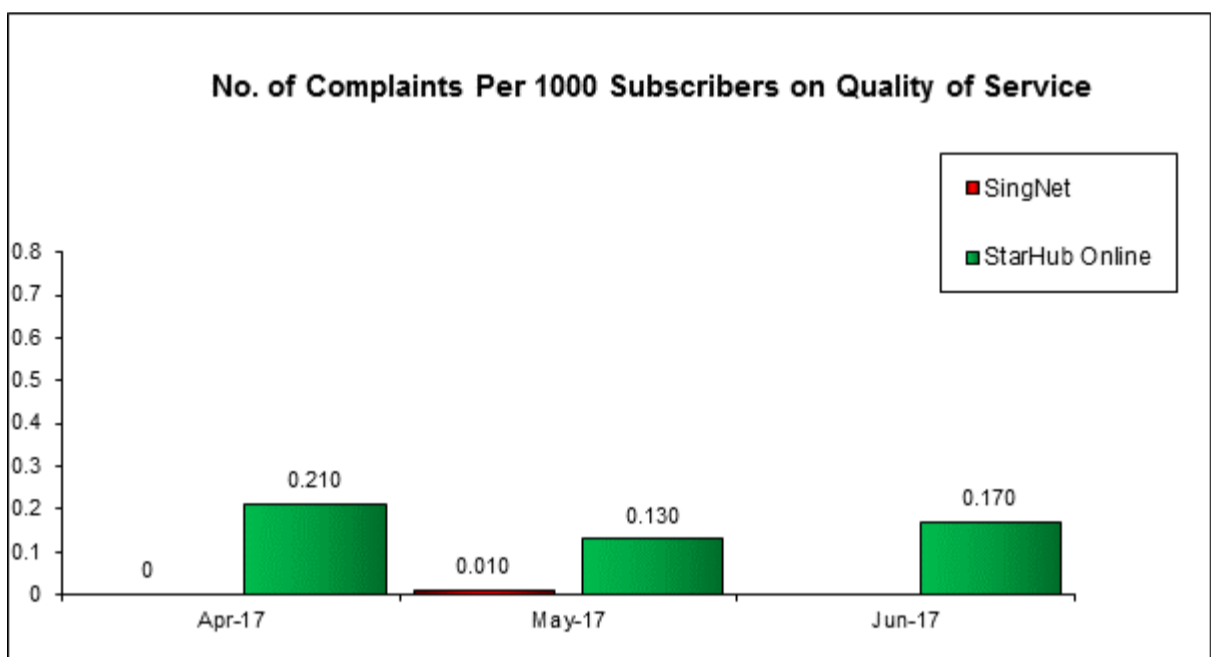
**International Network Latency (For Fibre Broadband Services)**



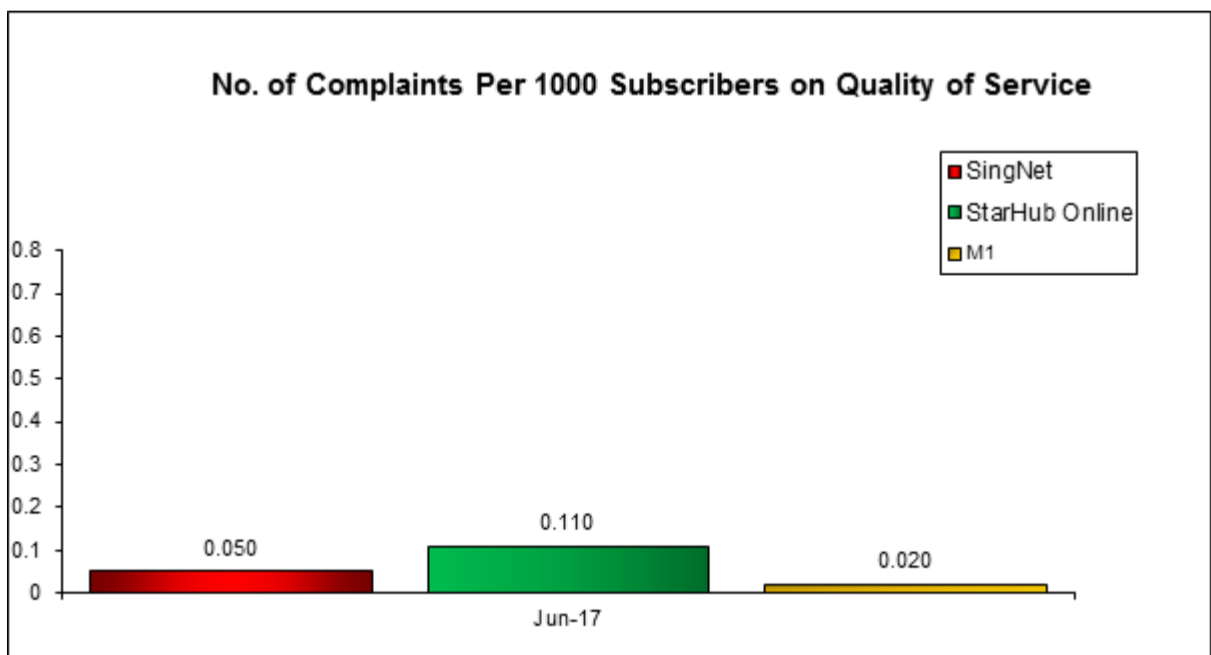
International latency measures the round-trip time for PING packets to travel between the test clients in Singapore and the BASP's test node(s) in its first US PoP.

Results are rounded off to two decimal places.

**4. Number of Complaints Per 1000 Subscribers (For ADSL and Cable Modem Broadband Services) - For Information**



**Number of Complaints Per 1000 Subscribers (For Fibre Broadband Services) - For Information**



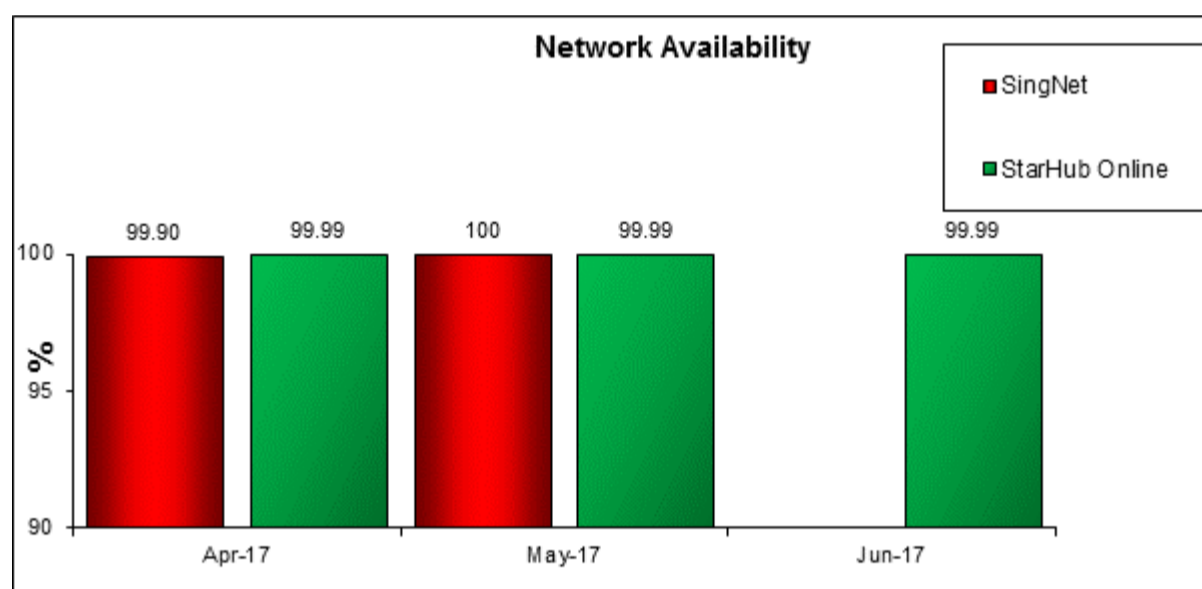
The term "complaints" is defined as any expression of dissatisfaction with the service providers' service, product, advertisement or policy via oral or written

communication that requires some action by the service provider beyond the initial contact.

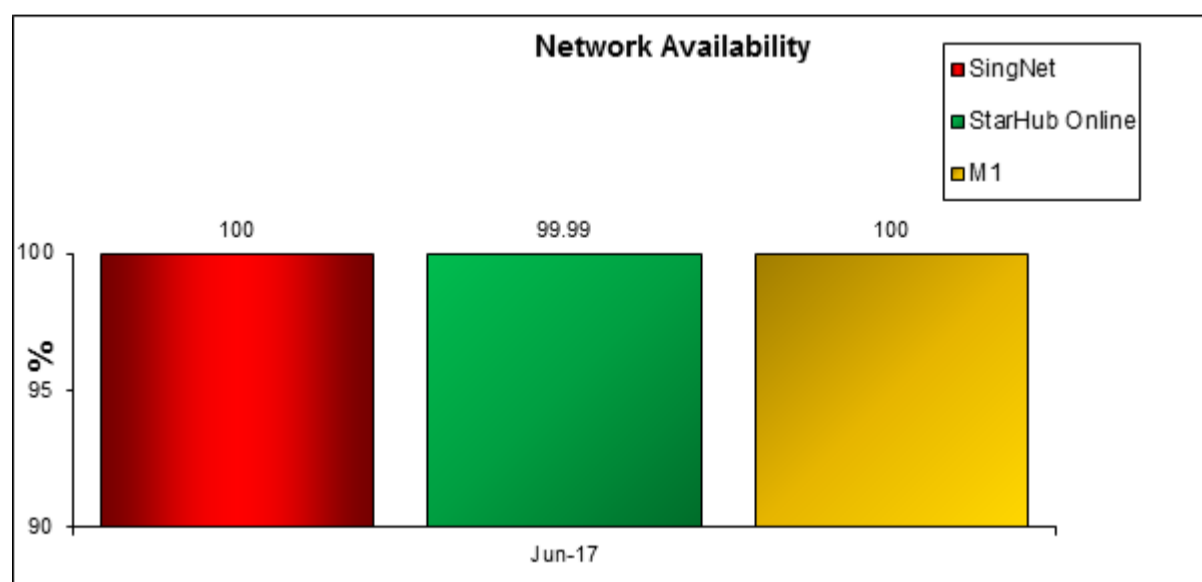
Results are rounded off to three decimal places. Therefore, a result of “0” does not necessarily reflect that there were no complaints on broadband services in that month.

Note: As the fibre broadband service QoS framework has come into effect from 1 June 2017, IMDA will publish the fibre broadband service performance of M1, SingNet and StarHub Online. IMDA will also cease the publication of the performance of ADSL/cable broadband services from Q3 2017 as the number of ADSL/cable broadband service subscriptions are close to just 10% of the individual BASPs’ total broadband service subscriptions and declining.

## 1. Network Availability (For ADSL and Cable Modem Broadband Services)



## Network Availability (For Fibre Broadband Services)



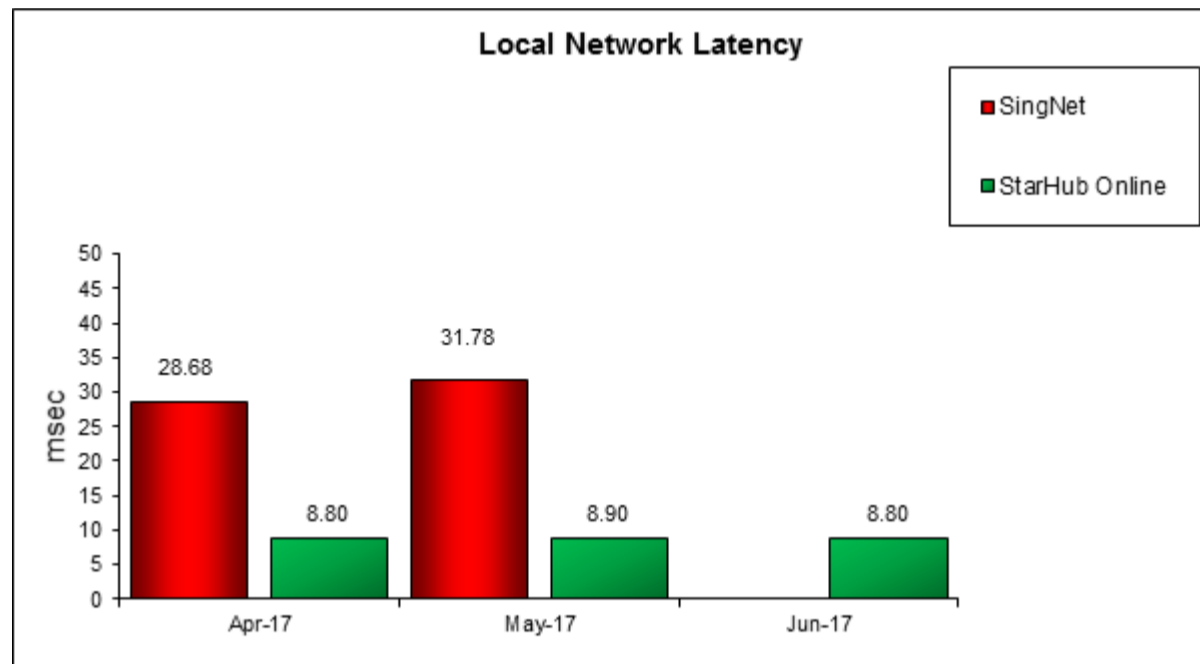
Network Availability is the measure of the degree to which the access network is operable and not in a state of failure or outage at any point of time. That is, it measures the total downtime of the network, including the ATM switches, multiplexers, routers, e-mail facilities (if provided) and connection to 1-NET and Internet backbone over a month. All scheduled downtime for the purposes of maintenance and upgrading of the network

system will be excluded from the calculation. However, all access network operators must keep their users informed of such maintenance times.

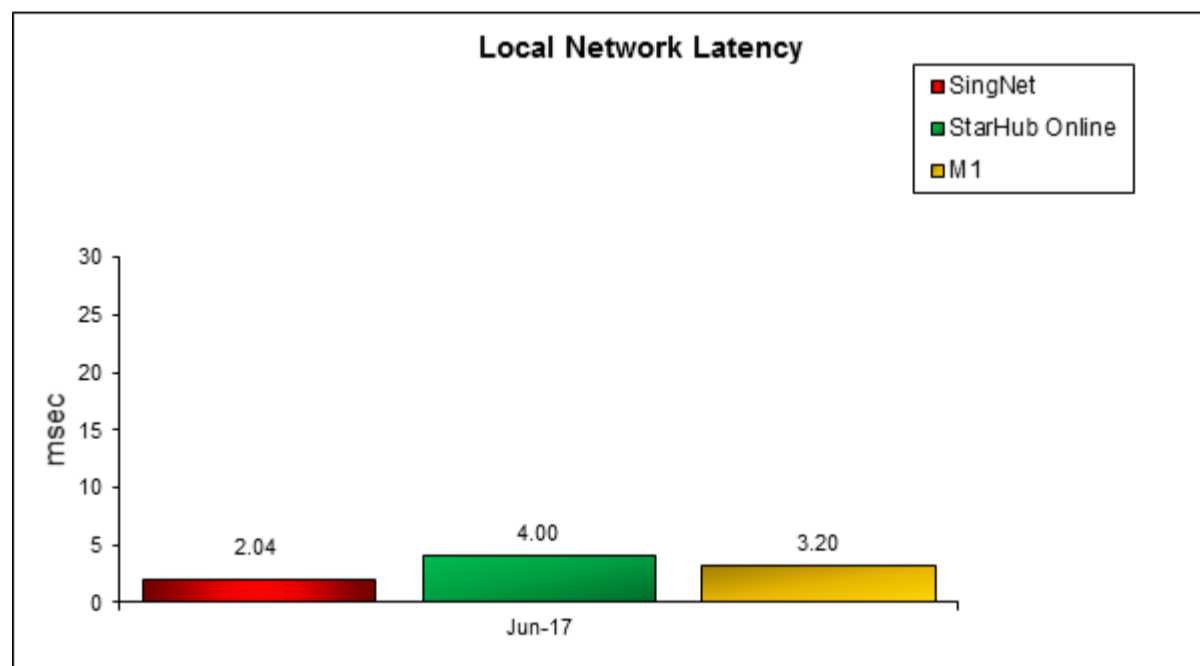
Network Availability = [(Total Operational minutes - Total minutes of service downtime) / Total operational minutes] x 100%

Results are rounded off to two decimal places. Therefore, a result of “100%” does not necessarily reflect that there was no service downtime in that month.

## 2. Local Network Latency (For ADSL and Cable Modem Broadband Services)



## Local Network Latency (For Fibre Broadband Services)



Local latency measures the round-trip time for PING packets to travel between the test clients in Singapore and the Broadband Access Service Provider's ("BASP's") test node(s) in its local Point-of-Presence ("PoP").

Results are rounded off to two decimal places.

### 3. International Network Latency

