



Telecom Quality of Service (QoS) Frameworks in Singapore

21 August 2019

Background





Quality of Service (QoS)

- IMDA sets QoS standards for the following key telecommunication services:
 - Public cellular mobile telecommunication services
 - Public basic telephone services
 - Broadband Internet access services
 - Fibre connection services
- Operators of these services are required to measure and submit periodic reports on their service quality performance
- Operators' performance are published on the IMDA website

Key QoS Frameworks



QoS – Mobile Telecom Services (3G)

- Applicable to Facilities-Based Operators (FBOs) providing 3G mobile services:

Performance Indicators	Compliance Benchmark
Service Coverage (signal strength -100dBm or better):	
Nation-wide	> 99%
In-building	> 85% (with effect from 1 Apr 2013)
Tunnels	> 99% in new road & MRT tunnels, >95% in existing road & MRT tunnels
Call success rates during busy hour:	
Ave across all cell localities	>99%
Ave in busiest cell locality	>95%
Ave for each cell locality	>70%
Drop call rate:	
Ave across entire month	<1%
Ave during busy hour	<2%
Ave during hour with worst performance	<2%

QoS – Mobile Telecom Services (4G)

- Applicable to Facilities-Based Operators (FBOs) providing 4G mobile services:

Performance Indicators	Compliance Benchmark	Effective Date (for incumbent operators)	Effective Date (for TPG)
Service Coverage (signal strength -109dBm or better):			
Nation-wide	>95%	From 1 Jul 2016	From 1 Jan 2019
	> 99%	From 1 Jul 2017	From 1 Jan 2020
In-building	For Monitoring	From 1 Jan 2018	N.A.
	> 85%	From 1 Jan 2019	From 1 Jan 2020
Tunnels	For monitoring	From Q4 2014	N.A.
	> 99%	From 1 Jul 2018	From 1 Jan 2020 (road tunnels) From 1 Jan 2022 (MRT tunnels)

3G and 4G Coverage Test Areas

①

Nation-wide outdoor

Drive Test



Parks



Town Centres



Above ground MRT



②

In-building



③

MRT and expressway tunnels



Using engineering handsets

QoS – Public Basic Telephone Service

- For Facilities-Based Operators (FBOs) providing basic telephone services:

Performance Indicators	Benchmark
Network Availability	> 99.9%
Telephone installation and Activation time (a) Within 3 working days of receiving a working connection or by date specified by customers (b) Within 4 working days after (a)	≥ 95% 100%
Telephone Fault Repair Time (a) Within 24 hours (b) Within 72 hours	≥ 90% ≥ 99.9%

- Performance indicators (for monitoring)
 - % of total calls handled for telephone fault reporting
 - Average waiting time for telephone fault reporting
 - % of trouble reports within 30 days of installation and activation

QoS – Fixed Broadband Access Services (Fibre)

- Applicable to broadband access service providers providing retail fibre broadband services to residential and/or business end users (with effect from 1 Jun 17).

Performance indicators	Benchmark
Network availability	> 99.9%
Network latency (1)Local (2)International	≤ 30msec ≤ 300msec
Bandwidth utilisation	≤ 90%

- Performance indicators (for monitoring)
 - Service activation time
 - Customer service support
 - Packet loss
 - International bandwidth utilisation



Broadband Speeds

- To address complaints from end users about actual broadband speeds being different from advertised speeds, in 2012, IMDA required all fixed and mobile broadband providers to **publish the typical download speeds likely to be experienced** by end users, apart from the advertised theoretical speeds
 - All internet service providers are also required to publish their measurement methodologies and how they computed the typical speeds
 - For larger internet service providers, IMDA has specified some baseline parameters for the measurement methodology to adopt for the measurement of typical speeds
 - Sample size of 200 data points
 - Requirement to measure at peak and off-peak periods
 - Use of end user devices to take measurements
 - Test devices/clients must be geographically distributed around Singapore
- The complaints from end users have since decreased

QoS – Fibre Connection Services

- Applicable to NetLink Trust, the operator who operates the nationwide dark fibre network in Singapore

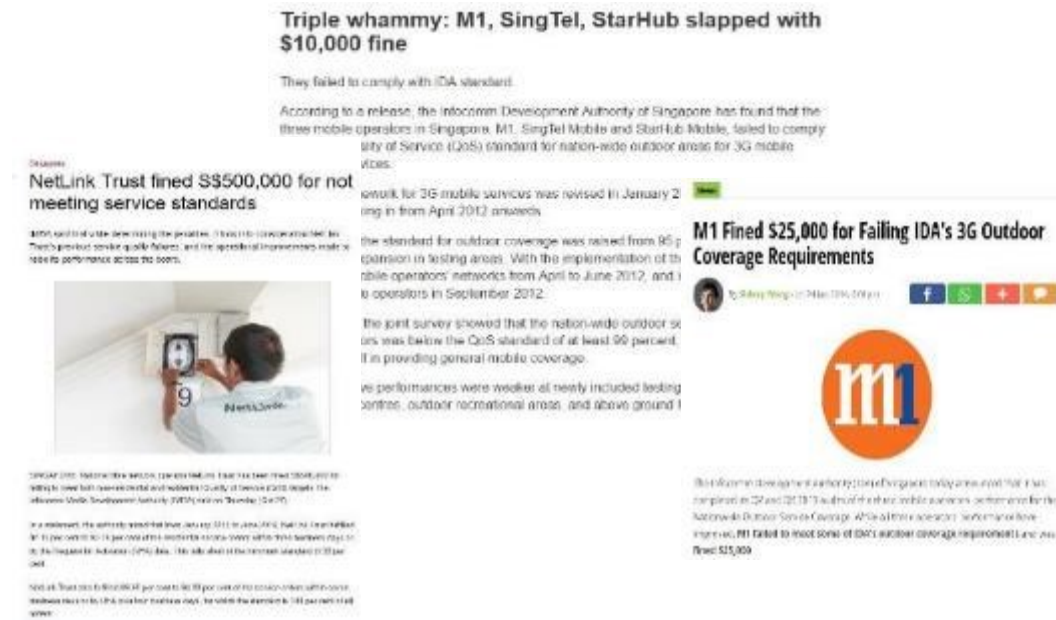
Performance indicators	Benchmark
Residential Orders Provisioned within 3 Business Days	≥ 98.0%
Residential Orders Provisioned within 7 Business Days	100.0%
Non-Residential Orders Provisioned within 4 Calendar Weeks	≥ 80.0%
Non-Residential Orders Provisioned within 8 Calendar Weeks	100.0%

Enforcing QoS Standards and Raising Public Awareness



Monitoring and Enforcing QoS

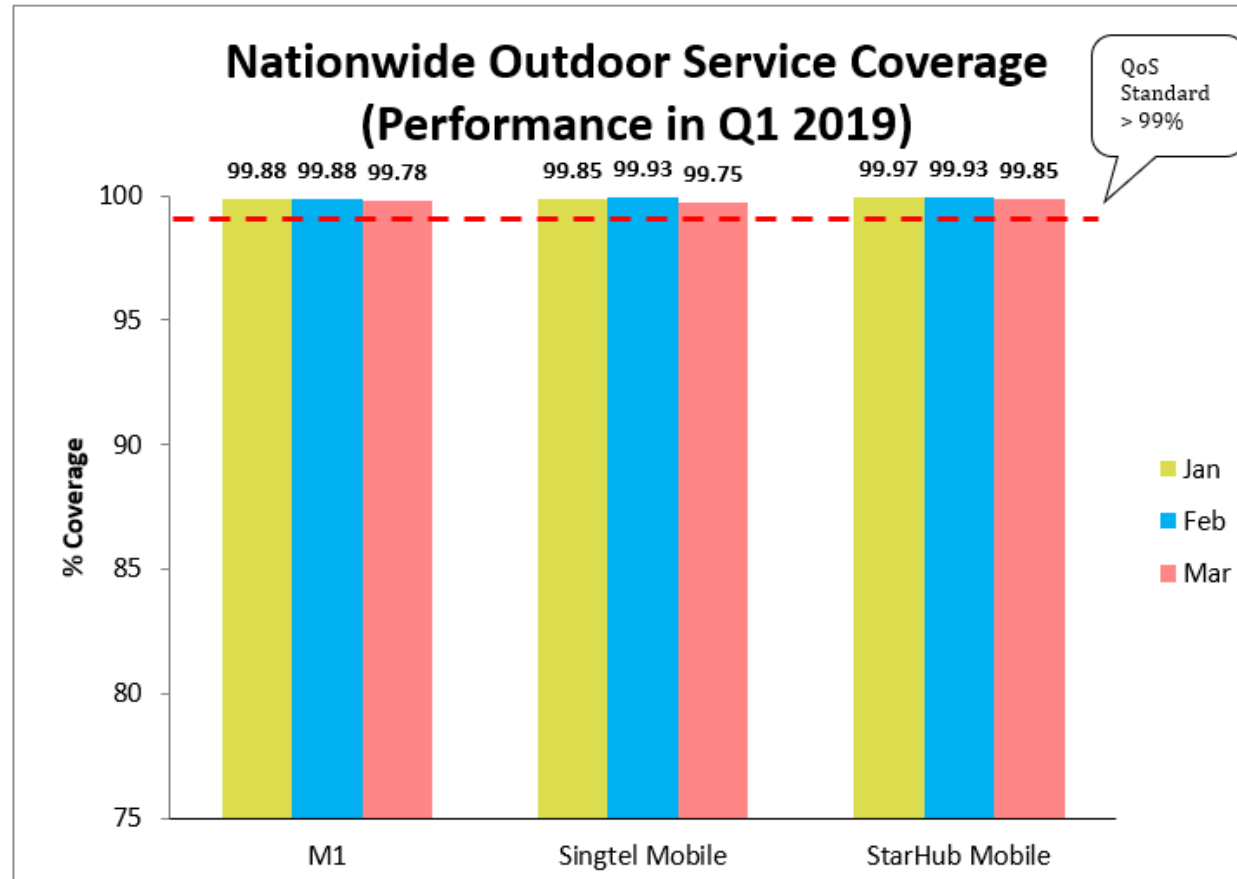
- Separate audit on mobile service coverage
 - Apart from performance reports submitted by operators, IMDA also conducts independent measurements of mobile service coverage on a monthly/quarterly basis
- Operators that fail to meet the QoS standards may have to pay a financial penalty



Raising Public Awareness

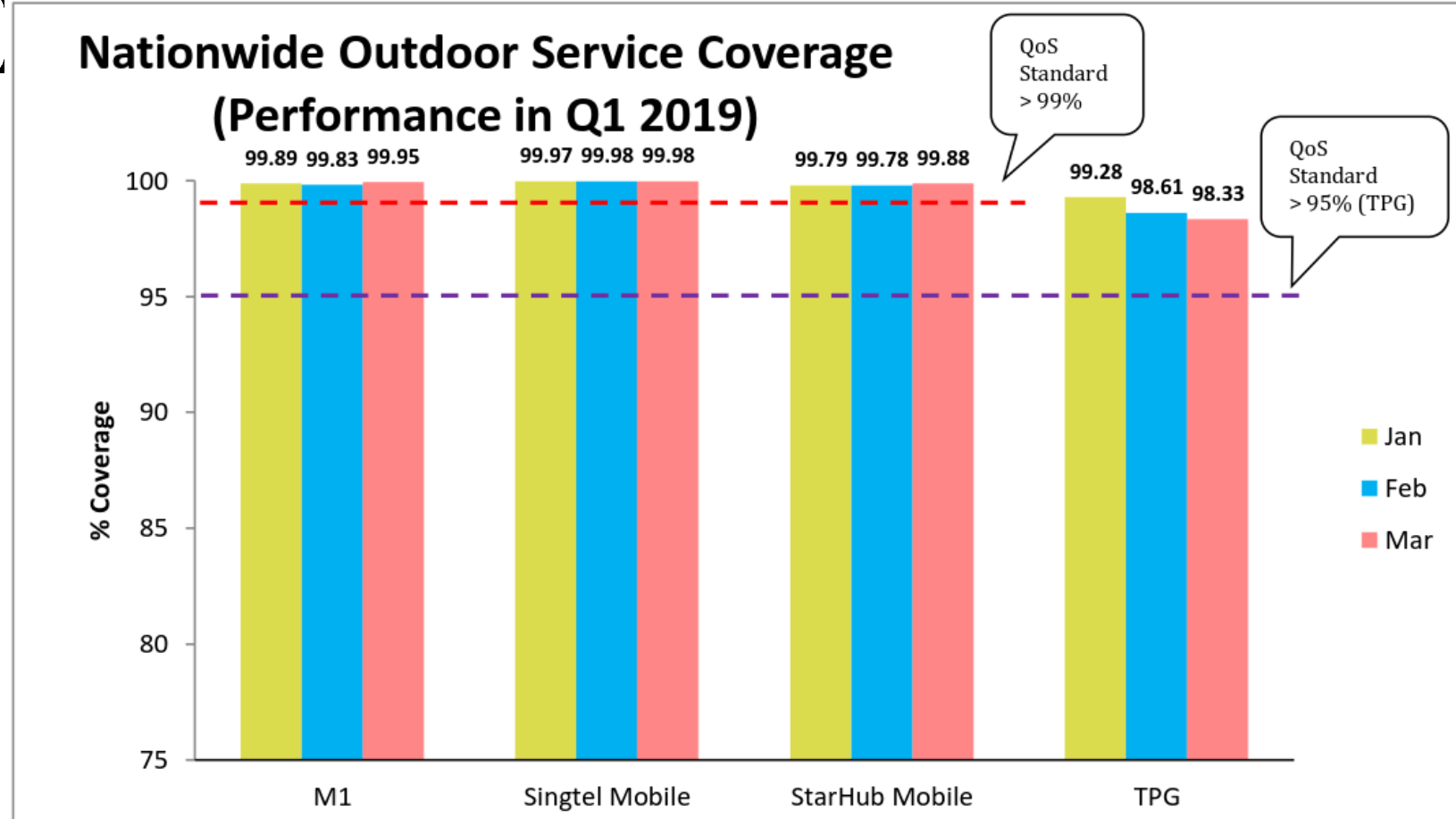
- Results of IMDA's measurement are published on the IMDA website

3G Mobile Services



Raising Public Awareness

4G Mobile Services



Thank You

