Suruhanjaya Komunikasi dan Multimedia Malaysia

Malaysian Communications and Multimedia Commission

PROPOSAL FOR REVIEW OF THE MANDATORY STANDARDS FOR QUALITY OF SERVICE (WIRELESS BROADBAND ACCESS SERVICE) (DETERMINATION NO. 1 OF 2016)

08 APRIL 2021

This Public Inquiry Paper is prepared in fulfilment of Sections 58 and 61 of the Communications and Multimedia Act 1998.

TABLE OF CONTENTS

PREFACE

The Commission is hereby holding a Public Inquiry on the proposal for the revision of Mandatory Standards for Quality of Service (Wireless Broadband Access Service) (Determination No. 1 of 2016) and invites members of the public and interested parties to participate in this inquiry by making written submissions on any matter they consider relevant to the inquiry. Written submissions, in both hard copy and electronic form, should be provided to the Commission in full by **12 noon, 04 June 2021** and addressed to:

Malaysian Communications and Multimedia Commission
MCMC Tower 1
Jalan Impact
Cyber 6
63000 Cyberjaya
Selangor Darul Ehsan

Attention : Quality of Service Department
Or E-mail : qos.dept@mcmc.gov.my
Or Fax : +60 3 86 88 10 00

In the interest of fostering informed and robust consultative process, the Commission may make available extracts of or entire submissions for others to read. Any commercially sensitive information should be provided under a separate cover and clearly marked “CONFIDENTIAL”.

Respondents are encouraged to support their comments with reasons and where appropriate provide or refer to evidence or other relevant information in support of their comments.
Incomplete and/or late submissions will not be considered.

The Commission thanks the public and all interested parties for their participation in this consultative process and for providing their submissions and feedback.

GLOSSARY

CMA1998	Communications and Multimedia Act 1998 (Act 588)
Commission	Malaysian Communications and Multimedia Commission
MS	Mandatory Standards
MSQoS	Mandatory Standards for Quality of Service
PI	Public Inquiry
QoS	Quality of Service

PREAMBLE

1. The present MSQoS for Wireless Broadband Service (Determination No.1 of 2016) came into force on 1 February 2016. At the time, the Commission recognizes the need to mandate certain QoS parameters in order to not only protect the consumers' interest but also to ensure that the wireless broadband service provided by the Service Providers is at the optimum level. This MSQoS covers the standards for Quality of Service for delivery of data over the internet protocol for wireless systems. The MSQoS standards are segregated into two parts; network performance and customer service.

2. The review of the MSQoS for Wireless Broadband Access Service will separate the customer service standards into a new Mandatory Standards specifically focusing on customer service aspects. This PI will only cover modifications made on network performance standards in light of customer expectations and perception towards service delivery.

3. In determining the relevant QoS parameters for the MSQoS, certain considerations must be taken including the current network scenario, network capabilities or readiness and user devices availability. Considerations are also made due to the increase of broadband usage, changes in customer expectations and perception towards service delivery. Therefore, pursuant to section 106 of the CMA1998, the Commission hereby undertakes the initiative to review the MSQoS for Wireless Broadband Service.

4. The review of the MSQoS is based on international best practices where possible in relation to wireless broadband service in Malaysia. This MSQoS review also seeks to strengthen and streamline the QoS framework for current and future technologies.

PUBLIC INQUIRY PROCESS

5. Section 58(2) of the CMA1998 provides that the Commission may hold a public inquiry if it is satisfied that the matter is of significant interest to either the public or to current or prospective licensees under the CMA1998. The objective of such a public inquiry is to inform as well as to invite views of the public and the licensees under the CMA1998 on the matter at hand.

6. The Commission is of the view that it is appropriate in the circumstances to hold a public inquiry under section 58 (2)(b) of the CMA1998 in order to obtain industry and public comment, and to promote transparency in the exercise of its powers.

7. Under section 61 (1) (d) of the CMA1998, the Public Inquiry period shall be a minimum of forty-five (45) days, within which public submissions are invited. In the present Public Inquiry, licensees and the public are days to formulate and submit their views on the matter within the stipulated period.

8. The Commission shall take into consideration all submissions received within the Public Inquiry period. The Commission is required under section 65 of the CMA1998 to publish a report setting out its findings as a result of any inquiry it conducted, and such report shall be published within thirty (30) days of the conclusion of the inquiry. The Commission shall summarize the submissions received and publish the same in the report.

REVISION OF THE MANDATORY STANDARDS ON QUALITY OF SERVICE

PART A: REVISION ON THE INTERPRETATION PART OF THE STANDARDS

9. The following interpretations shall be revised in this Mandatory Standards for Quality of Service (Wireless Broadband Access Service):

Table 1: Proposed revision on interpretation part of the standards

Existing Interpretation	Revised Interpretation	Remarks
"wireless broadband access service" means a wireless connectivity of communication bandwidth service has a minimum downstream capacity of 650 kbps.	"wireless broadband access service" means a wireless connectivity of communication bandwidth service that is faster than primary rate interface of Integrated Services Digital Network (ISDN) of 2.0 Mbps.	Recommendation ITU-T I.113 • Broadband defined as; qualifying a service or system requiring transmission channels capable of supporting rates greater than the primary rate. • The primary rate interface for ISDN is 2.0 Mbps.

10. The following interpretation shall be used in this revised MSQoS (Wireless Broadband Access Service). Other interpretations, which are not applicable, shall be removed from the standards.

"ASP" means Applications Service Provider;

"end user" means a person who receives, requires, acquires, uses or subscribes to the public cellular service and may include a customer;

"FDD" means frequency division duplex;

"FWA" means Fixed Wireless Access

"guidelines" means a guidelines issued by the Commission pursuant to paragraph 8 of the Commission Determination on the Mandatory Standards for Quality of Service (Wireless Broadband Access Service);

“LTE” means Long Term Evolution;

“MyIX” means Malaysia Internet Exchange;

“NSP” means Network Service Provider;

“PRB” means Physical Resource Block;

“service provider” means an Applications Service Provider or a Network Service Provider which provide wireless broadband access service;

“TDD” means time division duplex;

“wireless broadband access service” means a wireless connectivity of communication bandwidth service that is faster than primary rate interface of Integrated Services Digital Network (ISDN) of 2.0 Mbps.

QUESTION 1:	**THE COMMISSION SEEK VIEWS ON THE PROPOSED CHANGES TO THE INTERPRETATION PART OF THE MANDATORY STANDARD FOR QUALITY OF SERVICE (WIRELESS BROADBAND ACCESS SERVICE).**

PART B: PROPOSED REVISION ON THE QUALITY OF SERVICE INDICATORS, MEASUREMENTS, STANDARDS AND NOTIFICATION

11. The review of the MSQoS for Wireless Broadband Access Service will contain the revised and existing standards focusing on network service performance only.

12. Six (6) QoS indicators within MSQoS for Wireless Broadband Access Service to be placed under the new MSQoS for Customer Service. The 6 items are shown in Table 2 below:

Table 2: QoS Indicators to be place under new MSQoS for Customer Service

	Quality of Service Indicator
i.	Advance notice of scheduled downtime
ii.	Service Disruption
iii.	Percentage of billing related complaints
iv.	Non-billing related complaints per 1,000 customers
v.	Promptness in resolving customer complaints
vi.	Promptness in answering calls to Customer Hotline

13. The demarcation of customer service standards into a new Mandatory Standards seeks to streamline customer service QoS indicators under one new unified document. Customer Service standards focuses on Service Providers' responsibilities in regards to general services, service disruptions, customer complaint related matters, notifications and reporting timelines between service providers and the Commission. Network performance standards will solely focus on network and technical matters in regards to network service delivery.

14. The network performance standards are more technology specific. This will enable the Commission to review future network performance standards more efficient and in keeping up to date with the evolution of technology in the telecommunication industry.

15. Currently, six service providers are enforced with Mandatory Standards for Quality of Service (Wireless Broadband Access Service). Previous years' results[1] for Wireless Broadband Access Service shows that the service providers to achieve above the required existing standards on throughput, latency and packet loss.

16. There is an increasing demand for data usage from the consumers. In order to cater for the demand, continuous planning and investments are made by service providers to

[1] The Network Performance Report 2018 & 2019 - MCMC

upgrade and improve their network. Hence, the review the QoS standards is timely and critical to reflect current network capabilities and ensure good QoS experienced by consumers.

17. Currently, MSQoS on Wireless Broadband Access Service covers both 3G and LTE (4G) services. Theoretically, the performance of LTE network is better than 3G. Therefore, service providers are encouraged to increase network performance through the deployment of LTE network. The Carrier Aggregation and MIMO capabilities would be an added benefit in improving the performance. However, we do note that these capabilities are dependent on user devices or smartphones.

18. Since the Fixed Wireless Access (FWA) services are sharing the same network as wireless broadband network, this standard shall also be applicable to FWA services. Both services are sharing the same network resources.

19. It is to note that measurement of network latency, data throughput and data packet loss which are conducted nationwide, will be measured to a test server hosted locally at a common server exchange which is located in MyIX, Kuala Lumpur or in Klang Valley area.

20. In the near future, 5G network will be deployed. Standards for 5G will be different in terms of QoS network performance parameters. As it stands, 5G is still in the initial stage.

Table 3: Proposed Revision of the Quality of Service Standards

	Quality of Service Indicator	**Description / Definition / Formula / Measurement**	**Current Quality of Service Standard**	**Revise Quality of Service Standard**
i.	Network latency (ping time)	This indicator measures the round-trip time taken by a standard packet size between 32 bytes to 128 bytes to travel across the network from the end user to test server and back to the end user. Formula: $\left(\frac{Number\ of\ test\ samples\ with\ latency \leq standard}{Total\ number\ of\ test\ samples} \right) x\ 100\ \%$	Network latency must be not more than **250ms**, 70% of the time based on test sample.	Network latency must be not more than **150ms**, **90%** of the time based on test sample.

ii.	Broadband speed (Throughput)	This indicator measures the speed of downloading data measured in units of megabits per second (Mbps) between the end user and test server. Formula: $\left(\frac{\substack{Test \\ samples\ with \\ throughput\ \geq standard}}{\substack{Total \\ test\ samples}} \right) x\ 100\ \%$	Throughput must be: (a) not less than 650Kbps, 80% of time for TDD and 65% of the time for FDD effective from 1 February 2016; and (b) not less than 1Mbps, 80% of the time for both TDD and FDD effective from 1 January 2018.	Throughput of wireless broadband service for both TDD and FDD technology shall be not less than **2.5Mbps**, **90.0%** of the time based on test sample. Throughput of FWA service shall not be less than **25Mbps**, **90%** of the time base on sample.
iii.	Packet loss	This indicator measures the percentage of data packets transmitted from the source that fails to arrive at their destinations. It is calculated based on the average of sample measurements between the end user and test server. Formula: $\left(\frac{\substack{Total\ number\ of \\ packet\ loss}}{\substack{Total\ number\ of \\ packet\ sent}} \right) x\ 100\ \%$	Packet loss must be not more than **3.00%**, calculated based on the average of the test sample.	Packet loss must be not more than **0.5%**, calculated based on the test sample.
iv.	Base station (eNodeB) Utilization	This indicator measures the percentage of PRB utilization in LTE network (per base station/eNodeB). It is calculated based on the aggregated utilization for each LTE eNodeB.	N/A	Average aggregated % of PRB utilization (per base station (eNodeB)) for the duration of 3 months shall not be more than **80% and** shall be rectified within 7 days.

v.	Backhaul utilization	This indicator measures the percentage of microwave and fiber backhaul utilization per site. It is calculated based on the aggregated backhaul utilization for each site.	N/A	Average aggregated % of backhaul utilization of any base station shall not be more than **80%** and shall be rectified within 7 days.

QUESTION 2: THE COMMISSION SEEK VIEWS ON THE PROPOSED CHANGES TO NETWORK LATENCY (PING TIME) STANDARD FOR THE MANDATORY STANDARD FOR QUALITY OF SERVICE (WIRELESS BROADBAND ACCESS SERVICE).

QUESTION 3: THE COMMISSION SEEK VIEWS ON THE PROPOSED CHANGES TO BROADBAND SPEED (THROUGHPUT) STANDARD FOR THE MANDATORY STANDARD FOR QUALITY OF SERVICE (WIRELESS BROADBAND ACCESS SERVICE).

QUESTION 4: THE COMMISSION SEEK VIEWS ON THE PROPOSED CHANGES TO PACKET LOSS STANDARD FOR THE MANDATORY STANDARD FOR QUALITY OF SERVICE (WIRELESS BROADBAND ACCESS SERVICE).

QUESTION 5: THE COMMISSION SEEK VIEWS ON THE PROPOSED NEW STANDARD ON ENODEB UTILIZATION FOR THE MANDATORY STANDARD FOR QUALITY OF SERVICE (WIRELESS BROADBAND ACCESS SERVICE).

QUESTION 6: THE COMMISSION SEEK VIEWS ON THE PROPOSED NEW STANDARD ON BACKHAUL UTILIZATION FOR THE MANDATORY STANDARD FOR QUALITY OF SERVICE (WIRELESS BROADBAND ACCESS SERVICE).

QUESTION 7: THE COMMISSION SEEK VIEWS ON THE PROPOSED NEW STANDARD FIXED WIRELESS ACCESS FOR THE MANDATORY STANDARD FOR QUALITY OF SERVICE (WIRELESS BROADBAND ACCESS SERVICE).

PART C: APPLICABLE GUIDELINES

21. The Commission has developed a set of guidelines that sets out the testing procedures, examples of computations, reporting templates and explanatory notes to the standards proposed in this document. The said guideline is annexed in **Appendix** – Guidelines to the Commission Determination on the Mandatory Standards for Quality of Service (Wireless Broadband Access Service).

QUESTION 8:	**THE COMMISSION SEEK VIEWS ON THE PROPOSED MEASUREMENT METHODOLOGY AS STATED IN THE GUIDELINE OF THE COMMISSION DETERMINATION ON MANDATORY STANDARD FOR QUALITY OF SERVICE (WIRELESS BROADBAND ACCESS SERVICE).**

QUESTION 9:	**THE COMMISSION SEEK VIEWS ON THE PROPOSAL TO ENFORCE THE MANDATORY STANDARD FOR QUALITY OF SERVICE (WIRELESS BROADBAND ACCESS SERVICE) ON EACH OF THE LOCATION MEASURED AS STATED IN THE GUIDELINE OF THE COMMISSION DETERMINATION.**

QUESTION 10:	**THE COMMISSION SEEK VIEWS ON ANY OF THE GENERAL CHANGES PROPOSED TO THE GUIDELINE OF THE COMMISSION DETERMINATION ON MANDATORY STANDARD FOR QUALITY OF SERVICE (WIRELESS BROADBAND ACCESS SERVICE).**

APPENDIX

Suruhanjaya Komunikasi dan Multimedia Malaysia

Malaysian Communications and Multimedia Commission

GUIDELINES TO THE COMMISSION DETERMINATION ON THE MANDATORY STANDARDS FOR QUALITY OF SERVICE (WIRELESS BROADBAND ACCESS SERVICE), DETERMINATION '*X*' OF YYYY

(SKMM(T)06-SEIR/140.003/Jil. 1 ('x'))

DD MM YYYY

TABLE OF CONTENTS

GLOSSARY

CIMS	Communication Infrastructure Management System
ETSI	European Telecommunications Standards Institute
eNodeB	Radio base station or network node for LTE
FTP	File Transfer Protocol
FWA	Fixed Wireless Access
GPS	Global Positioning System
ISP	Internet Service Provider
Klang Valley	Area centered in Federal Territories of Kuala Lumpur and surrounding cities in Selangor districts
LTE	Long Term Evolution
PRB	Physical Resource Block
QoS	Quality of Service
RSCP	Received Signal Code Power
RSRP	Reference Signal Receive Power
UE	User Equipment
WGS	World Geodetic System

PART A: OBJECTIVE AND SCOPE

1. These guidelines are developed by the Malaysian Communications and Multimedia Commission (the "Commission") pursuant to Paragraph 'x' of the Commission Determination on the Mandatory Standards for Quality of Service (Wireless Broadband Access Service), Determination *'X'* of **YYYY** ("Mandatory Standards").

2. These guidelines set out the testing procedures, including test parameter and methodology, reporting templates and explanatory notes for the purpose of network QoS assessment.

3. These guidelines are applicable to terrestrial wireless broadband access service including Fixed Wireless Access Service.

PART B: NETWORK PERFORMANCE QUALITY OF SERVICE

Measurement Methodology

4. Network latency or ping time measures the round-trip time taken by a standard packet size of 32 to 128 bytes to travel across the network from the end user to the dedicated test server located in Klang Valley and back to the end user.

5. Broadband download speed or download throughput measures the speed of downloading data measured in units of megabits per second (Mbps) from dedicated test server located in Klang Valley to the end user.

6. Packet loss measures the percentage of data packets transmitted from the source that fails to arrive at their destinations. It is calculated based on the average of sample measurements between the end user and the dedicated test server located in Klang Valley.

7. The test shall be by way of a drive test, walk test or static test. The Commission shall, at its sole discretion, decide on which test should be conducted.

8. These tests will be carried out by the Wireless Broadband Service Providers or Service Provider's appointed consultant. The measurement report shall be provided to the Commission in accordance with these guidelines.

9. The Commission at its sole discretion may also perform tests on service provider where necessary.

10. All tests must be performed during workdays unless allowed by the Commission.

Location Identification

11. Service Provider or the Commission may list out the location prior to the assessment exercise. Locations of measurement shall not be the same unless requested by the Commission for retest or for verification of network improvements.

12. The tests are to be carried out locations that have been ascertained to have wireless broadband service coverage.

13. The service coverage will be identified in the following manner:

    a. Through the service coverage information as advertised in the wireless broadband Service Providers' websites; or

    b. Through the network indicator display on UE; or

    c. Where complaints from consumers on individual services by a particular service provider (within service provider's advertised coverage area) are lodged to the Commission.

Testing Equipment

14. UE supporting frequency bands in Malaysia are to be installed with QoS monitoring software for broadband based systems measurement and testing.

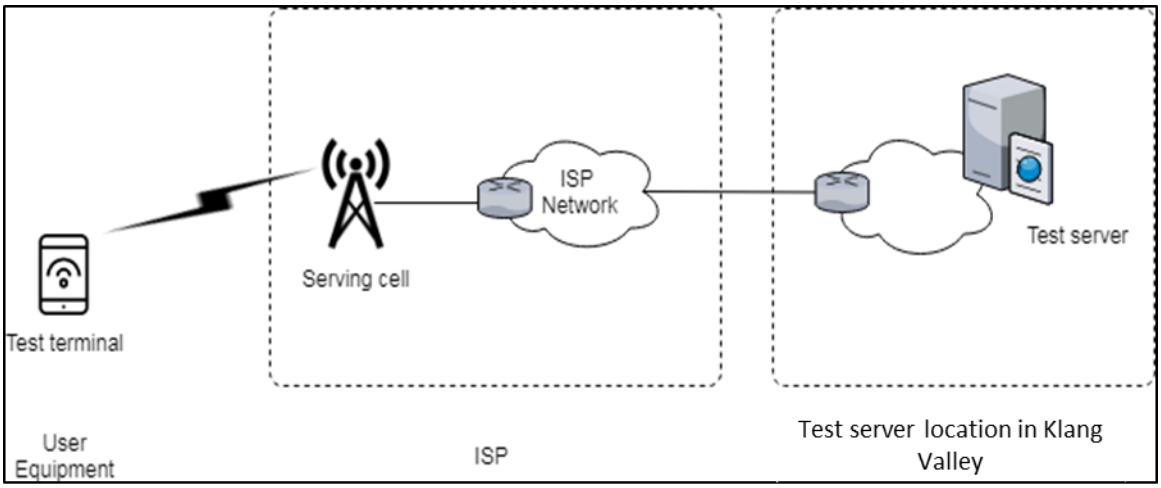
15. The software/measurement tools used for the tests shall comply with the relevant recommendations from European Telecommunications Standards Institute (ETSI)'s standards or equivalent.

16. The measurement logs produced by the tools must be compatible with the Commission's requirement for the purpose of the Commission's verification and analysis procedure.

Wireless Broadband Testing Procedures

17. The test set up configuration is as shown below:

Diagram 1: Test set up configuration



18. A test server or a responder will be configured and shall be located within Klang Valley to act as the target server.

19. Packet size of 32/64/128 bytes will be used for network latency or ping time measurement. The selection of test packet size is subject to the Commission's discretion.

20. The throughput test to be conducted via file transfer protocol (FTP) with download file size of 50/100/200 MB. The selection of download file size is subject to the Commission's discretion.

21. For benchmarking purposes, all relevant Service Providers shall carry out the test at the identified locations at the same time.

22. Geographical positioning will be based on the Global Positioning System (GPS) and the WGS-84 digital map or its equivalent.

23. The tests shall be carried out with minimum number of 50 test locations each month with a minimum of 3 locations in every states in Malaysia. Each test location shall have at least 5 samples of throughput attempt and 100 samples of ping attempt.

24. Serving site network configurations and frequency bands for each test location shall be recorded as required in the reporting template presented within this guideline.

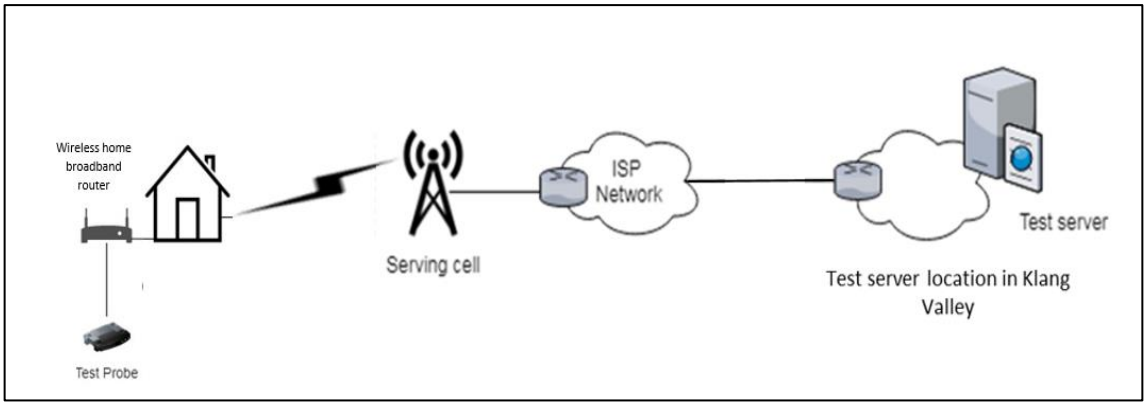
25. All test log files shall be kept accordingly and must be presented to the Commission as and when required.

26. The Commission, at its discretion, may conduct sampling audits for the identified locations that have been tested.

Fixed Wireless Access Testing Procedures

27. The test set up configuration is as shown below:

Diagram 2: Test set up configuration



28. A test probe will be attached at customer premise equipment (CPE) via LAN cable prior to generate traffic and simulate end-user experience while a test server or responder will be configured and shall be located within Klang Valley to act as the target server.

29. Packet size of 32/64/128 bytes will be used for network latency or ping time measurement. The selection of test packet size is subject to the Commission's discretion.

30. The throughput test to be conducted via file transfer protocol (FTP) with download file size of 50/100/200 MB. The selection of download file size is subject to the Commission's discretion.

31. Geographical positioning will be based on the Global Positioning System (GPS) and the WGS-84 digital map or its equivalent.

32. Serving site network configurations and frequency bands for each test location shall be recorded as required in the reporting template presented within this guideline.

33. The selection of test location is subject to the Commission's discretion.

34. The Commission, at its discretion, may conduct sampling audits for the identified locations that have been tested.

Service Prioritization & Misrepresentation

35. A validation procedure shall be applied to avoid any service/application prioritization in order to ensure the test is conducted in a fair manner representing real user experience. These prioritizations include but not limited to the following:

    a. SIM based prioritization.
    b. Service based prioritization such as, application name, port number, IP address, type of service, etc.

36. Any service provider found to perform alteration to the network configuration or manipulation during test measurement such as service prioritization, which did not represent real user experience will be penalized with the following, but not limited to:

    a. All results found to be manipulated during the said test will be zeroed.
    b. The zeroed results will be included into the calculation for compliance.

37. The report of the test shall not be misrepresented. Any intentional misrepresentation or false reporting of measurement and report shall be considered as non-compliance to the Mandatory Standards.

Network Utilization

38. Service providers shall provide to the Commission the statistics obtained from the service providers' actual network monitoring on the following parameters:

    a. Percentage of PRB utilization for each eNodeB.
    b. Percentage of Backhaul utilization for each eNodeB.

PART C: REQUIREMENT FOR REPORT SUBMISSION

39. All reports (including notices and notifications) that are required to be sent to the Commission should be sent to Quality of Service Department's address and/or email as follows:

Quality of Service Department
Malaysian Communications and Multimedia Commission
MCMC Tower 1, Jalan Impact, Cyber 6,
63000 Cyberjaya
Selangor Darul Ehsan
Email: qos.dept@mcmc.gov.my

40. These reports shall be in the form and format as described below. Each report shall be accompanied by a declaration signed by an officer of the Service Provider duly authorised by the board of directors, stating that each report is true and accurate.

41. The Service Provider shall submit the reports based on the following timelines:

Table 1: Reporting Timeline

No	Item	Reporting Period	Report Submission Date
1	Monthly Measurement Report for Wireless Broadband Access Service	Each Month	By 15th of the following month

No	Item	Reporting Period	Report Submission Date
1	Quarterly Report on Network Utilization	Quarterly	By 15th of the following month of each quarter

42. The report submitted shall include all relevant information regarding the test conducted including but not limited to:
    a. Time and date for each test conducted for each location.
    b. Information on the test tools used for the test.

43. The Service Provider shall submit network QoS measurement assessment report and network utilization based on the format as described in **Attachment 1** of this document.

44. The Service Provider shall submit Network Utilization reports based on the format as described in **Attachment 2** of this document.

Subjected Areas for Mandatory Standards

45. The Mandatory Standards for wireless broadband access service shall be enforced in all states and federal territories in Malaysia.

46. The Mandatory Standards for wireless broadband access service shall be enforced per location measured.

PART D: EFFECTIVE DATE AND COMMISSION CONTACT

47. These guidelines shall come into effect on **DD MM YYYY**, and shall continue to be effective unless modified, varied or revoked by the Commission.

48. These guidelines shall replace the Guidelines to The Commission Determination on the Mandatory Standards for Quality of Service (Wireless Broadband Access Service) - Determination No. 1 of 2016.

49. For any queries and further information on these Guidelines please contact:

Quality of Service Department
Malaysian Communications and Multimedia Commission
MCMC Tower 1, Jalan Impact, Cyber 6,
63000 Cyberjaya
Selangor Darul Ehsan
Phone : 03-8688 8000
Email : qos.dept@mcmc.gov.my

Attachment 1

No.	Location Name	Coordinate (Latitude, Longitude)	State	[1] Serving Site ID	[2] Serving Site Technology and frequency bands	[3] PRB utilization (%)	[4] Backhaul Type	Backhaul capacity (Mbps)	[5] Backhaul Utilization (%)	Avg. Signal Strength (i.e RSRP, RSCP in dBm)	Avg. DL Speed (Mbps)	[6] (%) of DL Speed ≥ 2.5 Mbps	Avg. Packet Round-Trip Time (ms)	[7] (%) of Ping RTT ≤ 150 ms	[8] Packet Loss (%)
1															
2															
.															
.															
n															

Table 2: Format for Wireless Broadband Access Service Measurement Report

[1] Site identification name should be the same as uploaded in CIMS
[2] Frequency band configuration for each base station (LTE900, LTE1800, LTE2100, WCDMA2100, etc.)
[3] Average eNodeB utilization during test day
[4] Microwave, Fiber, VSAT, etc
[5] Average backhaul utilization during test day
[6] Based on application throughput downlink average
[7] Based on successful ping transmitted and received
[8] Based on ping transmitted but was not received at sender

Attachment 2

No	Serving Site ID	Coordinate (Longitude & Latitude)	State	Backhaul Type (Microwave /Fiber)	[1] Backhaul Capacity (Mbps)	[2]Backhaul Utilization (%)	[3] LTE Frequency Configuration	[4] LTE PRB Utilization (%)	Compliance (Yes/No)
1									
2									
.									
.									
n									

Table 3: Format for Network Utilization Reports

[1] Total backhaul capacity in Mbps for each base station
[2] Percentage of utilization based on average of daily backhaul utilization per quarter for each base station
[3] Frequency band configuration for each base station (LTE900, LTE1800, LTE2100, etc.)
[4] Percentage of utilization based on average daily PRB utilization per quarter for each base station (eNodeB)