



Suruhanjaya Komunikasi dan Multimedia Malaysia
Malaysian Communications and Multimedia Commission

PROPOSAL FOR THE REVIEW OF THE MANDATORY STANDARDS FOR QUALITY OF SERVICE (WIRED BROADBAND ACCESS SERVICE) (DETERMINATION NO. 2 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 | 3 |
| GLOSSARY | 4 |
| PREAMBLE | 5 |
| PUBLIC INQUIRY PROCESS | 6 |
| REVISION OF THE MANDATORY STANDARDS ON QUALITY OF SERVICE | 7 |
| PART A: THE INTERPRETATION PART OF THE STANDARDS | 7 |
| PART B: PROPOSED REVISION ON THE QUALITY OF SERVICE INDICATORS, MEASUREMENTS, STANDARDS, NOTIFICATION AND REPORTS | 9 |
| PART C: APPLICABLE GUIDELINES | 13 |
| APPENDIX | 14 |

PREFACE

The Commission is hereby holding a Public Inquiry on the proposal for the new Mandatory Standards for Quality of Services (Wired Broadband Access Service Network Performance) 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 hardcopy 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@cmc.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 Wired Broadband Service (Determination No.2 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 wired 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 wired systems. The MSQoS standards are segregated into two parts; network performance and customer service.
2. The review of the MSQoS for Wired 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. The review of this MSQoS will solely focus on QoS standards relating to network performance. Therefore, pursuant to section 104 and 106 of the CMA1998, the Commission hereby undertakes a review of Determination No.2 of 2016.
4. The proposed revision for network performance will be retained into this revised MSQoS (Wired Broadband Access Service). The proposed revision also seeks to strengthen existing standards in relation to wired broadband service in Malaysia.

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 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: THE INTERPRETATION PART OF THE STANDARDS

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

Table 1: Proposed revision on interpretation part of the standards

| Existing Interpretation | Revised Interpretation | Remarks |
|--|---|---|
| “wired broadband access service” means a wired connectivity of communication bandwidth service has a minimum downstream capacity of 650 kbps, with a minimum subscribed package of 1 Mbps. | “wired broadband access service” means a wired connectivity of communication bandwidth service that is faster than primary rate interface of Integrated Service Digital Network (ISDN) of 2.0 Mbps. | Recommendation ITU-T I.113 <ul style="list-style-type: none">• 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 interpretations shall be used in this Mandatory Standards for Quality of Service (Wired Broadband Access Service):

“ASP” means Applications Service Provider;

“ATM” means Asynchronous Transfer Mode;

“CPE” means customer premises equipment including router and mesh WiFi;

“customer” means a person who, for consideration, acquires or subscribes to the wired broadband service;

“Digital Subscriber Line (DSL)” means a technology for bringing high bandwidth information over copper telephone lines;

“DSLAM” means Digital Subscriber Line Access Multiplexer;

“end user” means a person who receives, requires, acquires, uses or subscribes to the wired broadband service and may include a customer;

“fibre” means optical fibre cable used for broadband which is connected directly to customer premises equipment;

“guidelines” means guidelines issued by the Commission pursuant to this Determination;

“Metro-E” means Metro Ethernet;

“MSAN” means Multi-service Access Node;

“MyIX” means the Malaysia Internet Exchange;

“NSP” means Network Service Provider;

“OLT” means Optical Line Terminal;

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

“wired broadband access service” means a wired connectivity of communication bandwidth service that is faster than primary rate interface of Integrated Service 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 (WIRED BROADBAND ACCESS SERVICE).

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

- 11. The review of the MSQoS for Wired Broadband Access Service will contain the revised and existing standards focusing on network service performance only.
- 12. Nine (9) QoS indicators from from MSQoS for Wired Broadband Access Service will be moved under the new MSQoS for Customer Service. The 9 indicators are shown in Table 2 below:

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

| Quality of Service Indicator | |
|------------------------------|---|
| i. | Network Service Availability |
| ii. | Advance notice of scheduled downtime |
| iii. | Service Disruption |
| iv. | Service activation fulfilment |
| v. | Service restoration fulfilment |
| vi. | Percentage of billing related complaints |
| vii. | Non-billing related complaints per 1000 customers |
| viii. | Promptness in resolving customer complaints |
| ix. | Promptness in answering call 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 efficiently and keeping up to date with the evolution of technology in telecommunication industry.
- 15. Low latency is ideal for end users to enable seamless communication in particular to achieve minimal delays in video calls, virtual meetings, virtual reality applications and video gaming.

- 16. Network latency will test the responsiveness of the network from the end user to the destination server hosted locally in MyIX, Kuala Lumpur or in Klang Valley area. Based on publication¹ by Federal Communication Commission (FCC) in the US, the DSL services latency varies from 25 ms to 80 ms. Better latency performance is observed for fibre network between 12 ms to 20 ms. However, the performance is based on the nearest 3rd party server.
- 17. In order to achieve better network latency, the average round-trip time will be revised accordingly, taking into account the distance between East Malaysia and the destination server in Klang Valley.
- 18. In terms of broadband speed, there will be no change in standards for DSL due to the limitation of DSL technology itself. The Commission together with Service Providers are in the process of migrating the DSL network to fibre. Hence, revision of standards will be made for fibre technology. Higher standards will be imposed to ensure higher performance is achieved consistently for the experience of end users as the technology is able to provide better consistency of high throughput based on past network performance report².
- 19. Revised standards for network performance indicators are outlined in Table 3 below:

Table 3: Proposed Revision of the Quality of Service Standards

| | Quality of Service Indicator | Description / Definition / Formula / Measurement | Present 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 MyIX and back to the end user. Formula: $\left(\frac{\text{Number of test samples with latency} \leq \text{standard}}{\text{Total number of test samples}} \right) \times 100 \%$ | Network Latency must be not more than 85ms, 95.0% of the time based on test sample. | Network latency shall not be more than: (a) 50 ms for fibre for 95% of the time; or (b) 85ms for DSL for 95% of the time Both based on test sample. |

¹ FCC Report for 2018 - Measuring Fixed Broadband - Eighth Report

² Network Performance Report 2018 & 2019 - MCMC

| | | | | |
|------|---------------------------------|---|---|---|
| ii. | Broadband speed (Throughput) | <p>This indicator measures the speed of uploading and downloading data measured in units of megabits per second (Mbps) between the end user and MyIX. This is to be measured and reported separately for uploading and downloading.</p> <p>Formula:</p> $\left(\frac{\text{Number of test samples with throughput} \geq \text{standard}}{\text{Total number of test samples}} \right) \times 100 \%$ | <p>Throughput must be not less than</p> <p>a) 70.0% of the subscribed level of broadband speed, for 90.0% of the time effective from 1 February 2016 for DSL; and</p> <p>b) 90.0% of the subscribed level for 90.0% of the time effective from 1 February 2016 for fibre.</p> | <p>Throughput must be not less than</p> <p>c) 70.0% of the subscribed level of broadband speed, for 90.0% of the time for DSL; and</p> <p>d) 90.0% of the subscribed level for 90.0% of the time for fibre.</p> |
| iii. | Packet Loss | <p>This indicator measures the percentage of data packets transmitted from the source that fails to arrive at their destinations. It is computed based on the average of sample measurements between the end user and MyIX.</p> <p>Formula:</p> $\left(\frac{\text{Total Number of Packet Loss}}{\text{Total number of Sent Packet}} \right) \times 100 \%$ | <p>Packet Loss must be not more than 1.00%, computed based on the average of the test sample.</p> | <p>Packet loss shall not be more than 0.5% for fiber and not more than 1.0% for DSL computed based on average of the test sample.</p> |
| iv. | Access Network Utilization | <p>This indicator measures the total traffic between access node (not limited to DSLAM, MSAN, OLT, etc.) to aggregation node, e.g. Metro-Ethernet.</p> | <p>Access network (not limited to DSLAM, MSAN, OLT, Metro-E, etc.) uplink traffic utilization must be not more than 70.0% of the uplink bandwidth provided in every calendar month.</p> | <p>Aggregated average access network utilization traffic for the duration of 3 months shall not be more than 70% of the bandwidth capacity and shall be rectified within 7 days.</p> |

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

QUESTION 3: THE COMMISSION SEEK VIEWS ON THE PROPOSAL TO MAINTAIN THE EXISTING STANDARD FOR BROADBAND SPEED (THROUGHPUT) FOR THE MANDATORY STANDARD FOR QUALITY OF SERVICE (WIRED BROADBAND ACCESS SERVICE).

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

QUESTION 5: THE COMMISSION SEEK VIEWS ON THE PROPOSED CHANGES TO ACCESS NETWORK UTILIZATION STANDARD FOR THE MANDATORY STANDARD FOR QUALITY OF SERVICE (WIRED BROADBAND ACCESS SERVICE).

PART C: APPLICABLE GUIDELINES

20. The Commission has developed a set of guidelines that sets out the testing procedures, examples of computations, reporting templates, explanatory notes and list of designated areas 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 (Wired Broadband Access Service).

QUESTION 6: THE COMMISSION SEEK VIEWS ON THE PROPOSED CHANGES TO THE GUIDELINE OF THE COMMISSION DETERMINATION ON MANDATORY STANDARD FOR QUALITY OF SERVICE (WIRED BROADBAND ACCESS SERVICE).

QUESTION 7: THE COMMISSION SEEK VIEWS ON THE PROPOSAL TO ENFORCE THE MANDATORY STANDARD FOR QUALITY OF SERVICE (WIRED BROADBAND ACCESS SERVICE) ON EACH OF THE LOCATIONS MEASURED AS STATED IN THE GUIDELINE OF THE COMMISSION DETERMINATION.

QUESTION 8: 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 (WIRED 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 (WIRED BROADBAND ACCESS SERVICE),
DETERMINATION 'X' OF YYYY**

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

DD MM YYYY

TABLE OF CONTENTS

| | |
|---|----------|
| GLOSSARY | 3 |
| PART A: OBJECTIVE AND SCOPE | 4 |
| PART B: NETWORK PERFORMANCE QUALITY OF SERVICE | 4 |
| ○ Measurement Methodology | 4 |
| ○ Location identification | 5 |
| ○ Testing Equipment | 5 |
| ○ Testing Procedures | 6 |
| ○ Service prioritization and misrepresentation | 7 |
| ○ Network Utilization | 7 |
| PART C: REQUIREMENT FOR REPORT SUBMISSION | 7 |
| ○ Subjected Areas for Mandatory Standards | 8 |
| PART D: EFFECTIVE DATE AND COMMISSION CONTACT | 9 |

GLOSSARY

| | |
|--------------|---|
| CIMS | Communication Infrastructure Management System |
| FTP | File Transfer Protocol |
| GPS | Global Positioning System |
| ICMP | Internet Control Message Protocol |
| ISP | Internet Service Provider |
| Klang Valley | Area centered in Federal Territories of Kuala Lumpur and surrounding cities in Selangor districts |
| MEF | Metro Ethernet Forum |
| MyIX | Malaysian Internet Exchange |
| QoS | Quality of Service |
| RF | Radio Frequency |
| TCP | Transport Control Protocol |
| UE | User Equipment |
| UDP | User Datagram Protocol |
| 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 (Wired Broadband Access Service Network Performance), Determination 'X' of **YYYY** ("Mandatory Standards").
2. These guidelines set out the testing procedures, examples of computations, reporting templates, explanatory notes and list of designated areas to the standards in the Mandatory Standards.

PART B: NETWORK PERFORMANCE QUALITY OF SERVICE

Measurement Methodology

3. 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 dedicated test server located in Klang Valley and back to the end user.
4. Broadband speed or throughput measures the speed of uploading or downloading data measured in units of megabits per second (Mbps) between the end user and dedicated test server located in Klang Valley.
5. Packet loss measures the percentage of data packets transmitted from the source that fails to arrive at their destinations. It is computed based on the average of sample measurements between the end user and dedicated test server located in Klang Valley.
6. These tests will be carried out by the Wired Broadband Service Providers or Service Provider's appointed consultant. The measurement report shall be provided to the Commission in accordance with these guidelines.
7. The Commission at its discretion, may perform test on any selected Service Provider deemed necessary.
8. All tests must be performed during workdays unless allowed by the Commission.

Location Identification

9. 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.
10. The tests are to be carried out in locations identified to have wired broadband service coverage.
11. The service coverage will be identified in the following manner:
 - a. Confirmation from the wired broadband service providers; or
 - b. Through the service location information as advertised in the wired broadband service providers' websites; or
 - c. Where complaints from consumers on a particular service provider are lodged to the MCMC.

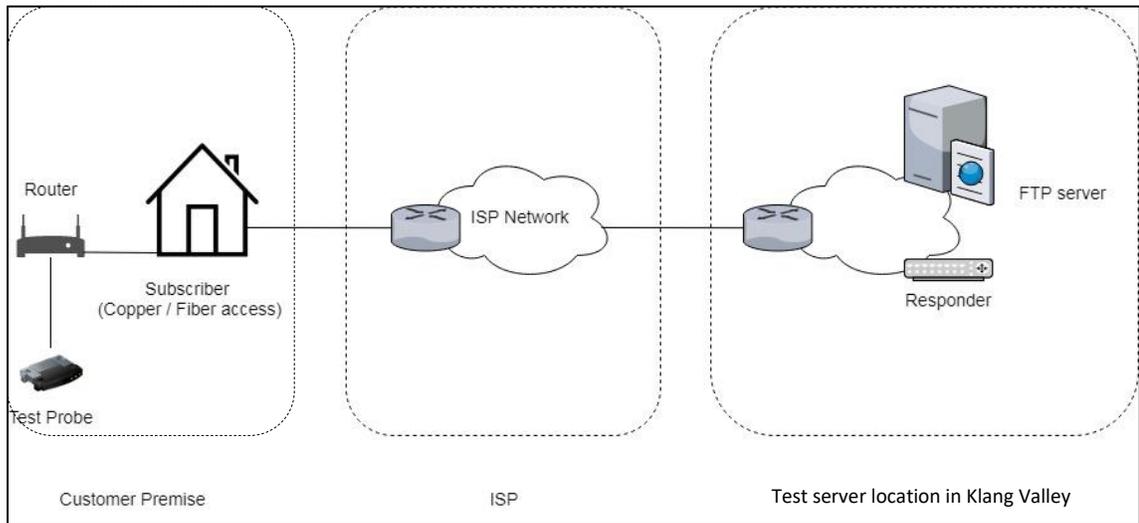
Testing Equipment

12. The software/measurement tools used for the tests shall comply with the relevant recommendations from Metro Ethernet Forum (MEF) or equivalent.
13. 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.

Testing Procedures

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

Diagram 1: Test set up configuration



15. 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.
16. 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.
17. The throughput test to be conducted via file transfer protocol (FTP) with download depending on the internet package subscribed by the user. The selection of download file size is subject to the Commission's discretion.
18. Geographical positioning will be based on the Global Positioning System (GPS) and the WGS-84 digital map or its equivalent.
19. At least 14 locations each month with a minimum of 1 location in every states in Malaysia will be selected based on availability of service. A minimum of 100 samples per location is required. The selection of test location is subject to the Commission's discretion.

Service Prioritization and Misrepresentation

20. 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 service based prioritization such as, application name, port number, IP address, type of service, etc.
21. 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.
22. 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.

Access Network Utilization

23. Service providers shall provide to the commission the statistics obtained from the service providers' actual network monitoring on the following parameters:
 - a. Percentage of access network utilization.

PART C: REQUIREMENT FOR REPORT SUBMISSION

24. 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

25. 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.
26. The Service Provider shall submit the report based on the following timelines:

Table 1: Reporting Timeline

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

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

27. The report submitted shall include all relevant information in regards to 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.
28. The Service Provider shall submit network QoS assessment report based on the format as described in **Attachment 1**.
29. The Service Provider shall submit network utilization report based on the format as described in **Attachment 2**.

Subjected Areas for Mandatory Standards

30. The Mandatory Standards for wireless broadband access service shall be enforceable to all or any states in Malaysia.
31. The Mandatory Standards for wired broadband access service shall be enforced per premises measured.

PART D: EFFECTIVE DATE AND COMMISSION CONTACT

32. These guidelines shall come into effect on **DD MM YYYY**, and shall continue to be effective unless modified, varied or revoked by the Commission.
33. These guidelines shall replace the Guidelines to The Commission Determination on the Mandatory Standards for Quality of Service (Wired Broadband Access Service) - Determination No. 2 of 2016.
34. 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 | Longitude /latitude | Customer's Subscribed Package (UL/DL) | ^[1] Access Network Type | State | ^[2] Access Node Name | ^[3] Access Network Utilization % | Avg. UL & DL Throughput (Mbps) | ^[4] (%) of UL Speed $\geq 90\%$ subscribed speed fibre or $\geq 70\%$ subscribed speed for DSL | ^[4] (%) of DL Speed $\geq 90\%$ subscribed speed for Fibre or $\geq 70\%$ subscribed speed for DSL | Avg. Packet Round-Trip Time (ms) | ^[5] (%) of Ping RTT ≤ 50 ms for Fibre or ≤ 85 ms for DSL | ^[6] (%) of Packet Loss (%) | ^[7] CPE brand and model | |
|----|---------------|---------------------|---------------------------------------|------------------------------------|-------|---------------------------------|---|--------------------------------|---|---|----------------------------------|---|---------------------------------------|------------------------------------|--|
| 1 | | | | | | | | | | | | | | | |
| 2 | | | | | | | | | | | | | | | |
| . | | | | | | | | | | | | | | | |
| . | | | | | | | | | | | | | | | |
| n | | | | | | | | | | | | | | | |

Table 2: Format for Wired Broadband Access Service Measurement Reports

- [1] Access network type can be either Fibre or Digital subscriber line (DSL)
- [2] Access Node name should be the same as uploaded in CIMS
- [3] Average Access network utilization during test day
- [4] Based on application throughput average per file transfer for FTP session depending on type of access network
- [5] Based on successful ping transmitted and received
- [6] Based on ping transmitted but was not received at sender
- [7] CPE will include both router and mesh WiFi

Attachment 2

| No | Access Node name | Coordinate (Longitude & Latitude) | State | [1] Access Node Type | [1] Access Node Utilization (%) ≤ 70% | Compliance (Yes/No) |
|----|------------------|-----------------------------------|-------|----------------------|---------------------------------------|---------------------|
| 1 | | | | | | |
| 2 | | | | | | |
| . | | | | | | |
| . | | | | | | |
| n | | | | | | |

Table 3: Format for Access Network Utilization Reports

[1] Access node not limited to i.e. Digital Subscriber Line Access Multiplexer (DSLAM), Multi-Service Access Node (MSAN), Optical Line Terminal (OLT), Metro-E, etc.