TELECOMMUNICATIONS QUALITY OF SERVICE RULE 2022

National Information and Communications Technology Act 2009

The NATIONAL INFORMATION AND COMMUNICATIONS TECHNOLOGY AUTHORITY makes this Rule under section 218 of the *National Information and Communications Technology Act 2009*.

Dated [date] [month] 2022

Noel Mobiha

Chairman

Kila Gulo Vui

Chief Executive Officer

National Information and Communications Technology Authority

PART I – PRELIMINARY

1 Name of Rules

This Rule is the *Telecommunications Quality of Services Rule 2022*.

2 Scope and Applicability

This Rule shall apply to fixed and mobile communication service providers referred to as Applications Licensee in this instrument.

3 Commencement

This Rule commences on the date on which it is notified in the National Gazette.

4 Definitions

(1) Subject to subsection (2), unless the context otherwise requires, terms used in these Rules have the same meaning as in the Act.

(2) In these Rules:

(a) ***"Act"*** means the *National Information and Communications Technology Act 2009*;

(b) ***"B-party"*** is a Retail Customer located in Papua New Guinea to whom a Call is made;

(c) ***"call"*** means a continuous communication;

(d) ***"cell"*** means a geographic area served by a base station;

(e) ***"fixed network"*** means a Network that is not a Mobile Network;

(f) ***"broadband internet access services"*** means an Applications Service whereby a person is able to access internet services and applications via a connection advertised or sold as having a minimum download speed of 1Mbps;

(g) ***"mobile network"*** means a Network that:

(i) comprises multiple base stations that transmit and receive Radiocommunications to and from Apparatus of a B-party located in a cell associated with each base station; and

(ii) detects the Apparatus within which the cell is located and causes the base station supporting that that cell to transmit and receive Calls to and from that Customer Equipment;

(iii) enables Calls to continue without interruption when such Apparatus moves between cells;

(h) ***"measurement period"*** means the six (6) month period from 1st January to 30th June, or 1st July to 31st December;

(i) ***"FTP"*** means File Transfer Protocol;

(j) ***"FWB"*** means Fixed Wireless Broadband;

(k) ***"PSTN"*** means Public Switched Telephone Network;

(l) ***"VoLTE"*** means Voice over LTE;

(m) ***"VoNR"*** means Voice over New Radio;

(n) ***"ETSI"*** means European Telecommunications Standards Institute;

(o) ***"3GPP"*** 3rd Generation Partnership Project;

(p) ***"MEF"*** Metro Ethernet Forum;

(q) ***"SMS"*** means Short Message Service;

(r) ***"MOS"*** means Mean Opinion Scores.

NOTE: The following terms are defined in the Act:

- apparatus;
- applications licensee;
- applications services;
- communication;
- customer equipment;
- network;
- NICTA;
- Radiocommunications;
- retail customer.

PART II – STANDARDS AND MEASUREMENT OF QUALITY OF SERVICE PARAMETERS

5 Mobile telephony services

(1) An Applications Licensee that supplies a voice Call Communications service using a Mobile Network shall:

(a) ensure to meet or exceed each of the Quality of Service parameters specified in Schedule 1 in relation to its supply of that voice Call Communications service during a Measurement Period;

(b) carry out the measurements required under sub-section (1) (a) in accordance with the methods and guidelines specified for such measurements in Schedule 1; and

(c) make available to the regulator and public, the mobile network coverage for voice call communications service.

6 Mobile broadband services

(1) An Applications Licensee that supplies a Broadband Internet Access Service using a Mobile Network shall:

(a) ensure to meet or exceed each of the Quality of Service parameters specified in Schedule 2 in relation to its supply of that Broadband Internet Access Service during a Measurement Period;

(b) carry out the measurements required under sub-section (1) (a) in accordance with the methods and guidelines specified for such measurements in Schedule 2; and

(c) make available to the regulator and public, the mobile network coverage for mobile broadband internet access communications service.

7 Fixed telephony services

(1) An Applications Licensee that supplies a voice Call Communications service using a Fixed Network shall:

(a) ensure to meet or exceed each of the Quality of Service parameters specified in Schedule 3 in relation to its supply of that voice Call Communications service during a Measurement Period; and

(b) carry out the measurements required under sub-section 1(a) in accordance with the methods and guidelines specified for such measurements in Schedule 3.

8 Fixed broadband services

(1) An Applications Licensee that supplies a Broadband Internet Access Service using a Fixed Network shall:

(a) Ensure to meet or exceed with each of the Quality of Service parameters specified in Schedule 4 in relation to its supply of that Broadband Internet Access Service during a Measurement Period;

(b) carry out the measurements required under sub-section (1)(a) in accordance with the methods and guidelines specified for such measurements in Schedule 4; and

(c) make available to the regulator and public the FWB network coverage for fixed broadband communications service.

9 User-related Quality of Service

(1) An Applications Licensee that supplies voice Call Communications and/or Broadband Internet Access Services using Fixed Network or Mobile Network shall:

(a) ensure to meet or exceed with each of the user-related Quality of Service parameters specified in Schedule 5 in relation to its supply services to consumers of that voice Call Communications and/or Broadband Internet Access services during a Measurement Period; and

(b) carry out the measurements required under sub-section (1) 5(1)(a) in accordance with the methods and guidelines specified for such measurements in Schedule 5.

PART III – REPORTING AND PUBLICATION

10 Quality of Service Report

(1) Applications Licensees shall provide NICTA with the results of its measurements within thirty (30) Days of the end of each Measurement Period.

(2) In the report, Applications Licensees must clearly indicate the locations where the measurements are taken and or provide separate measurement reports for Urban, Semi Urban and Rural areas.

(3) NICTA reserve the right to provide report templates and amend from time to time as required in order to ensure compatibility with the post-processing and publishing tools and formats as employed by NICTA for measurements of Quality of Service parameters for various ICT services. Sample of reporting template is shown in

Appendix A, B, C, D and E of this instrument. Details summary of each measurements including call events, measurement locations, etc. shall be attached separately in digital map or excel form.

(4) Applications Licensees shall provide NICTA with the measurement logfiles of the measurement report as and when required.

(5) Applications Licensees shall not conduct measurement at the same location within 2 calendar years except to reassess the network performance improvement.

11 Publication of Quality of Service Information

For each measurement period, applications licensees shall, no later than thirty (30) Days after the end of each reporting period publish on their website clear and up to date information of the Quality of Service measurements achieved during the previous measurement period.

PART IV - MONITORING AND ENFORCEMENT BY REGULATOR

12 Monitoring by NICTA.

(1) NICTA through its designated officers shall;

(a) conduct audit, surveys and tests to verity reports provided by the Application Licensees;

(b) conduct performance audits on Quality of Service of the Licensee from time to time, to ensure that users of ICT services receive such Quality of Service standards as laid down in this Rule and the License terms and conditions; and

(c) conduct investigation of the Quality of Service upon reports from the general public of poor quality of ICT services.

(2) Form of measurement shall be in accordance with the methods and guidelines specified in this Rule for measurements of Quality of Service parameters for various ICT services

13 Enforcement of Quality of Service Standards

(1) Enforcement action or penalties of Quality of Service standards are at the sole discretion of NICTA.

(2) Enforcement action may be taken based on submission of Quality of Service reports from Applications Licensees or based on NICTA's measurement audits.

(3) Enforcement action shall be considered for each of Measurement Period.

(4) NICTA may consider enforcement actions based on the responds, tangible improvement plan and timeline of execution by the Applications Licensees. Any relevant information or limitation (i.e. type of transport network (fibre/ microwave/ satellite), Universal Service areas, etc.) for the improvement of the non-compliance locations will be taken into account.

(5) In the case of network failure due to force majure or faults by 3rd party, the exclusion of measurement samples to be enforced shall be decided by NICTA. In this case, Applications Licensees is required to provide evident of the network failure events.

(6) Applications Licensees shall ensure that measurements and data collection is fair and true.

(7) Enforcement action shall be taken for any misrepresenting of data or any form of manipulation of measurement results including alteration to network configuration during measurement, alteration to access device, prioritization of SIMs or services, etc.

SCHEDULE 1: QOS PARAMETERS FOR MOBILE TELEPHONY SERVICES

QoS Parameter	Parameter Description	QoS requirements	Measurement method
Telephony service non-accessibility	Ratio of number of unsuccessful call attempt to the number of call attempted	Call Failure Rate must be not more than **2%** - Applicable for both intra-network and inter-network calls	Drive test or static test using test tools
Telephony cut-off call ratio	Ratio of number of unintentional call cut-off to the number of call successfully established	Call Dropped Rate must be not more than **2%** - Applicable for both intra-network and inter-network calls	Drive test or static test using test tools
SMS delivery time	Mean time for SMS delivery	SMS delivery must be completed within 90s for more than 95%	Network statistics reported by operator
Call speech quality (MOS)	Percentage of connections with good voice quality	Average MOS for voice calls must be more than 3, for not less than 95% of call samples	Drive test or static test using test tools

Guidelines to Schedule 1:

(1) Measurement shall be conducted by using phones installed with Quality of Service measurement system;

(2) Measurement system shall comply with the relevant ETSI/3GPP standards;

(3) Measurement shall be conducted in areas where mobile network coverage is ascertained, based on the coverage prediction map published by the Applications Licensees;

(4) Point of measurement shall be from any location within coverage areas to PSTN terminating number provided by the Applications Licensees;

(5) Measurement shall be performed on mobile originated calls;

(6) Measurement shall be conducted by way of drive test or static test;

(7) Geographical positioning shall be based on WGS-84 digital map or equivalent;

(8) The standards and measurements are applicable to 2G, 3G and VoLTE calls or any future voice call technology such as VoNR;

(9) Measurement call window shall be as follows:

Call setup time	: 20 seconds
Call holding time	: 120 seconds
Interval time	: 30 seconds
Total call window	: 170 seconds

(10) Measurement shall be conducted by Applications Licensees or representatives of the Applications Licensees;

(11) Measurement shall be performed at least 100 call samples for each region for each Measurement Period.

(12) MOS call quality shall be based on Recommendation ITU-T P.863 on the scale of 1 to 5.

SCHEDULE 2: QOS PARAMETERS FOR MOBILE BROADBAND SERVICES

QoS Parameter	Parameter Description	QoS requirements	Measurement method
FTP download mean data rate	Download data transfer rate measured throughout the entire connection time	From 2022 – 2023: FTP download throughput must be not less than **2.5Mbps** for at least **80%** of test samples From 2024 onwards: FTP download throughput must be not less than **2.5Mbps** for at least **90%** of test samples	Static test using test tools. Minimum 10 samples per location
FTP upload mean data rate	Upload data transfer rate measured throughout the entire connection time	From 2022 – 2023: FTP upload throughput must be not less than **0.5Mbps** for at least **80%** of test samples From 2024 onwards: FTP upload throughput must be not least than **0.5Mbps** for at least **90%** of test samples	Static test using test tools. Minimum 10 samples per location
Ping round trip time	The time required for a packet to travel from a source to a destination and back	Ping RTT (latency) must be not more than **250ms**, for at least **80%** of test samples (for fiber and microwave backhaul)	Static test using test tools Minimum 100 samples per location
HTTP mean data rate (web-browsing)	Average time for complete downloading webpage	Webpage download time must be not more than **10s**, for at least **80%** of test sample	Static test using test tools Minimum 10 samples per location

Minimum received signal level (coverage)	Average received signal measured by mobile device (LTE and WCDMA)	Average received signal level (RSRP) must be not less than **-110dBm** for LTE, for at least **80%** of the sample Average received signal level (RSCP) must be not less than **-100dBm** for WCDMA, for at least **80%** of the sample	Static test using test tools. Minimum 10 samples per location (Recorded based on FTP download measurement samples)

Guidelines to Schedule 2:

(1) Measurement shall be conducted by using phones installed with Quality of Service measurement system;

(2) Measurement system shall comply with the relevant ETSI/3GPP standards;

(3) Measurement shall be conducted in areas where mobile broadband network coverage is ascertained, based on the coverage prediction map published by the Applications Licensees;

(4) Point of measurement shall be from any location within mobile broadband operators' coverage areas to the test server and verifier located at an internet exchange in Port Moresby;

(5) Measurement shall be conducted by way of static test or walk test;

(6) Geographical positioning shall be based on WGS-84 digital map or equivalent;

(7) The standards and measurements are applicable to 3G and LTE (4G) networks, or any future mobile broadband technology such as 5G;

(8) Download and upload throughput measurement shall use File Transfer Protocol (FTP);

(9) FTP file size for the measurements shall be sufficient to represent network capacity for the locations under testing (i.e. 100MB file for LTE download, 50MB for 3G download);

(10) Ping RTT test shall use packet size between 32 and 128 bytes;

(11) Web-browsing measurement shall be performed to 5 different webpages of choice by NICTA;

(12) Measurement shall be conducted by Applications Licensees or representatives of the Applications Licensees;

(13) Measurement shall be perform at a minimum of 30 locations per region for each Measurement Period.

SCHEDULE 3: QOS PARAMETERS FOR FIXED TELEPHONY SERVICES

QoS Parameter	Parameter Description	QoS requirements	Measurement method
Call set up time (successful calls only)	The period starting when the address information required for setting up a call is received by the network and finishing when the called party busy tone or ringing tone or answer signal is received by the calling party	Call set up time for successful calls must be not more than **10s**, for at least **90%** of total successful calls during busy hours	Network statistics reported by operator
Unsuccessful call rate	The ratio of unsuccessful calls to the total number of call attempts	Unsuccessful call rate must be not more than **1%** during busy hours	Network statistics reported by operator

Guidelines to Schedule 3:

(1) Measurement shall be conducted by collecting calls set up time and unsuccessful calls data from network statistics of the Application Licensees;

(2) Measurement system shall comply with the relevant ETSI standards;

(3) Measurement data is applicable for PSTN originated calls and terminated to PSTN;

(4) Measurement data is applicable for national calls only;

(5) Measurement data is applicable for both intra-network and inter-network calls.

SCHEDULE 4: QOS PARAMETERS FOR FIXED BROADBAND SERVICES

QoS Parameter	Parameter Description	QoS requirements	Measurement method
Download data transmission speed	Download of data transfer from user access equipment to network	FTP download throughput must be not less than **80%** of subscribed speed, for not less than **80%** of test samples for fiber (GPON) and copper (DSL) connection FTP download throughput must be not less than **5Mbps**, for not less than **80%** of test samples for fixed wireless broadband (FWB)	Measurement using test probe connected to consumer's CPE (router) Minimum 50 samples for download per location
Upload data transmission speed	Upload of data transfer from user access equipment to network	FTP upload throughput must be not less than **80%** of the subscribed speed, for not less than **80%** of test samples for fiber and DSL connection FTP upload throughput must be not less than **0.5Mbps,** for not less than **80%** of test samples for FWB	Measurement using test probe connected to consumer's CPE (router) Minimum 50 samples for upload per location
IP packet transfer delay (Ping RTT)	Time required for a packet to travel from a source to a destination and back	Ping RTT (latency) must not be more than **80ms**, for not more than **80%** of test samples for fiber Average latency (ping RTT) must not be more than **100ms**, more than **80%** of test samples for DSL and FWB	Measurement using test probe connected to customer's CPE (router) Minimum 100 samples for per location
IP packet loss ratio	Ratio of total lost IP packet outcomes to total transmitted IP packets	Packet loss must be not more than **0.5%** for fiber Packet loss must be not more than **1%** for DSL and FWB	Measurement using test probe connected to customer's CPE (router) Minimum 100 samples for per location

Guidelines to Schedule 4:

(1) Measurement shall be conducted by using test probes installed with Quality of Service measurement system;

(2) Measurement system shall comply with the relevant ETSI and MEF standards;

(3) Measurement shall be conducted by connecting test probe connected directly to the Consumer Premise Equipment, CPE (router) via LAN cable;

(4) No other devices (except for test probe) are connected to the CPE during measurement;

(5) Measurement shall be conducted in areas where access network is provided and coverage for FWB is ascertained, based on the coverage prediction map published by the Applications Licensees;

(6) Point of measurement shall be from any location within fixed broadband operators' premise passed and FWB coverage areas to the test server located at an internet exchange in Port Moresby;

(7) The standards and measurements are applicable to copper (DSL), fiber (GPON) and FWB network;

(8) Download and upload throughput measurement shall use File Transfer Protocol (FTP);

(9) FTP file size for the measurements shall at least corresponds to the internet speed subsription package and sufficient to represent network capacity for the locations under testing (i.e. 50MB file for 50Mbps download speed package, 100MB file for FWB download);

(10) Ping RTT test shall use packet size between 32 and 128 bytes;

(11) Packet loss measurements shall be calculated based on data packets transmitted for Ping tests;

(12) Measurement shall be conducted by Applications Licensees or representatives of the Applications Licensees;

(13) Measurement shall be perform at a minimum of 5 locations per region for each access network (DSL, Fiber and FWB) for each Measurement Period.

SCHEDULE 5: QOS PARAMETERS FOR USER-RELATED SERVICES

QoS Parameter	Parameter Description	QoS requirements	Measurement method
Bill correctness complaints	• Inaccuracy in data or call usage • Incorrect charges or calculation	≤ **5%** of billing inaccuracy complaints per half year.	Report submission by operators
Accessibility of the complaint management desk	Ratio of the number of successful attempts to the total number of attempts to reach operators' support line	≥ **90%** of the call to customer support line (operated by human) must be answered within **60 seconds** per half year.	Report submission by operators
Network fault repair for mobile telephony, fixed telephony, mobile broadband and fixed broadband	Percentage of network fault repair for all networks in areas specified in Schedule 7, 8, 9 and 10 of Standard and Special Conditions of Individual Licenses Rule 2011	≥ **95%** network fault repair within **6 hours** in main centres ≥ **95%** network fault repair within **24 hours** in mid-sized centres ≥ **95%** network fault repair within **2 working days** in administrative district centres ≥ **95%** network fault repair within **3 working days** in small population centres ≥ **95%** network fault repair within **5 working days** in all other areas not specified in schedule 7, 8, 9 or 10	Report submission by operators

SUGGESTION:

Minimum benchmarking of OTT service QoS parameters may need to be included as ott services are becoming common for users especially in main towns utilizing the platform. Eg live streaming service through social media platforms, voice/video calling, instant messaging etc.

Guidelines to Schedule 5:

(1) Measurement shall be conducted by collecting data from network statistics of the Application Licensees;

(2) Measurement system shall comply with the relevant ETSI standards;

(3) Bill correctness complaints statistics should include all billing complaints received in the reporting period, regardless of the validity of the complaint and the dates of calls or any other occurrences that are the subject of the complaint

APPENDIX A: REPORTING TEMPLATE FOR MOBILE TELEPHONY

Licensee:

Report for the 6 month period from/to:

Report prepared by: (Name in capitals and signature)

Report authorised by: (Name in capitals and signature)

Date:

QoS Parameter	**QoS Requirements**	**Measurement Details and Calculations**	**QoS Result**
1: Telephony service non-accessibility	Call Failure Rate must be not more than **2%** - Applicable for both intra-network and inter-network calls	(e.g. no of calls attempt, no. of calls failed) (Per region)	(% to one decimal place)
2: Telephony cut-off call ratio	Call Dropped Rate must be not more than **2%** - Applicable for both intra-network and inter-network calls	(e.g. no. of call success, no. of calls dropped) (Per region)	(% to one decimal place)
3. SMS delivery time	SMS delivery must be completed within 90s for more than 95%	(e.g. no. of SMS ≤ 90s, no. of SMS) (Per region)	(% to one decimal place)
4. Call speech quality (MOS)	Average MOS for voice calls must be more than 3, for not less than 95% of call samples	(e.g. no. call MOS ≥ 3, no. of call success) (Per region)	(% to one decimal place)

APPENDIX B: REPORTING TEMPLATE FOR MOBILE BROADBAND

Licensee:

Report for the 6 month period from/to:

Report prepared by: (Name in capitals and signature)

Report authorised by: (Name in capitals and signature)

Date:

QoS Parameter	QoS Requirements	Measurement Details and Calculations	QoS Result
1: FTP download mean data rate	FTP download throughput must be not less than **2.5Mbps** for at least **80%** of test samples	(e.g. no. of ftp download test, no. of ftp download ≥ 2.5Mbps) (Per region)	(% to one decimal place) (include the average download speed)
2: FTP upload mean data rate	FTP upload throughput must be not less than **0.5Mbps** for at least **80%** of test samples	(e.g. no. of ftp upload test, no. of ftp upload ≥ 0.5Mbps) (Per region)	(% to one decimal place) (include the average upload speed)
3: Ping round trip time	Ping RTT (latency) must be not more than **250ms**, for at least **80%** of test samples (for fiber and microwave backhaul)	(e.g. no. of ping test, no. of ping ≤ 250ms) (Per region)	(% to one decimal place) (include the average latency)
4: HTTP mean data rate (web-browsing)	Webpage download time must be not more than **10s**, for at least **80%** of test sample	(e.g. no. of ping test, no. of ping ≤ 250ms) (Per region)	(% to one decimal place) (include the average web-browsing time)
5: Minimum received signal level (coverage)	Average received signal level (RSRP) must be not less than **-110dBm** for LTE, for at least **80%** of the sample Average received signal level (RSCP) must be not less than **-100dBm** for WCDMA, for at least **80%** of the sample	(e.g. no. of test, no. of RSRP ≥ -110dBm, no. of RSCP ≥ -100dBm) (Per region)	(% to one decimal place) (include the average received signal level for LTE and WCDMA)

APPENDIX C: REPORTING TEMPLATE FOR FIXED TELEPHONY

Licensee:

Report for the 6 month period from/to:

Report prepared by: (Name in capitals and signature)

Report authorised by: (Name in capitals and signature)

Date:

QoS Parameter	**QoS Requirements**	**Measurement Details and Calculations**	**QoS Result**
1: Call set up time (successful calls only)	Call set up time for successful calls must be not more than **10s**, for at least **90%** of total successful calls during busy hours	(e.g. no. of calls, no. of calls ≤ 10s) (Per region)	(% to one decimal place) (include the average call set up time)
2: Unsuccessful call rate	Unsuccessful call rate must be not more than **1%** during busy hours	(e.g. no. of calls no. of unsuccessful calls) (Per region)	(% to one decimal place)

APPENDIX D: REPORTING TEMPLATE FOR FIXED BROADBAND

Licensee:

Report for the 6 month period from/to:

Report prepared by: (Name in capitals and signature)

Report authorised by: (Name in capitals and signature)

Date:

QoS Parameter	QoS Requirements	Measurement Details and Calculations	QoS Result
1: Download data transmission speed	FTP download throughput must be not less than **80%** of subscribed speed, for not less than **80%** of test samples for fiber (GPON) and copper (DSL) connection FTP download throughput must be not less than **5Mbps**, for not less than **80%** of test samples for fixed wireless broadband (FWB)	(e.g. no. of ftp download test, no. of ftp download (fiber) ≥ 80% subscribed speed, no. of ftp download (DSL) ≥ 80% subscribed speed, no. of ftp download (FWB) ≥ 5Mbps subscribed speed) (Per region)	(% to one decimal place) (include the average download speed for fiber, DSL and FWB)
2: Upload data transmission speed	FTP upload throughput must be not less than **80%** of the subscribed speed, for not less than **80%** of test samples for fiber and DSL connection FTP upload throughput must be not less than **0.5Mbps,** for not less than **80%** of test samples for FWB	(e.g. no. of ftp upload test, no. of ftp upload (fiber) ≥ 80% subscribed speed, no. of ftp upload (DSL) ≥ 80% subscribed speed, no. of ftp upload (FWB) ≥ 0.5Mbps subscribed speed) (Per region)	(% to one decimal place) (include the average upload speed for fiber, DSL and FWB)
3: IP packet transfer delay (Ping RTT)	Ping RTT (latency) must not be more than **80ms**, for not more than **80%** of test samples for fiber Average latency (ping RTT) must not be more than **100ms**, more than **80%** of test samples for DSL and FWB	(e.g. no. of ping test, no. of ping (fiber) ≤ 80ms, no. of ping (DSL/FWB) ≤ 100ms) (Per region)	(% to one decimal place) (include the average latency for fiber, DSL and FWB)

4: IP packet loss ratio	Packet loss must be not more than **0.5%** for fiber Packet loss must be not more than **1%** for DSL and FWB	(Per region)	(% to one decimal place) (include the packet loss % for fiber, DSL and FWB)

APPENDIX E: REPORTING TEMPLATE FOR USER-RELATED SERVICE

Licensee:

Report for the 6 month period from/to:

Report prepared by: (Name in capitals and signature)

Report authorised by: (Name in capitals and signature)

Date:

QoS Parameter	QoS Requirements	Measurement Details and Calculations	QoS Result
1: Bill correctness complaints	**≤ 5%** of billing inaccuracy complaints per half year	(e.g. no. of bill sent, no. of bill complaint received)	(% to one decimal place)
2: Accessibility of the complaint management desk	**≥ 90%** of the call to customer support line (operated by human) must be answered within **60 seconds** per half year	(e.g. no. of customer calls, no. of customer calls answered within 60s)	(% to one decimal place) (include the average call center answered time)
3: Network fault repair for mobile telephony, fixed telephony, mobile broadband and fixed broadband	**≥ 95%** network fault repair within **6 hours** in main centres **≥ 95%** network fault repair within **24 hours** in mid-sized centres **≥ 95%** network fault repair within **2 working days** in administrative district centres **≥ 95%** network fault repair within **3 working days** in small population centres **≥ 95%** network fault repair within **5 working days** in all other areas not specified in schedule 7, 8, 9 or 10	(e.g. no. of hours for network downtime) (Per region)	(% to one decimal place) (include the average network fault repair time for each centres)