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**GUIDELINES
FOR
HANDLING
NETWORK CONGESTION**



**TELECOMMUNICATIONS AUTHORITY
HONG KONG**

AMENDMENT HISTORY

Item	Issue No.	Paragraph	Description
1	2	Foreword Paragraph 1	Incorporation of CM TEL (HK) Limited
2	3	Annex 3	Incorporation of HKC Network Limited
3	3	Annex 3	Update the names of some licensees
4	3		Minor editorial amendments
5	4	Foreword Paragraph 1	Delete the reference to Public Radiocommunications Service
6	4	Foreword Paragraph 4	Update OFTA's contact information
7	4	2.2.4	Delete the out-dated system configuration
8	4	3.1.1	Update the name of warning signal
9	4	3.2.1	Revise the arrangement for warning message dissemination
10	4	3.2.2 and 3.3.3	Revise the acknowledgment requirement
11	4	3.3.21	Update the arrangement for sending out announcement to the public
12	4	Annex 4	Revise the second example of network status
13	4		Minor editorial amendments
14	5	Foreword Paragraph 1	Incorporation of unified carrier licensees
15	5	2.1.1	Update the name of PCCW-HKT Telephone Limited and Hong Kong Telecommunications (HKT) Limited
16	5	3.3.21	Update the name of MTR Corporation

FOREWORD

1. With a view to preventing and alleviating network congestion in the event of severe weather conditions, disasters or other emergency situations, the Telecommunications Authority (TA) issues this document setting out the guidelines for handling network congestion (“the Guidelines”). The Guidelines should be observed by fixed and mobile network operators including the licensees of Fixed Carrier, Fixed Telecommunications Network Services, Mobile Carrier and Unified Carrier.

2. Telecommunications network operators are under their relevant licences obliged to provide service in a manner satisfactory to the TA at all times during the continuance of the licence. The Guidelines aim to ensure that the licensees provide satisfactory service to the public at all times including the time preceding and during emergency and bad weather situations. If a licensee fails to comply with the Guidelines, the TA would consider whether the licensee is in breach of the licence condition requiring “satisfactory service” and if so, the TA may consider prescribing the standards and specifications under section 32D, issuing a direction under section 36B of the Telecommunications Ordinance requiring the licensee to comply with the said licence condition and/or taking other regulatory action (e.g. financial penalty) if the situation so warrants.

3. This document as well as other information notes issued by the TA can be obtained through one of the following methods:

- download direct through the Office of the Telecommunications Authority (OFTA)’s Internet Home Page. The Home Page address is <http://www.ofta.gov.hk>;
- hard copies will be available upon request to:

Senior Telecommunications Engineer (Regulatory Section 11)
Office of the Telecommunications Authority
29/F., Wu Chung House
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Wanchai
Hong Kong

4. If further information is required regarding this document, please contact:

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SECTION 1 : INTRODUCTION

1. Introduction

1.1 The Guidelines apply to network operators for handling network traffic in the event of severe weather conditions, disasters or other emergency conditions which may cause or have triggered network congestion in the public telecommunications network. In order to maintain the traffic handling capability and capacity of networks in the above events, the TA issues the Guidelines which set out the guiding principles, requirements and procedures for handling network congestion and for reporting network status to OFTA.

1.2 Section 2 of this document sets out the technical requirements for the provision of (i) dedicated trunk for handling emergency calls and (ii) coordination network for communication between operators as well as OFTA. Section 3 of this document sets out the procedures which network operators should follow before, during and after the events mentioned in paragraph 1.1 of this Section.

SECTION 2 : REQUIREMENT FOR PROVISIONING

2.1 Dedicated Trunk for Emergency Call

2.1.1 In order to prevent emergency calls from being rejected out of the telephone networks due to network congestion, all fixed and mobile network operators should set up dedicated trunks for routing emergency calls to the interconnection points to PCCW-HKT Telephone Limited and Hong Kong Telecommunications (HKT) Limited.

2.1.2 For emergency calls, all fixed and mobile network operators shall maintain a Grade of Service (GoS) for the interconnection route for emergency call handling. This GoS is 0.8% for each route under normal traffic conditions.

2.2 Coordination Network

2.2.1 Network operators are required to equip with the necessary communications devices capable of maintaining direct and effective communications with OFTA and other network operators during normal or abnormal situation of the public telecommunications networks. Among all the different communications devices available, each network operator is required to maintain (i) a wire-line telephone with priority access to telephone network, (ii) a mobile phone and (iii) an email account dedicated for the communications with OFTA and other network operators. Each network operator shall notify OFTA of the contact information of each of the established communication channels.

2.2.2 The coordination network serves to enhance coordination among network operators as well as connection to OFTA with a view to alleviating network congestion in the event of severe weather conditions, disasters and other emergency situations that may or have triggered network congestion. Section 3 of this document sets out the procedures that the network operators should follow in using this network.

2.2.3 The configuration of coordination network in the form of a chatroom in OFTA’s website by using broadband Internet is given below:

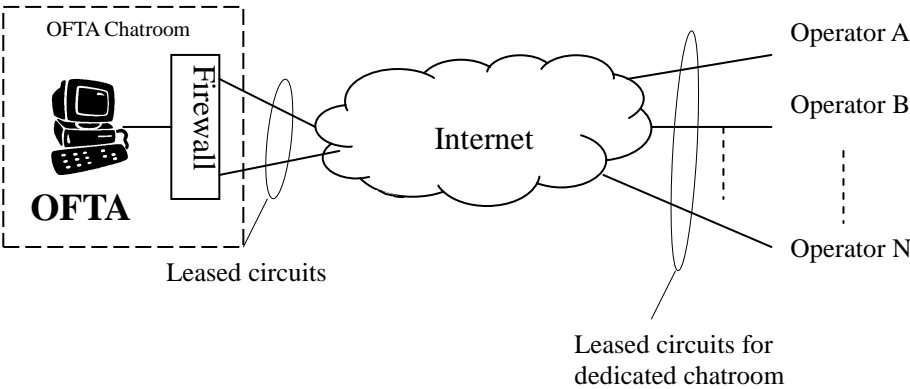


Figure 1: Coordination Network (by the use of dedicated chatroom)

SECTION 3 : PROCEDURES FOR HANDLING NETWORK CONGESTION

3.1 Introduction

3.1.1 The procedures will apply in the following events:

- (a) Tropical Cyclone (advance notification of issuance of Tropical Cyclone Warning Signal No. 8 or above, or issuance of such a signal)
- (b) Rainstorm (issuance of Red / Black Rainstorm Warning Signal)
- (c) Other severe weather conditions that may trigger or have triggered telephone network congestion
- (d) Other disasters or incidents that may trigger or have triggered telephone network congestion

3.2 Warning Message Dissemination

3.2.1 According to the established arrangement, the Hong Kong Observatory (HKO) will endeavour to send advance notification to OFTA 30 minutes before the issuance of “Pre-No. 8 Special Announcement” to the public (Alert Message). This advance notification issued by HKO will be inherently probabilistic in nature as weather condition will continue to change. HKO will provide updates on the chance of issuance of Tropical Cyclone Warning Signal No. 8. In addition, HKO will also send advance notifications of the issuance of red and black rainstorm warning signals (Alert Message) to OFTA. In the event of receiving an Alert Message from HKO, OFTA would instantly disseminate the same message to network operators via email and Short Message Service (SMS). Operators should make sure that their dedicated mobile phones and email accounts are properly attended to so that the messages from OFTA can be received at the first instance.

3.2.2 Upon receiving the Telecommunications Network Congestion Warning (TNCW) message (message details are in paragraph 3.2.4), network operators are required to enter OFTA chatroom and shall acknowledge OFTA as soon as possible (within 15 minutes) through the coordination network or SMS. Network operators shall carry out the necessary precautionary actions to minimize the possibility of network congestion.

3.2.3 Occasionally, there are other severe weather conditions that can be formed in such a short time that HKO simply does not have sufficient time to make any advance notification. Such sudden change of weather conditions may also trigger traffic upsurge over the public telephone network in a short period of time. Similarly, the outbreak of other disasters or incidents may also trigger an upsurge of telephone traffic. In order to minimize the possibility of network congestion or at least minimize the impact after its occurrence, each network operator is required to closely monitor its network traffic and take appropriate precautionary actions even though TNCW message is yet to be delivered by OFTA.

3.2.4 As a general guideline, network operators should treat the following messages as TNCW message disseminated by OFTA and act accordingly to alleviate network congestion.

- (a) Alert Message
- (b) Message confirming the outbreak of a disaster, an incident or, other type of severe weather condition that may trigger or has triggered telephone network congestion.

3.3 Procedures for Network Operators to Handle Telecommunications Network Congestion Warning Messages and Other Events Issued by OFTA That Would Trigger Network Congestion

3.3.1 If a TNCW message is issued, network operators are required to submit a network traffic situation report by the use of coordination network (the OFTA chatroom) to OFTA within 60 minutes if no congestion problem occurs and network situation reports every 60 minutes during network congestion. In the event that network congestion develops or the network congestion situation changes, network operators are also required to use the coordination network to communicate among themselves and to report these situations in simple messages such as “network congestion develops” or “congested network resumes normal” to OFTA by the coordination network and SMS as soon as possible.

3.3.2 Before proceeding to take any action on the network traffic conditioning during congestion or abnormal situation of the network, network operators should coordinate with each other by the use of the OFTA chatroom with a view to minimizing the adverse impact to the general public. OFTA would also use this chatroom to monitor all network operators’ traffic management issues and their network status.

Duties and responsibilities of operators

3.3.3 Whenever any sign of network problem (e.g. network traffic congestion) is detected, each originating network operator (ONO), transit network operator (TRNO) and terminating network operator (TNO) should notify OFTA by the use of the OFTA chatroom or SMS of its own traffic situation. In addition, each network operator would have its own role to play to ensure that the adverse impact to the general public is minimized.

3.3.4 Each network operator should maintain detailed guidelines for their staff to follow in managing their network(s) during situations that may trigger or have triggered telephone traffic congestion.

3.3.5 The basic principle of the Guidelines is for network operators given in Annex 3 to maintain their networks in handling maximum traffic during the events as mentioned in paragraph 3.1 of this Section.

3.3.6 Each network operator should use reasonable endeavours to ensure that whatever action it has taken to respond to other operator’s request is the most appropriate measure and would not cause problem to its own network.

Terminating Network Operator (TNO)

3.3.7 TNO is responsible for monitoring the traffic volume terminated at each of its switches. Whenever there is any sign of traffic congestion taking place at one or more of its switches, the TNO could take action that depends upon the connection arrangement of its switch to other network operators.

- If the switch is directly connected to more than one ONO, the TNO could put up its requests to all the direct-connected ONOs by the use of the OFTA chatroom to block a certain percentage of outgoing traffic (trunks) to the switch experiencing congestion. The ONO should take appropriate traffic

regulation measures to respond to the TNO's request taking into account of its own network condition.

- If the switch is connected to TRNO(s), the TNO should broadcast its requests to all other network operators by the use of the OFTA chatroom. ONO should take appropriate traffic regulation measures to respond to the TNO's request. If necessary, ONOs could liaise with the TRNO(s), who would be in the best position to clarify the routing and examine the effectiveness of the traffic regulation actions taken to respond to the TNO's request.

3.3.8 Under any circumstance, the TNO has to terminate the traffic intended for it as far as practicable. The TNO should not purposely reject the incoming traffic except under the following special situations:

- There are essential maintenance activities at the TNO switch which require blocking of incoming traffic.
- The TNO's switch generates a lot of undesirable traffic because of equipment failure.
- There is an equipment outage causing problem to or overloading a terminating/transit switch; the network operator of terminating/transit switch should follow the standard procedures as specified in Annex 2 to regulate the abnormal incoming traffic.
- If the switch processor of the TNO switch is overloaded by incoming traffic and is likely to get outage which might lead to the complete collapse of the whole switch, the TNO should follow the standard procedures as specified in Annex 2 to control the incoming traffic.

3.3.9 TNO requesting assistance from other operators should from time to time post the most up-to-date information to all ONOs and TRNOs via the OFTA chatroom about the network congestion status (for example: any hard-to-reach attributes). Network operators may use any hard-to-reach attributes which they consider appropriate to let other network operators understand the situation. The following lists out some hard-to-reach attributes for reference:

- (i) The terminating network has encountered continuous overload which persistently causing the network node(s) unable to handle new incoming calls, and/or the terminating network intended to block incoming trunks for traffic originating from other networks in next 30 minutes.
- (ii) The terminating network experienced a system fault causing the network node(s) total failure or complete isolation of services.
- (iii) Particular level, directory number (DN) / network number (NN) or call destination encounters extremely high terminating traffic upsurge together with extremely high amount of failure calls.
- (iv) The terminating switch has a low connection ratio for a certain period of time.
- (v) The terminating network has a long paging delay for the mobile.
- (vi) The terminating network has a long origination delay for the mobile.
- (vii) The controlling processor of one or more switching nodes is running beyond the safe limit.

- (viii) The number of call attempts exceeds the safe limit. That is the affected exchange(s) will not be able to handle new (level or exchange specific) calls.
- (ix) Severely drop of Answer/Seizure Ratio (ASR) value observed on all incoming routes. Affected exchange is not handling the incoming call attempt in a satisfactory way, either because the incoming traffic is abnormally high or the processor is malfunctioning.

Originating Network Operator (ONO)

3.3.10 It is considered by OFTA that the most efficient means to prevent the development of traffic congestion is to control traffic at the originating network from which traffic is generated. To achieve this purpose, each ONO could introduce effective and efficient traffic regulation mechanism (e.g. trunk blocking) to control the relevant traffic to be routed to TNO's hard-to-reach areas when (i) there is a request from the direct connected TNO or (ii) there is an agreement with the TRNOs who manage traffic in the interconnect gateways (ICGs). In addition, each ONO can also implement, with the consent of TRNOs and TNOs, the necessary traffic regulation mechanism if it foresees its originating traffic is going to have harmful effect on its own network, transit network or terminating network.

3.3.11 To be more specific, ONO is required to block the traffic to be terminated at the hard-to-reach areas as reported and requested by the TNO or TRNO. As for other traffic that is surging up and is likely to overload some ICGs of the transit network, it is advisable for the ONO to divert the relevant traffic to some other less congested ICGs via switches and routes that have spare capacity available at that time.

Transit Network Operator (TRNO)

3.3.12 TRNO should have the best knowledge on various traffic volume in all Point of Interconnection (POI) links. They are required to closely monitor the traffic volume in all POI links and ensure that the utilization of all POI links is maintained at the optimal level. Whenever the TRNO detects any upsurge of traffic and is likely to overload its ICGs, it should alert the relevant ONO and advise it to carry out effective traffic management measures to control the upsurge and to divert the traffic concerned in such a way that the spare capacity of some less congested routes and ICGs can be fully utilized. If the TNO identifies any severe traffic congestion area, the TNO should report to ONOs and TRNOs, and advise them to carry out suitable traffic management measures to block a certain percentage of traffic (trunk) to be routed to the congested switch(es).

3.3.13 Under all circumstances, all network operators should work closely to maintain the local telecommunications network working normally with maximum traffic volume flowing through the transit network.

Operation Procedures for Network Operators

Preparation Work

3.3.14 Each network operator should (i) train its technical staff to familiarize with the network maintenance work and traffic re-routing procedures, (ii) maintain detailed guidelines

for its staff to follow in managing its network(s) during traffic network congestion. In addition, each operator should check the coordination network linking to the OFTA chatroom regularly to ensure that it is maintained in good working conditions.

After TNCW Messages Issued by OFTA and Action Taken to Handle Network Congestion

3.3.15 Upon receiving the TNCW message, network operators are required to follow the procedures as mentioned in Section 3 of this document to carry out necessary precautionary actions, if required, to minimize the possibility of network congestion.

3.3.16 The basic principle for each network operator in alleviating the network congestion is to ensure its own network to handle the maximum traffic and prevent its own network from breaking down no matter whatever action it has taken to respond to other network operator's request.

3.3.17 Each network operator is requested to report to OFTA the network situation through the appropriate channel as mentioned in Sub-section 3.3 of this document.

After Cancellation of TNCW Message

3.3.18 All network operators are required to submit reports to OFTA after 3 working days about the messages and actions taken that have been posted onto the OFTA chatroom in relation to the traffic or trunk capacity regulation issue. The report format is in Annex 4.

Role of OFTA

3.3.19 OFTA will be responsible for maintaining the coordination system as mentioned in Sub-section 2.2 of this document. The messages posted onto the OFTA chatroom will be kept by OFTA for seven working days.

3.3.20 The TA may call for forum meeting after the incident with operators to review the situation of each network. In addition, if there are any measures that could be considered for the improvement of handling network problems or telephone traffic congestion and any disputes between operators in handling the traffic regulation, the TA will call for industry forum meeting to discuss and review all cases.

3.3.21 When situation requires, OFTA will liaise with Information Services Department for consideration of making public announcement through TV or radio stations to advise the general public not to make any unnecessary telephone calls. OFTA will also liaise with the MTR Corporation to disseminate message advising the public in the MTR stations about the status of mobile phone networks and how to make best use of the networks.

Contact Information

3.3.22 Each network operator is required to provide OFTA with the contact information of its focal point responsible for coordination with OFTA in times of emergency. Such information will be annexed to this document and hidden in the public version. Whenever,

there is any update on the contact information, operator should inform OFTA of the change one week before the effective date. OFTA would then update Annex 3 accordingly and disseminate it to all operators for information. The contact information should include the following items:

- (a) Fixed line telephone number
- (b) Mobile phone number
- (c) E-mail address

Guideline for the use of Chatroom in OFTA's Web and the Coordination Network

Functions and General Use of Chatroom and the Coordination Network

1. The chatroom has (i) a database, in the form of a bulletin board, for storing messages posted by operators and OFTA and (ii) an email system for communication between operators to handle network problem or telephone traffic congestion during severe weather conditions or disastrous conditions.

2. Network operators are responsible for the costs of equipment at operator ends including set-up cost of a dedicated circuit connecting to its own Internet service provider(s), monthly rental of the dedicated circuit, re-installation cost, re-location cost, operator machines cost and associated cost.

User account and posting rules

3. Each network operator shall have one parent account and several child accounts. However, only the parent account will be used to post messages onto the OFTA chatroom while other child accounts are set as "Read Only".

4. Each network operator can only post messages in a folder named after the relevant operator. The messages should be clear and concise. Any company confidential data or controversial issues should be avoided as all other operators can access such information. Each message should contain in its end the name and telephone number of a contact person for enquiries concerning the message.

5. Messages posted cannot be edited or deleted by the originators. If amendment or editing is required, it is necessary to post a new message to expressly supersede the previous message. Operators should therefore always refer to the latest postings for the most up-to-date information.

6. Only the System Administrator of the chatroom has the right to create new event category under the chatroom.

7. Network operators should base on the principles laid down in this document to (a) post the seek for assistance message whenever any sign of network problem or telephone traffic congestion is detected at any switch or ICG and (b) publish the hard to reach attributes.

8. OFTA may request network operators to post warning messages onto the chatroom to advise other operators to take precautionary actions when situation requires.

9. Network operators should keep copies of messages/information they post onto the OFTA chatroom during the incident for their record purpose. OFTA will keep the information in the chatroom database for seven working days after the incident. However, the System Administrator may purge the system earlier in order to deal with the onset of another tropical cyclone / rainstorm or other incidents when a large number of messages have cluttered the system.

Procedures for Network Operators to Communicate in Handling Network Congestion

The following are the standard procedures for operator to (i) broadcast network congestion status (for example: location of congestion switch), (ii) issue message seeking for assistance from other operators, (iii) report actions taken in response to the request from other operators, and (iv) broadcast message for reporting action to be taken.

1. Broadcast of network congestion status

- (i) List the affected switch(es) clearly
- (ii) Endorsed by
 - Name of network operator:
 - Site-in-charge:
 - Telephone number:
 - Email Address:
- (iii) Endorsed time according to HKO clock

2. Message for seeking assistance

- (i) List the assistance required clearly
 - e.g. traffic regulation request:
 - to reduce traffic (route capacity) of Route A by x%
 - to reduce traffic (route capacity) of Route B by y%
- (ii) Spell out the reason why assistance is needed.
- (iii) Endorsed by
 - Name of network operator:
 - Site-in-charge:
 - Telephone number:
 - Email Address:
- (iv) Endorsed time according to HKO clock

3. Report on actions taken in response to the request from other operators

- (i) Make reference to the message and liaise with the operator seeking for assistance
- (ii) What action has been taken and the time of the action taken
- (iii) Endorsed by
 - Name of network operator:
 - Site-in-charge:
 - Telephone number:
 - Email Address:
- (iv) Endorsed time according to HKO clock

4. Report on actions going to be taken by the operator broadcasting the message

- (i) Spell out the reason why action to be taken is required.
- (ii) List clearly the schedule the action(s) to be taken. Allow at least 15 minutes for other operators to prepare or respond
- (iii) Endorsed by
Name of network operator:
Site-in-charge:
Telephone number:
Email Address:
- (iv) Endorsed time according to HKO clock

5. Report the result of network status by the operator broadcasting the message seeking for assistance from other operators

- (i) Report when the network is resumed.
- (ii) List clearly the action(s) taken.
- (iii) Endorsed by
Name of network operator:
Site-in-charge:
Telephone number:
Email Address:
- (iv) Endorsed time according to HKO clock

Contact List of Network Operators for Network Congestion

Intentionally Left Blank

Network Traffic Regulation and Status Report

Name of Reporting Network Operator:

Name of site-in-charge:

Telephone Number:

Internet Email Address:

The Telecommunications Network

Congestion Warning Message Received by: [time in Hong Kong Local Time], [date]

Details of Actions Taken

Description of Network Status	Request to other Network Operators for Assistance	Request Sent at [time] on [date]	Reply Details and Actions Taken by Responding Operators	Incident Resolved at [time] on [date]	Remarks
e.g. [x] switch experienced congestion at [time] on [date]					
e.g. [y] interconnection link experienced congestion at [time] on [date]					