HKCA 3106
ISSUE 6
JUNE 2017

GUIDELINES
FOR
HANDLING
NETWORK CONGESTION

通訊事務管理局
COMMUNICATIONS AUTHORITY

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
17	6	Whole document	(i) Editorial changes to rename OFTA to OFCA; (ii) update OFCA's contact information.

FOREWORD

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

2. Telecommunications network operators are under their relevant licences obliged to provide service in a manner satisfactory to the CA 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 severe weather situations. If a licensee fails to comply with the Guidelines, the CA would consider whether the licensee is in breach of the licence condition requiring "satisfactory service" and if so, the CA 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 CA can be downloaded from the website of the Office of the Communications Authority (OFCA) at http://www.ofca.gov.hk. Enquiries about the Guidelines may be directed to –

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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 CA issues the Guidelines which set out the guiding principles, requirements and procedures for handling network congestion and for reporting network status to OFCA.

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 OFCA. 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 OFCA 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 OFCA and other network operators. Each network operator shall notify OFCA 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 OFCA 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 OFCA's website by using broadband Internet is given below –

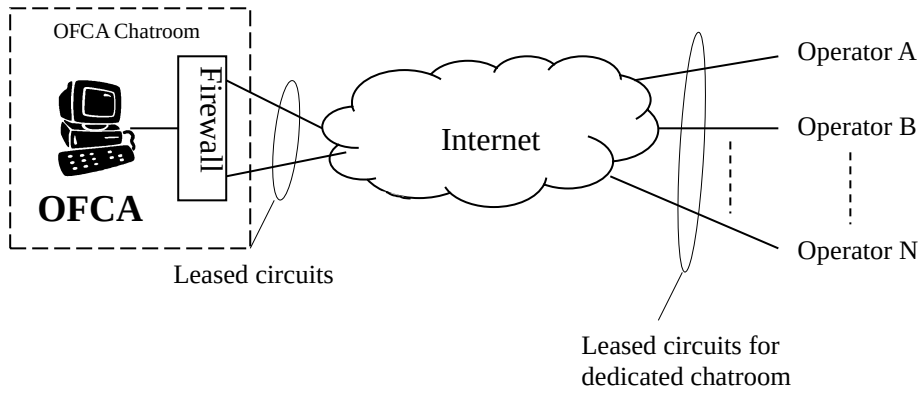

Figure 1: Coordination Network (by the use of dedicated chatroom)

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 (advance notification of issuance of Red/Black Rainstorm Warning Signal, or issuance of such a signal);
(c) Other severe weather conditions that may trigger or have triggered telephone network congestion; and
(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 OFCA 30 minutes before the issuance of "Pre-No. 8 Special Announcement" to the public. 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/Black Rainstorm Warning Signal to OFCA. In the event of receiving an advance notification from HKO, OFCA 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 OFCA 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 OFCA's chatroom and shall acknowledge OFCA as soon as possible (within 15 minutes) through the coordination network or SMS. Network operators shall carry out the necessary precautionary actions to minimise 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, an outbreak of other disaster or incident may also trigger an upsurge of telephone traffic. In order to minimise the possibility of network congestion or at least minimise 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 OFCA.

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

(a) HKO's issuance or advance notification of issuance of Tropical Cyclone Warning Signal No. 8 or above, or Red/Black Rainstorm Warning Signal; and
(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 TNCW Messages and Other Events 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 (OFCA's chatroom) to OFCA 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 OFCA by the coordination network or 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 OFCA's chatroom with a view to minimising the adverse impact to the general public. OFCA would also use this chatroom to monitor all network operators' traffic management issues and their network status.

Duties and Responsibilities of Network 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 OFCA by the use of OFCA's 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 minimised.

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 listed in **Appendix 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 any one of its switches, the TNO could take action that depends upon the connection arrangement of the

switch concerned 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 OFCA's chatroom to block a certain percentage of outgoing traffic (trunks) to the switch experiencing congestion. Each of the ONOs should take appropriate traffic regulation measures to respond to the TNO's request taking into account of its own network condition; and

- If the switch is connected to TRNO(s), the TNO should broadcast its requests to all other network operators by the use of OFCA's chatroom. ONOs 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's 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 **Appendix 2** to regulate the abnormal incoming traffic; or

- If the switch processor of the TNO's switch is overloaded by incoming traffic and is likely to be malfunctioned which might lead to the complete collapse of the whole switch, the TNO should follow the standard procedures as specified in **Appendix 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 OFCA's 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; and
(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 OFCA 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 which 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 Specifically, 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 utilisation 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 utilised. 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 familiarise 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 OFCA's chatroom regularly to ensure that it is maintained in good working conditions.

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

3.3.15 Upon receipt of 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 minimise 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 OFCA 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 OFCA after three working days about the messages and actions taken that have been posted onto OFCA's chatroom in relation to the traffic or trunk capacity regulation issue. The report format is in **Appendix 4**.

Role of OFCA

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

3.3.20 OFCA 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, OFCA will call for industry forum meeting to discuss and review all cases.

3.3.21 When situation requires, OFCA 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. OFCA will also liaise with the MTR Corporation to disseminate message advising the public in the MTR stations about the status of mobile networks and how to make best use of the networks.

Contact Information

3.3.22 Each network operator is required to provide OFCA with the contact information of its focal point responsible for coordination with OFCA in times of emergency. Such information will be appended to this document and redacted in the public version. Whenever there is any update on the contact information, operator should inform OFCA of the change one week before the effective date. OFCA would from time to time update **Appendix 3** and, where necessary, disseminate the relevant part to the operators concerned for the purposes stated in the Guidelines. The contact information should include the following items –

(a) Fixed line telephone number;
(b) Mobile phone number; and
(c) Email address.

Appendix 1

Guidelines for the Use of OFCA's Chatroom and the Coordination Network

Functions and General Use of OFCA's Chatroom and the Coordination Network

1. OFCA's chatroom has (i) a database, in the form of a bulletin board, for storing messages posted by operators and OFCA and (ii) a messaging 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 OFCA's 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 sensitive issues should be communicated with OFCA separately. Network operator may insert at the end of a message the name and telephone number of its 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 OFCA's 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 message seeking for assistance 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. OFCA may request network operators to post warning messages onto OFCA's chatroom to advise other operators to take precautionary actions when situation requires.

9. Network operators should keep copies of messages/information they post onto OFCA's chatroom during the incident for their record purpose. OFCA 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.

Appendix 2

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

Appendix 3

Contact List of Network Operators for Network Congestion

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Appendix 4

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]					