FINAL DECISION OF THE COMMUNICATIONS AUTHORITY

DISRUPTIONS OF THE TELECOMMUNICATIONS SERVICES OF CHINA UNICOM (HONG KONG) OPERATIONS LIMITED

| Telecommunications Licensee Investigated: | China Unicom (Hong Kong) Operations Limited ("China Unicom") |
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| Issue: | There were disruptions of the telecommunications services of China Unicom on 3 April and 5 April 2015 |
| Relevant Instruments: | General Condition ("GC") 5.1 of China Unicom's Services-Based Operator ("SBO") Licence for Class 3 Service (Licence No. 922) |
| Decision: | Breach of GC 5.1 of China Unicom's SBO Licence for Class 3 Service (Licence No. 922) |
| Sanction: | Financial penalty imposed |
| Case Reference: | LM T 19/15 in OFCA/R/R/134/2 C |

BACKGROUND

On 3 April 2015, China Unicom reported to the Office of the Communications Authority ("OFCA") that there was a disruption of its mobile services due to congestion of the signalling links to its Home Location Register ("HLR") platform¹. Two days later, on 5 April 2015, China Unicom reported to OFCA that there was another incident of disruption of its mobile services caused by the congestion of the same set of signalling links. In both incidents, China Unicom's mobile voice services, short message services ("SMS") and data services (i.e. Internet access) were disrupted. OFCA activated the Emergency Response System² on both

¹ The HLR platform is a central database which contains the information of the mobile phone customers who are authorised to access China Unicom's mobile network.

² Emergency Response System is the communication arrangement for maintaining contacts among OFCA and all the major public telecommunications network service operators when there is a risk of possible network congestion problem or network outage which may substantially affect the general public.

occasions and kept in close contact with China Unicom to monitor the situation.

THE SERVICE DISRUPTIONS

First Incident on 3 April 2015

2. According to China Unicom, the first incident was caused by a staff error of its equipment vendor who initiated an unplanned HLR MAP RESET command³ at 1:45 am on 3 April 2015 when carrying out scheduled maintenance for the HLR. After the command was initiated, the signalling links between the HLR and the core switch platform became very congested starting from 2:00 am. With the problem, the HLR failed to entertain all location update authentication requests from customers, rendering some of the customers unable to use the mobile services of China Unicom in Hong Kong.

3. In response to the congestion of the signalling links to the HLR, the engineers of China Unicom's equipment vendor had attempted without success to resolve the problem. At 5:30 am, China Unicom's network operating centre observed that there was a critical alarm on the HLR system. With escalation of the problem, China Unicom's engineers arrived on site at 6:00 am with an attempt to resolve the problem. However, the problem persisted and became worse in the morning. At 12:30 pm, China Unicom worked out and implemented a system restoration plan to resume the services by phases. The restoration process took around 14 hours to complete, and all affected services resumed normal at 2:30 am on the next day, 4 April 2015.

4. In summary, the first incident started at 2:00 am on 3 April 2015 and ended at 2:30 am on 4 April 2015. The disruption period lasted for 24.5 hours. Around 75 000 customers of China Unicom were affected, representing about 83% of the total number of active customers of China Unicom's mobile services in Hong Kong.⁴

³ HLR MAP RESET command is a network command which requests the devices of all customers to provide an update of their locations to the HLR when the customers used the mobile services of China Unicom the first time after the command was made.

⁴ According to China Unicom, its mobile services in Hong Kong have approximately a total of 90 000 active customers.

Second Incident on 5 April 2015

5. The second incident occurred on 5 April 2015. According to China Unicom, there was a sudden surge of location update authentication requests to the HLR starting from 4:00 pm which again caused heavy congestion to the signalling links between the HLR and the core switch platform. China Unicom found that the majority of such authentication made by its inbound customers requests were using One-SIM-Card-Two-Numbers ("1C2N") service⁵ at areas near the boundary between Hong Kong and the Mainland. Similar to the first incident, China Unicom's mobile voice service, SMS and data service were disrupted.

6. China Unicom's engineers and its vendor support team tried to implement traffic control policy to handle the problem starting from 4:30 pm but in vain. Between 6:00 pm to 8:00 pm, China Unicom's engineers applied the service restoration plan and all affected services resumed normal at 0:30 am on the next day, 6 April 2015.

7. In summary, the disruption period of the second incident lasted for about 8.5 hours. About 31 500 customers of China Unicom were affected, representing about 35% of the total number of active customers of China Unicom's mobile services in Hong Kong.

OFCA'S INVESTIGATION

8. According to the criteria set out in the "Guidelines for Local Fixed, Mobile, and Services-Based Operators for Reporting Network and Service Outage" issued by OFCA ("Guidelines"),⁶ the two incidents were critical events. As a large number of China Unicom's customers were affected, OFCA conducted an investigation into the two incidents to –

⁵ 1C2N service allows customers to use one single SIM card assigned with a Hong Kong mobile number and a Mainland mobile number to access mobile services in both Hong Kong and the Mainland. When travelling in Hong Kong, customers may use China Unicom's mobile services. When travelling in the Mainland, customers may use the mobile services provided by China Unicom's counterpart there. Inbound customers for 1C2N service refer to those customers who are registered customers with China Unicom's counterpart in the Mainland and are travelling in Hong Kong.

⁶ For details of the Guidelines, please refer to -<u>http://www.coms-auth.hk/filemanager/statement/en/upload/285/gn_201404e.pdf</u>

- (a) examine whether China Unicom had breached GC 5.1 of its SBO Licence No. 922, which specifies that
 - "5.1 The licensee shall, subject to Schedule 1 to this licence and any special conditions of this licence relating to the provision of the service, at all times during the validity period of this licence operate, maintain and provide a good, efficient and continuous service in a manner satisfactory to the Authority..."; and
- (b) review the actions taken by China Unicom in response to the incidents (including the efficiency of service restoration, and the communication with OFCA, customers and the media, etc.) to examine whether there are any areas requiring China Unicom to make improvements.

9. In the course of OFCA's investigation, China Unicom submitted the preliminary reports⁷ and the full reports⁸ of the incidents to OFCA on 10 April 2015 and 24 April 2015 respectively. China Unicom had also provided supplementary information in response to OFCA's enquiries about the incidents. OFCA has thoroughly examined the reports and the information submitted by China Unicom. As part of the investigation, OFCA has also examined the 124 consumer complaints it received concerning the incidents. The complaints were mainly about customers' dissatisfaction of the repeated service disruptions in a few days, the long disruption periods, China Unicom's failure to update customers of the status and its lack of follow-up actions etc.

10. OFCA completed its investigation and submitted its findings to the Communications Authority ("CA") on 15 August 2015. Having considered the findings of OFCA, the CA issued its Provisional Decision to China Unicom on 17 August 2015 and invited China Unicom to make representations. China Unicom submitted its representations to OFCA on 31 August 2015.

⁷ The preliminary reports submitted by China Unicom are available at : <u>http://www.ofca.gov.hk/filemanager/ofca/en/content_723/cuol_report_20150410.pdf</u>

⁸ The final reports submitted by China Unicom are available at : <u>http://www.ofca.gov.hk/filemanager/ofca/en/content_723/cuol_report_20150424.pdf</u>

Issues Examined During the Investigation

The Cause of the Incidents and the Adequacy of China Unicom's Preventive Measures

11. China Unicom reported that the first incident was caused by a staff error of its equipment vendor who improperly sent a HLR MAP RESET command to China Unicom's mobile system at 1:45 am on 3 April 2015 when carrying out scheduled maintenance for the HLR. The action resulted in a sudden surge of location update authentication requests which had reached the maximum capacity of the signalling links between the HLR and the core switch platform, thereby causing the congestion. China Unicom claimed that its vendor should not issue the command to its mobile system without prior impact assessment and proper preventive measures. Following the issue of the reset command, the vendor should reasonably foresee that there would be a large number of location update authentication requests and put in place appropriate measures to prevent and alleviate congestion of the signalling links.

12. As regards the second incident, China Unicom reported that there was a sudden surge of location update authentication requests from inbound customers of its 1C2N service at Lo Wu, Huang Gang and Lok Ma Chau areas at around 4:00 pm on 5 April 2015. The signalling traffic volume was about 40% to 100% more than that recorded at the same time of the previous day and such traffic volume had exceeded the designed capacity of the signalling links between the HLR and the core switch platform in China Unicom's mobile system. Due to the sudden and unexpected increase in traffic within a very short period of time, China Unicom's core network experienced high utilization and resulted in signalling link congestion.

13. China Unicom submitted that after the first incident, it had already added two more signalling links connecting the HLR and the core switch platform to avoid similar traffic congestions. However, the occurrence of the second incident indicated that the capacity of the signalling links to HLR despite the earlier increase remained insufficient and needed to be further expanded. China Unicom worked with its vendor and found out that although it had increased the number of signalling links for its HLR, the traffic loading on the signalling links was not balanced and therefore rendered the two additional links ineffective in handling the surge of

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signalling traffic.

14. To prevent similar incidents from recurring, China Unicom submitted that it would –

- (a) add two more signalling links for its HLR to balance the traffic loading on the signalling links to enhance their overall utilisation;
- (b) upgrade its core network platform to enhance the processing capability of the HLR; and
- (c) replace all the existing signalling links by IP-based signalling links with four times higher capacity.

China Unicom claimed that, after the implementation of the above improvements, the capacity of the signalling links to HLR and the processing capability of the HLR would be significantly enhanced.⁹ Furthermore, China Unicom said that it would discuss with its counterpart in the Mainland to find ways to control the inflow of authentication requests from customers of 1C2N services to its HLR, in order to prevent overloading the signalling links when a large number of customers of 1C2N services travelling across the borders.

OFCA's Assessment

15. OFCA notes that the first incident was caused by China Unicom's vendor who had improperly entered a network command into its mobile system, which triggered a sudden increase in signalling traffic congesting the signalling links to the HLR. Although China Unicom claimed that the incident was the fault of its vendor, OFCA considers that since the vendor should have been working under the supervision of China Unicom, ultimately it should still be China Unicom who should be directly responsible for the incident and the service disruption that ensued. In fact, the occurrence of the incident reflected that there was an inadequate and

⁹ China Unicom claimed that, in parallel with the addition of the signaling links to the HLR, it had also reviewed the capacity of the other critical signaling links connecting other core network components. According to China Unicom's measurement, the utilization of the critical signaling links over its network in general was only at most 18% during the busy hour of a normal day in May 2015. Its core network should have ample spare capacity to cope with sudden increase of mobile traffic in the future.

ineffective supervisory control on the part of China Unicom over the vendor in carrying out the system maintenance works. Given that China Unicom should be aware of its network capacity constraint and that the execution of the network command would significantly affect the operation of the network and its services to customers, the vendor should not be allowed to execute any network commands on an unplanned basis without putting in place appropriate preventive measures in advance. It is considered that China Unicom should enhance its supervisory control over the works of the vendor and put in place proper procedures and guidelines to strengthen its internal control over the execution of network commands in system maintenance works. Effective access control mechanism should be set up to ensure that the execution of network commands must be properly controlled and subject to prior approval of the authorised persons of China Unicom.

16. OFCA notes that the second incident occurred because the capacity of the signalling links to the HLR in China Unicom's mobile system was unable to cope with the sudden increase in authentication requests from the inbound customers of China Unicom's 1C2N service at Lo Wu, Huang Gang and Lok Ma Chau areas. OFCA observes that the second incident revealed the deficiency in the design of China Unicom's mobile system. Notwithstanding that China Unicom had already increased the number of the signalling links after the first incident, they still failed to cope with the sudden surge of traffic of its 1C2N services on the day of the incident. Since it was a public holiday, a much larger number of travellers would be crossing the boundary areas, and the resulting surge of traffic was only to be China Unicom should have factored in such traffic surge in the expected. design of its mobile system. The incident showed that China Unicom had under-estimated the demand for its 1C2N services and the signalling links to the HLR were therefore under-provisioned. It is noted that after the second incident, China Unicom has already planned for certain system enhancement works and commenced liaison with its counterpart in the Mainland for better OFCA is of the view that there is still a need for China traffic control. Unicom to conduct holistic reviews of its network design regularly based on the up-to-date traffic estimate to ensure that the network capacity, including the capacity of the signalling links between the HLR and the core switch platform, is properly dimensioned to cope with the potential surge in service demand.

17. In conclusion, having examined the causes of the two incidents, OFCA is of the view that China Unicom has not put in place sufficient and reasonable measures to prevent the incidents from occurring. In particular, China Unicom's supervision over the works of the vendor and the internal control over the execution of network commands were unsatisfactory, and the under-provisioned capacity of the signalling links to the HLR clearly indicated deficiency in its mobile system design.

Time and Actions Taken by China Unicom to Restore Services

18. China Unicom submitted that, in the first incident, its vendor observed that the signalling links to the HLR were very congested at 2:00 am on 3 April 2015 and they had unsuccessfully attempted to resolve the problem between then and 5:30 am, when the critical alarm on HLR system was triggered. China Unicom claimed that it had noticed the problem since 2:00 am but it decided to leave the problem to be handled initially by its Upon receipt of the critical alarm at 5:30 am, China Unicom's vendor. engineers stepped in. They arrived on site at 6:00 am and managed to work out and implement a system restoration plan at 12:30 pm. China Unicom explained that, as the capacity of the signalling links was limited, it had to divide the restoration process into more than 400 batches for implementation. All affected services resumed normal at 2:30 am on the next day, 4 April 2015. In summary, the disruption period lasted for 24.5 hours, of which 10.5 hours were for troubleshooting (including the identification of the problem and the development of the restoration plan) and 14 hours were for the implementation of the restoration plan.

19. China Unicom claimed that, in the second incident, it detected that the signalling links to the HLR were very congested at around 4:00 pm on 5 April 2015. Its engineers had tried to resolve the problem by implementing traffic control policy at 4:30 pm but in vain, and started to implement a system restoration plan by 6:00 pm. Similar to the first incident, due to the limited capacity of the signalling links, China Unicom had to divide the affected customers into small groups for service restoration. The implementation of the restoration plan took 6.5 hours and all affected services resumed normal at 0:30 am on the next day, 6 April 2015. In summary, the disruption period lasted for 8.5 hours, of which 2 hours were for troubleshooting and 6.5 hours were for the implementation of the restoration plan.

OFCA's Assessment

20. OFCA notes that in the first incident, China Unicom and its vendor had spent as much as 10.5 hours for troubleshooting. During the initial period of the incident, i.e. between 2:00 am and 5:30 am on 3 April 2015, China Unicom relied solely on its vendor to handle the congestion problem and had not played an active role in supervising the work of the China Unicom's engineers stepped in after receipt of the critical vendor. alarm and finally arrived on-site at 6:00 am, four hours after the congestion had occurred. However, China Unicom still needed to spend another 6.5 hours to work out and implement a system restoration plan by 12:30 pm. OFCA considers that the time spent by China Unicom for sending engineers to attend to the problem and for system troubleshooting (including working out the restoration plan) was unreasonably long. China Unicom should review the works done in the troubleshooting period, train up engineers, and simplify the working procedures to ensure that, in case there is a service disruption in future, it should be more alert and responsive to deal with the problem.

21. OFCA notes that in the second incident, the time used by China Unicom for troubleshooting was two hours. Though the time for troubleshooting was much improved when compared with that of the first incident, given that the first incident took place just two days before, the mere occurrence of the second incident in such close proximity in time reflected badly on China Unicom's ability and readiness to prevent repeated service disruptions which were not mitigated by the two hours it took for troubleshooting in this second incident. OFCA considers that China Unicom should put in place a more responsive contingency arrangement to enable further improvements in the time and actions taken in handling the troubleshooting of any service disruption in the future.

22. OFCA also notes that, in both incidents, China Unicom had taken a long period of time to complete the restoration process. In the first incident, China Unicom had taken 14 hours. In the second incident, China Unicom had taken 6.5 hours. According to China Unicom's explanation, the delay was due to the limited signalling link capacity, such that China Unicom had to divide the affected customers into small groups for service restoration in both incidents. To prevent similar problem from recurring again, China

Unicom should proactively identify all possible means to remove the constraint preventing service restoration to be carried out in a more timely manner.

23. Due to long troubleshooting period and restoration process, the disruption periods of the first incident and the second incident lasted for 24.5 hours and 8.5 hours respectively. In conclusion, OFCA considers that the time and actions taken by China Unicom to restore the services in both incidents are unsatisfactory and unacceptable.

China Unicom's Communication with OFCA over the Service Disruptions

24. In the first incident, the disruption of China Unicom's mobile services started at 2:00 am on 3 April 2015 (a public holiday) and had lasted for 24.5 hours up to 2:30 am on the next day (also a public holiday). China Unicom reported to OFCA at around 11:30 am on 3 April 2015, i.e. 9.5 hours after the incident occurred. China Unicom reported to OFCA at around 3:00 am on 4 April 2015 that all affected services had been recovered since 2:30 am.

25. In the second incident, the disruption occurred at 4:00 pm on 5 April 2015 (a public holiday). China Unicom reported to OFCA at 6:00 pm, i.e. two hours after the incident occurred. China Unicom reported to OFCA at around 1:00 am on 6 April 2015 that all affected services had been recovered since 0:30 am.

OFCA's Assessment

26. According to the Guidelines, the two incidents were critical events. Since they occurred on a public holiday, China Unicom should have reported to OFCA within 1 hour and 15 minutes after the occurrence of the first and the second incident respectively. However, according to OFCA's record, in both incidents, China Unicom had failed to meet the requirements stipulated in the Guidelines by a big margin each.

27. The delay of China Unicom in reporting has restricted OFCA's ability in making an accurate assessment on the severity of the incidents of outage and their impacts on the public. It has also prevented OFCA from assisting in providing timely advice and guidance to users on alternative

arrangements to make during the service disruptions (e.g. switching to fixed line services, using alternate SIM cards etc.) and offering support to China Unicom to shorten the outage time (e.g. OFCA may coordinate with the hosting mobile network operators to make temporary arrangement for China Unicom's customers).

28. In conclusion, OFCA considers the manner in which China Unicom handled its communication with OFCA in both incidents unsatisfactory.

China Unicom's Communication with Customers and the Media

29. China Unicom claimed that, in both incidents, it had made announcements on its official website and on its customer service page on Facebook to inform customers of the service disruptions. It had also notified its hotline staff to enable them to respond to customer enquiries properly. The dispatch times of the announcements are as follows –

- (a) In the first incident,
 - (i) announcements were posted on China Unicom's official website at 11:50 am, 2:16 pm, 3:22 pm and 7:01 pm on 3 April 2015 and at 8:27 am on 4 April 2015;
 - (ii) announcements were posted on China Unicom's customer service page on Facebook at 11:38 am, 2:04 pm, 3:10 pm and 6:49 pm on 3 April 2015 and at 3:33 am on 4 April 2014; and
 - (iii) internal notifications were dispatched to hotline staff at 9:30 am, 11:13 am, 11:32 am, 2:03 am, 3:00 pm and 6:09 pm on 3 April 2015.
- (b) In the second incident,
 - (i) announcements were posted on China Unicom's official website at 7:24 pm on 5 April 2015 and at 1:42 am on 6 April 2015;

- (ii) announcements were posted on China Unicom's customer service page on Facebook at 6:50 pm on 5 April 2015 and at 1:37 am on 6 April 2014; and
- (iii) internal notification was dispatched to hotline staff.¹⁰

30. China Unicom reported that it had received public complaints and media enquiries regarding the service disruptions. As there were a large number of customer calls made to its hotline during the disruption periods, it admitted that only a portion of the customers could reach its hotline staff despite the fact that it had increased the manpower to handle the surge of incoming calls. China Unicom reported that up to 24 April 2015 it had received a total of 2 942 complaints regarding the two incidents.

31. OFCA has received a total of 124 complaints and 27 enquiries from the public about the two incidents. OFCA has also received enquiries from the media. The complaints can be classified in the following areas –

- (a) the repeated disruptions of China Unicom's mobile services within a few days;
- (b) the long disruption periods in both incidents;
- (c) China Unicom's failure to notify customers of the service disruptions in a timely manner;
- (d) China Unicom's hotline was always engaged; and
- (e) China Unicom's failure to make follow-up calls to customers as promised.

OFCA's Assessment

32. After examining the actions taken by China Unicom and the complaints from the public and the media, OFCA is of the view that China Unicom had failed to provide customers with timely information about the two incidents.

¹⁰ According to China Unicom, its hotline staff was notified of the occurrence of the second incident on 5 April 2015. However, China Unicom could not identify the exact time for the dispatch of the notification.

33. In the first incident, the service disruption started at 2:00 am on 3 April 2015. China Unicom notified its hotline staff at 9:30 am, which was about 7.5 hours after the occurrence of the incident. Similarly, the announcements made by China Unicom on its website and on the customer service page on Facebook were at 11:50 am and at 11:38 am respectively, i.e. nearly 10 hours after the occurrence of the incident. In addition, OFCA notes that, although China Unicom notified its hotline staff at 9:30 am, the The message to hotline staff was that "系統緊急 notification was not factual. 升级,請稍後再試.部份和記網絡用戶恢復,請關機及開機再試" (English translation: "The system is being urgently upgraded. Please try again later. A portion of the customers hosted by the Hutchison network has been restored. Please try again by turning your handset off and then on"). As the hotline staff had not been notified of the correct facts and status, they were not able to provide the customers with accurate information about the incidents. Even worse, the message had the adverse effect of encouraging a portion of the affected customers (those hosted by the Hutchison network) to restart their handsets, which would inevitably send additional authentication requests to the HLR and further overload the signalling links to HLR. As such, the notification arrangement was very unsatisfactory. The affected customers and the media had no idea of the correct status about the service disruption until around 9.5 hours after the incident occurred, when China Unicom made the announcements at its customer service page on Facebook and at its official website.

34. In the second incident, the service disruption occurred at 4:00 pm on 5 April 2015. China Unicom made an announcement to its customers via Facebook at 6:50 pm. OFCA considers that the arrangement was still unsatisfactory because the announcement was made nearly 3 hours after the occurrence of the incident. In OFCA's view, China Unicom should inform its customers and the media as early as possible and shortly after the time it was required to notify OFCA of the occurrence of the service disruption pursuant to the Guidelines.

35. OFCA notes that, in both incidents, the scale of service disruption was large with a sizable number of its customers affected. Under these circumstances, OFCA considers that China Unicom has the duty to provide its customers with timely information about the service disruptions. As China Unicom had not provided detailed information about the service

disruptions to the public in time, particularly in the first incident, there was a lot of confusion among customers as to the severity of the incidents, and the expected time for services to resume normal. If China Unicom had made better use of the media as a channel to inform the public of the outage and the progress of its restoration works, customers should have been better informed and hence more ready to make alternative arrangement. As it is, the lack of initiative on the part of China Unicom to keep its customers duly informed of the outage had caused much grievance and discontent among customers which was reflected in the adverse comments in the news reports and the number of consumer complaints received.

36. In conclusion, OFCA considers that China Unicom had failed to provide prompt information and notification to its customers, through the media or otherwise, about the service disruptions in both incidents. The notification arrangement was particularly chaotic in the first incident.

CONSIDERATION AND DECISION

37. After examining the facts of the cases, the assessment of OFCA and the representations of China Unicom, the CA considers that China Unicom has –

- (a) in the first incident, failed to supervise its vendor in an effective manner and exercise proper internal control over the execution of network commands;
- (b) in the second incident, failed to put in place sufficient signalling links between the HLR and the core switch platform to meet the surge in authentication requests from inbound customers for 1C2N service at areas near the boundary between Hong Kong and the Mainland;
- (c) in both incidents, failed to restore its services within a reasonable timeframe;
- (d) in both incidents, failed to report the incidents to OFCA within the timeframe stipulated in the Guidelines; and

(e) in both incidents, failed to notify its customers, through the media or otherwise, of the service disruptions in a prompt and efficient manner.

38. On the basis of the above, the CA is of the view that China Unicom has <u>not</u> complied with GC 5.1 of its licence, to operate, maintain and provide a good, efficient and continuous service in a manner satisfactory to the CA. In view of the severity of the incidents, China Unicom should be imposed a financial penalty pursuant to section 36C(1)(a) of the Telecommunications Ordinance (Cap. 106) ("TO").

FINANCIAL PENALTY

39. Pursuant to section 36C(1)(a) of the TO, the CA may, subject to section 36C(3B), impose a financial penalty in any case where the licensee fails to comply with any licence condition. Under section 36C(3) of the TO, a financial penalty so imposed shall not exceed \$200,000 for the first occasion, and \$500,000 for the second occasion, on which a penalty is so imposed.

40. On the basis that this is the first occasion where China Unicom is to be imposed a financial penalty for non-compliance with GC 5.1 of its licence, the maximum penalty stipulated by the TO is \$200,000. In considering the appropriate level of financial penalty, the CA has had regard to the Guidelines on the Imposition of Financial Penalty under Section 36C of the TO (the "Financial Penalty Guidelines").¹¹ Under the Financial Penalty Guidelines, the CA is to consider a number of factors including the gravity of the breach (which includes the nature and seriousness of the infringement), whether any repetition of conduct is involved and whether there are any aggravating or mitigating factors.

41. In considering the gravity of this breach, and therefore the starting point for the level of penalty, the CA notes that the impacts of the service disruptions were serious because –

¹¹ The document may be downloaded from <u>http://tel_archives.ofca.gov.hk/en/legislation/guideline_6d_1/guideline_6d_1_150402.pdf</u>.

- (a) Approximately 75 000 and 31 500 customers of China Unicom were affected in the first incident and in the second incident respectively, representing 83% and 35% of China Unicom's active customers in Hong Kong;
- (b) there had been 24.5 hours and 8.5 hours of service disruption in the first and second incident respectively, the two incidents themselves occurred just one day apart; and
- (c) the scope of the service disruptions was extensive, covering basically all mobile services provided by China Unicom.

42. The CA also notes that there is no information to suggest any foul play or ill intent in the incidents, which would have added to the severity of the breach. Taking into account the need to allow a reasonable margin for considering aggravating factors (if any) and having considered the precedent cases, the CA considers that the appropriate starting point for determining the level of financial penalty should be \$130,000.

43. In considering the mitigating factors, the CA notes that China Unicom has provided full cooperation to OFCA in the course of the investigation. China Unicom has also taken prompt action to implement preventive measures against the recurrence of similar incident. As China Unicom has taken a conscientious and responsible attitude in making improvements to enhance its capability to handle similar incidents in the future, the CA considers that these are mitigating factors that should be taken into account in its determination of the level of financial penalty.

44. The CA has not identified any aggravating factors which offset the mitigating factors that have been taken into account.

45. Having carefully considered the circumstances of the case and taken all factors into account, the CA concludes that a financial penalty of **\$100,000** is proportionate and reasonable in relation to the breach.

IMPROVEMENT MEASURES

46. The CA recommends that China Unicom should implement the following measures to prevent the recurrence of similar incident in future, and to enhance its capability in handling service disruptions. China Unicom should –

- (a) enhance the supervision over the works of the vendor and strengthen the internal control over the execution of network commands. Effective access control mechanism should be set up to ensure that the execution of network commands must be properly controlled and subject to prior approval of the authorised persons of China Unicom;
- (b) conduct holistic reviews of its network design regularly based on the up-to-date traffic estimate to ensure that the network capacity, including the capacity of the signalling links between the HLR and the core switch platform, is properly dimensioned to cope with the potential surge in service demand;
- (c) review the process of service restoration in both incidents and liaise with its hosting mobile network operators in order to work out an effective contingency plan and an expeditious service restoration arrangement involving timely assistance from the mobile network operators. In addition, the ability and alertness of the relevant staff in assessing the severity of network problem and their efficiency in handling troubleshooting and implementing service restoration should also be improved; and
- (d) develop and implement effective procedures to ensure that its customers, the public and OFCA, will be notified timely of any future service disruptions.

The Communications Authority October 2015