

**FINAL DECISION
OF THE COMMUNICATIONS AUTHORITY**

**DISRUPTIONS OF THE TELECOMMUNICATIONS SERVICES
OF CHINA MOTION TELECOM (HK) LIMITED**

Telecommunications Licensee Investigated:	China Motion Telecom (HK) Limited ("China Motion")
Issue:	There were disruptions of the telecommunications services of China Motion on 30 March and 9 April 2013
Relevant Instruments:	General Condition ("GC") 5.1 of China Motion's Services-Based Operator ("SBO") Licence for Class 3 Service (Licence No. 908)
Decision:	Breach of GC 5.1 of China Motion's SBO Licence for Class 3 Service (Licence No. 908)
Sanction:	Financial penalty imposed
Case Reference:	LM T 25/13 in OFCA/R/R/134/2 C

BACKGROUND

On 30 March 2013, China Motion reported to the Office of the Communications Authority ("OFCA") that there was an outage of its Home Location Register ("HLR") platform.¹ On 9 April 2013, China Motion reported to OFCA that there was another outage of its HLR platform. In both incidents, all voice services, short message services ("SMS") and data services (i.e. Internet access) provided by China Motion were disrupted. OFCA activated the Emergency Response System² in both incidents and kept in close contact with China Motion to monitor the situation.

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

² Emergency Reporting 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 affect the general public.

THE SERVICE DISRUPTIONS

2. According to China Motion, the first incident occurred at around 3:01 am on 30 March 2013. China Motion's customer hotline started to receive calls from customers complaining about loss of connections to its network. At around 6:10 am, China Motion's engineers arrived on-site (i.e. the data-centre where equipment was located) and confirmed that the HLR platform was not functioning properly. As a result, all customers' authentications failed and customers were not able to use any mobile services of China Motion, including voice services; SMS and data services (i.e. Internet access), during the period from 3:01 am to 4:18 pm on 30 March 2013. The outage had lasted for around 13 hours and around [✂] customers (representing about 17.6% of its customer base) of China Motion were affected. China Motion claimed that, after it had confirmed that there was an outage of the HLR platform, it immediately created a separate customer database and installed it in a backup server. The backup server was then commissioned to replace the problematic server of the HLR platform. According to China Motion, the affected services started to resume operation from 4:18 pm on 30 March 2013 after the completion of the installation of the backup server with the newly created customer database.

3. On 9 April 2013, 10 days after the incident, China Motion attempted to put the original server (which was suspected to be the cause of the outage on 30 March 2013) back into service. Before taking such an action, China Motion had reinstalled all software on the original server. However, after the working backup server was replaced by the original server, the HLR system sounded an alarm at 12:15 pm indicating that the system was not functioning properly. Similar to the incident which occurred on 30 March 2013, all of China Motion's mobile services (i.e. voice services, SMS and data services) were disrupted. At 4:00 pm, China Motion decided to fall back on the use of the backup server. According to China Motion, the affected services began to resume operation from 4:10 pm on 9 April 2013. The outage had lasted for about four hours and the number of affected customers was around [✂] (representing about 17.6% of its customer base).

OFCA'S INVESTIGATION

4. As the network outages were critical ones affecting a large

number of China Motion’s customers, OFCA conducted an investigation into the incidents to –

- (a) examine whether China Motion had breached GC 5.1 of its SBO Licence No. 908, 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 responses of China Motion to the incidents (including the communication with OFCA, customers and the media, and the efficiency of service restoration etc.) to examine whether there are any areas requiring China Motion to make improvements.

5. The “Guidelines for Fixed and Mobile Network Operators for Reporting Network Outage” issued on 17 June 2008 (“Guidelines”) for voluntary compliance by network operators specify the detailed reporting requirements to OFCA and the timeline in the event of network outage. As China Motion is not a network operator but a mobile virtual network operator (“MVNO”)³, it is not bound by the Guidelines.

6. In the course of OFCA’s investigation, China Motion submitted two preliminary reports to OFCA on 3 April and 11 April 2013 respectively and a full report on 29 April 2013. OFCA has carefully examined the reports. As part of the investigation, OFCA has also examined the 11 consumer complaints it received concerning the incidents. The complaints were mainly about customers’ dissatisfaction of the service disruptions and the difficulties in reaching China Motion’s customer hotline during the disruption period.

³ As an MVNO, China Motion provides mobile services without owning any wireless network infrastructure or being assigned any radio spectrum. It enters into a business agreement with a mobile network operator (“MNO”) to access the network services of the MNO at wholesale rates, and then sets its own retail prices for the provision of mobile services to end-users. In operating its services, China Motion has its own HLR platform, data network and billing system.

7. OFCA completed its investigation and submitted its findings to the Communications Authority (“CA”) on 3 August 2013. Having considered the findings of OFCA, the CA issued its Provisional Decision to China Motion on 5 August 2013 and invited China Motion to make representations. China Motion submitted its representations to OFCA on 23 August 2013.

Issues Examined During the Investigation

The Cause of the Incidents and the Adequacy of China Motion’s Preventive Measures

8. According to China Motion, the first incident was suspected to be caused by a software bug in the server of the HLR platform. The problematic software made the HLR platform unstable rendering it unable to respond to the authentication requests made by switching equipment. As a result, all China Motion’s customers in Hong Kong could not obtain authentication to access the network of China Motion during the period from 3:01 am to 4:18 pm on 30 March 2013.

9. Although there was an outage of the HLR platform on 30 March 2013, the vendor, ZTE Limited (“ZTE”), was not able to do much about the software bug since the version of the software used in China Motion’s HLR platform was obsolete. It is not possible for ZTE to carry out in-depth troubleshooting to find out the root cause and fix the problem.

10. Regarding the second incident on 9 April 2013, China Motion confirmed that it was caused by human error. A configuration related parameter was wrongly input into the original server of the HLR platform when it was re-installed. The error was not detected during the testing phase because China Motion only performed functional test after re-installing the server. After the original server took over the backup server (i.e. which was put into operation after the first incident), the original server was overloaded by subscriber data because of the wrongly data-filled parameter. The overload problem caused the malfunction of the HLR platform starting from 12:15 pm on 9 April 2013, until China Motion switched back to use the backup server at 4:10 pm on the same day.

11. China Motion submitted that the current HLR platform had been put into service since June 2002. It has carried out regular maintenance and

health checking for the HLR platform. The most recent software upgrade for the HLR platform was carried out in 2005 and there were also patches installed by the vendor from time to time. However, China Motion has no record of the detailed timing of the patch installations.

12. Since the version of the software used in China Motion's HLR platform is already obsolete, the vendor is unable to provide a fix to resolve the software bug. To prevent similar incidents from recurring in future, China Motion submitted that it would –

- (a) set up an additional standalone server as the second backup for the HLR platform. If the server currently in operation in the HLR platform has an outage, the second backup server can take over within a few minutes to minimize the outage time; and
- (b) upgrade its core network (including the HLR platform and gateway switches etc.) to improve the network stability and to support 4G/3G services in late 2013.

OFCA's Assessment

13. OFCA recognizes that it is not uncommon for software bug to exist in a computer programme, but operators should strive to ensure that the software used has been fully tested before it is put into service. Besides, operators should also make their best endeavours to ensure that the software used is up-to-date and there are regular maintenance and health checking procedures in place to ensure the proper functioning of the software.

14. China Motion reported that the HLR platform in question has been put into service since June 2002. OFCA notes that the last software upgrade for the HLR platform was as far back as 2005, which was about eight years ago. According to China Motion, the software used in the HLR platform is already obsolete and the vendor is unable to carry out in-depth troubleshooting to identify the root cause and fix the software bug. OFCA considers the situation unsatisfactory for a number of reasons. Firstly, the HLR platform is a critical component of the network. It is very risky for China Motion to operate the HLR platform with software which has become obsolete and has gone without upgrade for a long period of time. Secondly, given that the software is already obsolete, China Motion should not realistically expect that the vendor would be able to provide effective and timely maintenance, or effective troubleshooting at the times of outage.

Thirdly, despite that an obsolete software is used in the HLR platform, China Motion has not made adequate preparation in advance (e.g. to draw up a contingency plan; put in place a backup HLR platform; see to the possible traffic diversity arrangement etc.) to hedge the increasing risk of the failure of the HLR platform as time goes by.

15. In addition to the above, China Motion had also committed operational error which directly led to the occurrence of the second incident. OFCA had asked China Motion why it considered there was a pressing need to put the original server back into service to replace the backup server, when the backup server was functioning well without any problem at that time. China Motion explained that it had to do so because there was no more backup server after the first incident. OFCA considers, as the root cause of the first incident has yet to be identified, the risk that the original server of the HLR platform may go out of order again once it has been put back into service should not be taken lightly by China Motion. Also, China Motion admitted that the second incident was caused by human error. A configuration related parameter was wrongly input into the original server of the HLR platform and the error was not detected during the testing phase because China Motion only performed functional test after re-installing the server. A lesson from the incident is that China Motion should review the need for conducting more comprehensive testing before a server is put back into service in the HLR platform as this should go some way towards forestalling similar problem from occurring again in future.

16. In conclusion, having examined the causes of the two incidents and China Motion's preventive measures, OFCA is of the view that China Motion has not made sufficient efforts in putting in place reasonable contingency plans and preventive measures against the failure of its HLR platform.

Time and Actions Taken by China Motion to Restore Services

17. Regarding the first incident, China Motion submitted that its customer hotline started to receive calls from customers complaining network failure from 3:01 am on 30 March 2013 (a Saturday). However, as the outage occurred during the Easter holiday (i.e. 29 March – 1 April 2013 were public holidays), its engineers could only arrive on-site at round 6:10 am and the vendor's support engineer could only remotely login to system at

12:45 pm on 30 March 2013. China Motion said that, once the engineers confirmed that they could not restore the server of the HLR platform, it had immediately decided to create a separate customer database in a backup server and use it to replace the faulty original server. After the completion of the installation of the backup server (with the newly created customer database) at round 4:18 pm, customers began to be able to register with China Motion's network and to use China Motion's services again. The network outage lasted for around 13 hours.

18. In relation to the second incident, China Motion reported that the HLR system sounded an alarm at 12:15 pm on 9 April 2013 after the backup server was replaced by the re-installed original server. China Motion's engineers (who were on-site at that time) immediately noted that the HLR platform was not operating properly because all test calls failed. China Motion immediately sought support from its vendor, and the vendor engineers remotely login from China at around 12:45 pm to diagnose the problem. At 4:00 pm, China Motion decided to switch back to use the backup server. Upon the completion of the switching, the HLR platform began to accept customers' registration from 4:10 pm. The network outage lasted for about four hours.

OFCA's Assessment

19. OFCA notes that, in the first incident, it had taken about three hours for China Motion's engineers to be on-site and nearly 10 hours for the vendor's support engineer to remotely login to the system for troubleshooting. Although the outage occurred during the period of long holiday, OFCA considers that the time for China Motion itself to attend, and to get support from the vendor to attend to the network outage, was unreasonably long. Furthermore, OFCA notes that China Motion had taken around three hours to install software and to create a replacement database in the backup server. If a backup server (with a replacement customer database) had been made readily available in advance as a form of contingency measure, the time and efforts for the creation of the replacement customer database during the outage period could have been saved, and the duration of the outage should have been shortened.

20. OFCA also considers China Motion's response to the second incident unsatisfactory. When the system sounded an alarm at 12:15 pm on

9 April 2013 indicating that the HLR platform was not functioning properly, China Motion should readily apprehend the high likelihood that the outage was caused by the original server being re-installed into the HLR platform. The outage duration could have been shortened should China Motion take a more decisive move to switch back to the use of the backup server to restore the services.

21. In conclusion, OFCA considers that the time and actions taken by China Motion to restore the services in both incidents are unacceptable.

China Motion's Communication with OFCA over the Service Disruptions

22. In the first incident, the outage of China Motion's HLR platform occurred at 3:01 am on 30 March 2013 (a public holiday) and had lasted for 13 hours up to 4:18 pm on the same day. China Motion reported to OFCA at around 5:27 pm on 30 March 2013, after the incident was over and all affected services had resumed normal operation. China Motion subsequently sent an email message to OFCA at around 8:52 pm on 30 March 2013 providing more information about the incident.

23. In the second incident, the outage occurred at 12:15 pm on 9 April 2013 (a Tuesday). China Motion had not reported to OFCA altogether. At around 2:20 pm, OFCA received complaints from the public to the effect that China Motion's network had been out of service. In response to OFCA's enquiries, China Motion informed OFCA at around 2:32 pm on 9 April 2013 that there was a problem on the HLR platform and China Motion was working with its vendors to resolve it. At 4:13 pm on 9 April 2013, China Motion reported that the affected services had been fully recovered.

OFCA's Assessment

24. OFCA notes that the two incidents of outage are critical ones in terms of the number of customers affected and the duration of the outage. If similar incidents had occurred with a network operator, according to the Guidelines, both incidents would have been classified as critical outages. Accordingly, the network operator should report to OFCA within one hour for the first incident (i.e. happened during public holiday) and within 15 minutes for the second incident (i.e. happened during weekday) respectively.

China Motion reported to OFCA about 14 hours after the first incident had occurred on 30 March 2013. China Motion also had not taken any initiatives to inform OFCA of the second incident on 9 April 2013. When China Motion responded to OFCA's enquiries regarding the outage, it was over two hours after the outage occurred.

25. The long delay of China Motion 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 Motion to shorten the outage time (e.g. OFCA may coordinate with the hosting mobile network operator to make temporary arrangement for China Motion's customers).

26. In conclusion, OFCA considers the manner in which China Motion handled its communication with OFCA on the incidents unsatisfactory.

China Motion's Communication with Customers and the Media

27. China Motion said that it had made the following arrangements to inform its customers of the service disruptions –

- (a) in both incidents, it had made a voice announcement in its interactive hotline system to inform customers of the service disruptions; and
- (b) in the second incident, it had posted an announcement on its customer service page on the Facebook and its company website to inform customers of the service disruption.

28. China Motion reported that it had received public complaints and media enquiries regarding the service disruptions. It also admitted that, as the number of customer calls made to its hotline during the outage period was significant, only a portion of customers could get through to its hotline staff. According to China Motion, it has received a total of 417 complaints regarding the first incident and 114 complaints regarding the second incident respectively.

29. OFCA has received a total of 11 complaints from the public about the two incidents. OFCA has also received enquiries from the media. The complaints can be broadly classified into the following three areas –

- (a) China Motion failed to provide resilient telecommunications services;
- (b) China Motion’s hotline was always engaged; and
- (c) China Motion failed to notify customers of the service disruptions in a timely manner. Details were not provided to customers until the outages were over.

OFCA’s Assessment

30. After examining the actions taken by China Motion and the complaints from the public and the media, it is OFCA’s view that China Motion had failed to provide customers with timely information about the two incidents. As a result, the majority of affected customers and the media had no idea as to what had happened and why there was disruption of China Motion’s services.

31. OFCA notes that, in both incidents, the scale of service disruption was large and a sizable number of customers were affected. In these circumstances, OFCA considers that China Motion has a duty to provide its customers with timely information about the service disruptions. As China Motion had not provided detailed information about the service disruptions to the public, there was a lot of confusion among customers as to the severity of the incidents, and the time taken for services to resume normal. If China Motion had made better use of the media as a channel to inform the public of the outage and the progress of its restoration works, users should have been better informed and hence better prepared to make alternative arrangement. As it is, the lack of initiative on the part of China Motion to keep its customers duly informed of the outage had caused much grievance and discontent among users which had culminated into public outcry and consumer complaints.

32. In conclusion, OFCA considers that China Motion had failed to provide prompt information and notification to its customers, through the media or otherwise, about the service disruptions in both incidents.

THE CA'S CONSIDERATION AND DECISION

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

- (a) failed to ensure the proper operation of its HLR platform, leading to the two outages, and disrupting the telecommunications services to its customers;
- (b) failed to restore its services within a reasonable timeframe;
- (c) failed to report the incidents to OFCA within a reasonable timeframe; and
- (d) failed to notify its customers, through the media or otherwise, of the service disruptions in a prompt and efficient manner.

34. On the basis of the above, the CA is of the view that China Motion has not 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. China Motion should be imposed a financial penalty pursuant to section 36C(1)(a) of the Telecommunications Ordinance (“TO”) (Cap. 106).

35. In arriving at the above conclusion, the CA has given regard to the fact that the Guidelines, which were issued for voluntary compliance by network operators, are not applicable to all MVNOs. In addition, the CA also notes that China Motion is not explicitly required by the TO or the conditions of its licence to notify OFCA of the outage promptly. Although China Motion’s failure in reporting the incidents within the reasonable timeframe did not by itself constitute a breach of the TO or the licence condition, given that GC 5.1 requires China Motion to “operate, maintain and provide a good, efficient and continuous service in a manner satisfactory to the CA”, OFCA considers that it is reasonable for the CA to take this factor

into account in considering whether China Motion has met the requirements of GC 5.1 of its licence.

FINANCIAL PENALTY

36. 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.

37. On the basis that this is the first occasion where China Motion 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”).⁴ 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.

38. 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 outages were serious because –

- (a) all China Motion’s active customers in Hong Kong were affected, amounting to [✂] users (representing about 17.6% of its customer base);
- (b) there had been 13 hours of service disruption in the first incident and around four hours of service disruption in the second incident; and
- (c) the scope of service disruption was extensive, covering basically all mobile services provided by China Motion.

⁴ The document may be downloaded from http://tel_archives.ofca.gov.hk/en/legislation/guideline_6d_1/guideline_6d_1_150402.pdf.

39. 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 case, the CA considers that the appropriate starting point for determining the level of financial penalty should be \$100,000.

40. In considering the mitigating factors, the CA notes that China Motion has provided full cooperation to OFCA in the course of the investigation. China Motion has also taken prompt action to implement preventive measures against the recurrence of similar incident. As China Motion 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.

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

42. Having carefully considered the circumstances of the case and taken all factors into account, the CA concludes that a financial penalty of \$80,000 is proportionate and reasonable in relation to the breach.

IMPROVEMENT MEASURES

43. The CA recommends that China Motion should implement the following measures to prevent the recurrence of similar incident in future, and to enhance its capability in handling outages. China Motion should –

- (a) conduct a technical review of the system set-up and design, the software version and the operation of the HLR platform to ensure that it is reliable, stable and up-to-date;
- (c) review the effectiveness of the backup arrangement for the HLR platform, formulate contingency plan and improve the efficiency of service restoration in response to outage; and

- (c) develop and implement effective procedures to ensure that its customers, the public and OFCA, will be notified timely of outage.

The Communications Authority
November 2013