FINAL DECISION OF
THE COMMUNICATIONS AUTHORITY

DISRUPTION OF THE TELECOMMUNICATIONS SERVICES OF WHARF T&T LIMITED ON 12 AUGUST 2014

Telecommunications Licensee Investigated:	Wharf T&T Limited ("WTT")
Issue:	There was a disruption of the telecommunications services of WTT on 12 August 2014
Relevant Instruments:	General Condition ("GC") 5.1 of WTT's Unified Carrier Licence ("UCL") No. 28 and Services-based Operator ("SBO") Licence No. 15
Decision:	No breach of GC 5.1 of WTT's UCL No. 28 and SBO Licence No.15
Sanction	N/A
Case Reference:	LM T60/14 in OFCA/R/R/134/2 C

BACKGROUND

At around 4:33 pm on 12 August 2014, the Office of the Communications Authority ("OFCA") received enquiries from the public about disruption of the telecommunications services of WTT at various locations. OFCA immediately contacted WTT to check out the situation. After confirming with WTT that a service disruption had occurred, OFCA activated the Emergency Response System[1] and kept in close contact with WTT to monitor the situation.

[1] 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 network congestion or network outage which may affect the general public.

THE SERVICE DISRUPTION

2. WTT reported that, at 3:30 pm on 12 August 2014, its network operations centre ("NOC") was alerted by system alarms that the Uninterrupted Power Supply ("UPS") system[2] and the isolation transformer at WTT's Tsuen Wan data centre did not function properly. The malfunction had resulted in disruption of WTT's broadband Internet access services and Internet Protocol ("IP") telephony services.

3. According to WTT, the disruption was not specific to any particular area of Hong Kong. The incident affected a total of 47 353 customers, including (a) 1 213 customers of business IP telephony services, (b) 4 363 customers of business broadband Internet access services, and (c) 41 777 customers of residential IP telephony services. During the disruption period, the affected customers could not use these services.

4. WTT claimed that, once the disruption was confirmed to be caused by the simultaneous malfunction of the UPS system and the isolation transformer at around 4:15 pm on 12 August 2014, it promptly responded and took a number of actions including switching the affected telecommunications systems to another power source to restore the affected telecommunications services. WTT reported that after it had completed the switching at around 4:25 pm, the affected telecommunications services resumed gradually, and were largely restored (i.e. covering 99% of the affected customers) at 4:50 pm and fully recovered at 6:07 pm on the same day. The disruption lasted for approximately 2.5 hours.

OFCA'S INVESTIGATION

5. According to OFCA's records, the affected telecommunications services were operated by WTT under two licences. The business IP telephony services and the business broadband Internet access services were provided by WTT under UCL No. 28 as a carrier licensee, and the residential

[2] UPS is an electrical apparatus which provides continuous power to a load when the input power source, typically mains power, fails.

IP telephony services were provided by WTT under SBO Licence No. 15[3] as a holder of a SBO licence.

6. As the service disruption had affected more than 40 000 customers of WTT for over two hours, OFCA considers it necessary to conduct an investigation into the incident to –

(a) examine whether WTT has breached GC 5.1 of its UCL and SBO Licence 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 WTT in handling the incident (including the efficiency of service restoration, and the communications with OFCA, customers and the media, etc.) to examine whether there are any areas requiring WTT to make improvements.

7. In the course of OFCA's investigation, WTT submitted, as per OFCA's request, a preliminary report[4] on 15 August 2014 and a full report[5] on 1 September 2014. OFCA has carefully examined the reports. As part of the investigation, OFCA has also examined the 10 consumer enquiries/ complaints it received concerning the disruption of WTT's telecommunications services. Most of the complaints were about dissatisfaction of the service disruption and the difficulties in reaching WTT's customer hotline during the period of service disruption.

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[3] The business IP telephony services and the business broadband Internet access services are marketed by WTT. The residential IP telephony services, however, are marketed by i-Cable Communications Limited.

[4] The preliminary report of WTT is available from OFCA's website at http://www.ofca.gov.hk/filemanager/ofca/en/content_723/wtt_report_201408.pdf.

[5] The full report of WTT is available from OFCA's website at http://www.ofca.gov.hk/filemanager/ofca/en/content_723/wtt_report_20140902.pdf.

8. OFCA completed its investigation and submitted its findings to the Communications Authority ("CA") on 16 December 2014. Having considered the findings of OFCA, the CA approved the Provisional Decision which was issued to WTT on 2 January 2015 for its representations. WTT submitted to OFCA on 16 January 2015 that it noted the CA's Provisional Decision and would implement the improvement measures in accordance with the CA's advice.

Issues Examined During the Investigation

The Cause of the Incident and the Adequacy of WTT's Preventive Measures

9. WTT reported that the incident was triggered by a faulty control board installed in the UPS system at WTT's Tsuen Wan data centre. Due to hardware problem, the control board of the UPS system was dysfunctional at around 3:30 pm on 12 August 2014. According to WTT's resilience design, the isolation transformer should immediately take up the function of the UPS system to supply power to the connected telecommunications systems. Unfortunately, the isolation transformer also had hardware problems and was not functional at the same time. Without any power supply to the telecommunications systems handling broadband Internet access services and IP telephony services at the Tsuen Wan data centre, a portion of WTT's customers could not access the Internet; make or receive IP voice calls during the disruption period.[6]

10. WTT claimed that the resilience design of its UPS system was in line with the industry standard. Firstly, the UPS system was equipped with a pair of UPS units (i.e. one active unit and one backup unit) according to a redundancy protection mechanism. In case the active unit failed, the backup unit would take over and supply power to the connected telecommunications systems. Secondly, if both the active unit and the backup unit failed at the same time, the UPS system would automatically switch to the isolation transformer which would take up the function of providing power to the connected telecommunications systems. However, in this incident, as the control board of the UPS system had hardware problem, the redundancy mechanism of the UPS system could not function properly which triggered

[6] WTT has data centres at Tsuen Wan and Kwun Tong. The data centre at Kwun Tong was not affected by this incident.

the automatic switchover to the isolation transformer. Unfortunately, due to hardware problem, the isolation transformer was also dysfunctional at the same time. As a result, no power was supplied to the connected telecommunications systems which triggered the service disruption. WTT explained that the incident was uncommon and beyond its expectation as it was caused by the simultaneous malfunction of the UPS system and the isolation transformer.

11. WTT reported that both the UPS system and the isolation transformer were supplied by a reputable power systems vendor called Chloride Group PLC (which was fully acquired by Emerson Network Power Limited in 2010). WTT claimed that it had made its best endeavours to maintain the stability and reliability of the UPS system and the isolation transformer after they were put into service in 2001. There were regular preventive maintenance and health checking procedures in place for the UPS system and the isolation transformer. The last inspection and preventive maintenance procedures for the UPS system and the isolation transformer were carried out on 30 June 2014, and no anomaly was found. WTT also said that the current firmware and hardware of the UPS system and the isolation transformer were up-to-date. As the hardware problems of the control board of the UPS system and the isolation transformer had never happened simultaneously in the past, WTT claimed that the service disruption was caused by circumstances beyond its control.

12. In order to prevent any similar incident from occurring again in future, WTT submitted that –

(a) as an interim measure, it had installed an additional AC/DC inverter to the existing UPS system as another source of backup power supply to telecommunications systems under emergency situations; and

(b) in the long term, it would commission an additional UPS system and operate it in parallel with the existing one to strengthen the reliability of power supply to telecommunications systems.

OFCA's Assessment

13. OFCA notes that the root cause of the incident was the simultaneous malfunction of the UPS system and the isolation transformer. OFCA observes that the UPS system and the isolation transformer were supplied by a reputable equipment vendor, and WTT has taken reasonable measures to maintain the healthiness and stability of the equipment after they were put into service. The firmware and the hardware are up-to-date, and there are regular maintenance and health checking procedures in place to examine the proper functioning of the equipment.

14. OFCA also notes that WTT has put in place backup arrangements to cater for the possible failure of the UPS system. Despite having the backup arrangement, the disruption still occurred. According to WTT's explanation, the incident was beyond its expectation in that both the control board of the UPS system and the isolation transformer were dysfunctional at the same time. As there was no evidence that the design of WTT's backup power supply system was deficient, or that WTT had committed any error which led to the occurrence of the outage, OFCA accepts WTT's explanation and agrees that the service disruption may not be reasonably envisaged by WTT beforehand.

15. In sum, having examined the cause of the incident and the preventive measures taken by WTT, OFCA accepts that the occurrence of the service disruption, though undesirable, was caused by circumstances reasonably beyond WTT's control. OFCA is satisfied that WTT has taken reasonable preventive measures in a bid to ensure the proper functioning of its UPS system and isolation transformer, and made provisions of redundancy arrangement to minimise the risk of suspension of power supply. Having said that, in order to prevent any similar incident from occurring again, OFCA suggests that WTT should consider running drills for the operation of switchover among the UPS system, the isolation transformer and other components of the power supply system such as the AC/DC inverter etc. on a regular basis.

Time and Actions Taken by WTT to Restore Services

16. WTT submitted that, once the NOC noted that both the UPS system and the isolation transformer were dysfunctional at around 3:30 pm on 12 August 2014, it immediately escalated the problem to the facility management team for action. The support engineer arrived on-site at around 4:05 pm and promptly carried out a series of emergency checking and troubleshooting procedures with an attempt to resolve the problem.

17. WTT claimed that, it had also escalated the issue to the vendor of the UPS system and worked with it closely to deal with the problem. At around 4:20 pm, WTT reset the UPS system. As the problem still persisted, WTT immediately took action thereafter to switch the affected telecommunications systems to another power source. Following such an action, the telecommunications systems started to operate again and the affected services resumed progressively. According to WTT, the affected services were largely resumed (i.e. covering 99% of the affected customers) at 4:50 pm and were fully restored at 6:07 pm on 12 August 2014.

OFCA's Assessment

18. OFCA notes that, once WTT's NOC was alerted by system alarms, it responded and referred the matter to the facility management team for action expeditiously. The facility management team had taken prompt actions to deal with the problem, including seeking help from the vendor. Once WTT had discovered that the problem could not be fixed by resetting the UPS system, it immediately proceeded to switch the affected telecommunications systems to another power source. The action was successful and the affected telecommunications services resumed gradually. Most of the affected customers could use the services again at around 4:50 pm (about 80 minutes after the service disruption occurred) and all affected services were fully recovered at 6:07 pm on 12 August 2014. WTT's actions to switch the affected systems to another power source effectively shortened the duration of service outage and minimized the impact on customers.

19. Overall speaking, OFCA considers that the time and actions taken by WTT to restore the affected services are acceptable.

WTT's Communications with OFCA over the Service Disruption

20. The service disruption of WTT occurred on 12 August 2014. According to the "Guidelines for Fixed and Mobile Network Operators for Reporting Network Outage" issued on 17 June 2008 and the "Guidelines for Cable-based External Fixed Telecommunications Network Services Operators and Internet Service Providers for Reporting Network and Service Outage" issued on 19 July 2011 (collectively called the "Guidelines") which were in effect at the time, a facility-based network operator should report to OFCA in the event of network or service outage. The Guidelines also specify that in the event of outage of IP telephony services affecting 5 000 or more users for more than 60 minutes, the network operator concerned should report the outage to OFCA within 15 minutes after the triggering criteria are met, if the outage occurs on weekdays during the period from 7:30 am to 9:00 pm. Similarly, in the event of degradation of Internet access services or failure of critical components affecting/potentially affecting 10 000 or more users for more than 30 minutes, the network operator concerned should report the outage to OFCA within one hour if the outage occurs on weekdays during the period from 8:30 am to 1:00 am of the next day.

21. The service disruption was first detected by WTT at 3:30 pm on 12 August 2014, which was a weekday. It affected (a) 1 213 customers of business IP telephony services, (b) 4 363 customers of the business broadband Internet access services, and (c) 41 777 customers of residential IP telephony services. According to OFCA's record, the first instance that WTT reported the incident to OFCA was at 5:38 pm, when OFCA successfully got in touch with WTT's NOC enquiring about the situation after receipt of public enquiries. The reporting time of WTT was over two hours after the outage had occurred, which exceeded the timeframe specified in the Guidelines for compliance by all carrier licensees by 53 minutes.

22. WTT explained that the business broadband Internet access service and the business IP telephony services were provided by WTT as a carrier licensee under UCL No. 28 and the residential IP telephony services were provided by WTT as a holder of a SBO licence under SBO Licence No. 15. It claimed that it was not required to report the disruption of the business broadband Internet access service and the business IP telephony services to OFCA pursuant to the Guidelines because the number of affected

customers was below the reporting threshold (i.e. less than 5 000 affected customers). As regards the disruption of the residential IP telephony services, WTT submitted that it should not be bound by the Guidelines because the Guidelines were not applicable to telecommunications services operated under the SBO Licence before 1 October 2014.[7] WTT added that, notwithstanding that it was not bound to report the incident to OFCA, it had been very cooperative and responsive to OFCA's enquires throughout and after the disruption period.

23. WTT also submitted that it was out of its own initiative that it informed OFCA of the full recovery of the affected services with effect from 6:07 pm on 12 August 2014.

OFCA's Assessment

24. OFCA notes that (a) regarding the disruption of the business IP telephony services and the business broadband Internet access services, the number of affected customers was below the reporting threshold and (b) regarding the disruption of the residential IP telephony services, the Guidelines were not applicable to holders of SBO licences like WTT before 1 October 2014. In these circumstances, although the reporting time of WTT was over two hours after the outage had occurred which had exceeded the timeframe specified by the Guidelines, WTT had not contravened the Guidelines as the incident on 12 August 2014 occurred at the time when the updated Guidelines were not yet in force and applicable to WTT in the capacity of a SBO licensee in operating the residential IP telephony services. That notwithstanding, WTT is advised to take proper actions to ensure that it would observe the updated Guidelines with effect from 1 October 2014, under which all carrier licensees and major SBO licensees are subject to the same reporting requirements.

25. In conclusion, OFCA considers that the manner in which WTT handled its communications with OFCA in the incident was not in contravention of the Guidelines prevailing at that time. Having said that, WTT is advised to observe the new requirements specified in the updated

[7] With effect from 1 October 2014, the Guidelines have been updated such that they are applicable to all carrier licensees and the majority of SBO licensees (including all SBO licensees for Class 1 and Class 2 IP telephony services, mobile virtual network services, inter-operator short messages services and Internet access services).

Guidelines to ensure that its communications with OFCA would comply with the new requirements in future.

WTT's Communications with Customers and the Media

26. WTT submitted that it had communicated with its customers about the service disruption through the following channels –

(a) at around 4:11 pm on 12 August 2014, WTT notified the heads of sales teams about the outage;

(b) from 5:50 pm on 12 August 2014, WTT updated the Interactive Voice Response System ("IVRS") of its hotline by adding a voice announcement about the service disruption;

(c) from 6:00 pm on 12 August 2014, WTT's customer service representatives returned calls to the affected business customers who had contacted WTT's hotline in relation to the disruption; and

(d) from 13 to 15 August 2014, WTT issued letters to the affected business customers who had requested a written response.

27. WTT also submitted that, during the disruption period, it had made its best endeavours to mobilise all the available manpower at the call centre to cope with the surge of customer enquiries.

28. According to WTT, it received a total of 158 enquires/complaints regarding the incident. OFCA received a total of 10 enquires/complaints from members of the public and a few enquiries from the media about the incident.

OFCA's Assessment

29. OFCA notes that the first notification made by WTT to its customers (via the IVRS) about the service disruption was at 5:50 pm on 12 August 2014, nearly 2.5 hours after the occurrence of the service disruption when the service restoration was almost completed. During the

period between the start of the service disruption (i.e. at 3:30 pm on 12 August 2014) and 5:50 pm on 12 August 2014, no information about the service disruption was provided by WTT to its customers. WTT did not notify the media of the incident during the disruption period.

30. As WTT had not provided the affected customers and the media with timely information about the incident, the majority of the affected customers and the media had no idea as to what had happened and why there was disruption of WTT's services. Some of the affected customers tried to call WTT's hotline during the period but could not get through to WTT staff. OFCA considers that WTT should as and when service disruptions occur improve its arrangements to notify the affected customers and the media as early as possible (e.g. as soon as possible after it had ascertained that there was a disruption of services). If WTT had made better use of the media as a channel to inform the public of the occurrence of the disruption and the progress of service restoration, the affected customers would have less grievances, and the number of complaints would likely be reduced.

31. In conclusion, OFCA considers that WTT did not notify its customers, through the media or otherwise, of the service disruptions in a prompt and efficient manner. WTT should improve its arrangements in notifying customers and the media in the event of service disruption in future.

THE CA'S CONSIDERATION AND DECISION

32. After examining the facts of the case, the assessment of OFCA and the representations of WTT, the CA considers that WTT has –

(a) taken reasonable preventive measures in a bid to ensure the healthiness and stability of the UPS system and the isolation transformer, and made provisions of redundancy arrangement to minimise the risk of suspension of power supply. In view of the fact that the incident was caused by the simultaneous malfunction of the UPS system and the isolation transformer, which had not occurred before and was hence not anticipated, and considering that there was no evidence that the design of WTT's backup power supply system was deficient, or that WTT

had committed any error which led to the occurrence of the outage, the CA accepts that the occurrence of the service disruption was caused by circumstances reasonably beyond WTT's control;

(b) taken effective actions to restore the affected services within an acceptable timeframe;

(c) reported the service disruption to OFCA in a manner not at variance with the requirements set out in the Guidelines, which were in effect at the time of the incident. However, as the Guidelines have been updated with effect from 1 October 2014, WTT is advised to observe the new requirements specified in the updated Guidelines to ensure that its communications with OFCA would comply with the new requirements in future whether as a carrier licensee or a holder of a SBO licence; and

(d) failed to notify its customers, through the media or otherwise, of the service disruptions in a prompt and efficient manner. WTT should improve its arrangements in notifying customers and the media in the event of service disruption in future.

33. In conclusion, the CA considers that there has been no breach of GC 5.1 of WTT's UCL No. 28 and SBO Licence No.15, which requires WTT to provide a good, efficient and continuous service in a manner satisfactory to the CA.

IMPROVEMENT MEASURES

34. Notwithstanding the finding of no breach by WTT of GC 5.1 of its UCL No. 28 and SBO Licence No. 15, the CA considers that WTT should implement the following suggested measures to prevent the recurrence of any similar incident and to improve the manner in which it handles the communications with OFCA, the customers and the media in future. WTT should –

(a) consider running appropriate drills for the operation of switchover among the UPS system, the isolation transformer and other components of the power supply system such as the AC/DC inverter on a regular basis;

(b) remind its staff of the new requirements specified in the updated Guidelines to ensure that its communications with OFCA would comply with the new requirements in future whether in its capacity as a carrier licensee or a SBO licensee; and

(c) improve its internal procedures to ensure more timely dissemination of information to its customers and the media in the event of service disruption. The target should be to notify customers and the media shortly after the first report of the incident to OFCA.

The Communications Authority
February 2015