

Wharf T&T Limited

Final Report on Service Degradation on 12 August 2014

1 Introduction

This final report is submitted by Wharf T&T Limited (“WTT”) pursuant to its Services-Based Operator (“SBO”) Licence #015.

WTT provides residential voice telephony service pursuant to its SBO Licence which is marketed and operated by i-Cable Telecom Limited (“i-Cable”). WTT does not offer or provide residential broadband service.

This report summarizes the service degradation incident on 12 August 2014. At around 15:30, one of the UPS (Uninterrupted Power Supply) at WTT Tsuen Wan Central Office (CO) failed.

The incident affected the Digital HomeLine (“DHL”) service, which is an IP voice telephony service, and affected an estimated 41,777 customers.

2 Incident Description

The incident occurred at around 15:30 due to the malfunctioning of the parallel control board of one of the UPS inverters at WTT Tsuen Wan CO. This incident occurred despite that the UPS was designed with 1+1 protection such that in the event of board failure it would trigger the switchover to the isolation transformer for continuous power supply. Unfortunately, the transformer was faulty and failed to supply power. Such exceptional double failure caused total failure of the UPS.

The incident was detected by WTT Network Management Center (NMC). NMC immediately despatched CO facility management engineers and network operation engineers to the site. Network operation engineers alerted senior management and customer service staff to enable them to timely respond to customer inquiries on the problem and the progress of service recovery.

Most of the DHL service was resumed by 16:50. The circuit breaker was turned off in order to check that the power supply was stable. This then caused a temporary interruption of service from 17:57 to 18:07. By 18:07 all DHL service was resumed normal.

3 Services and Customers Affected

DHL service was affected.

The estimated number of customers affected is 41,777. An estimated 158 customers' enquiries/complaints were received.

4 **Event Log on 12 August 2014 on Incident and Recovery Action**

Time	Event
15:30	NMC detected system alarm and diagnosed to be UPS power failure at Tsuen Wan Central Office. Immediately informed Central Office Facility Management (COFM) engineer to check.
16:05	COFM engineers arrived on site.
16:15	UPS A/B observed inverter alarm and no output.
16:20	Facility maintenance contractor arrived on site. Reset UPS alarm for trial without success.
16:25	IP voice broadband switches were connected to non-essential AC power.
16:50	Most of the DHL service resumed normal, save for an estimated 1% of the affected customers. Resumption was delayed due to the need to register their IP telephony terminals which might be caused by customers' attempt to reset their terminals or turn off.
17:00	Power down/ up UPS for emergency recovery without success.
17:10	Facility maintenance contractor advised that the fault might be caused by parallel control board and isolation transformer failure.
17:30	Facility maintenance contractor started cable connection bypass of isolation transformer for emergency restoration.
17:57	Breaker was turned off to perform thorough check for power supply stability assurance.
18:07	Breaker was turned on. Confirmed all DHL services resumed normal.
20:05	Completed the cable connection to bypass the isolation transformer and faulty parallel control board replacement of UPS.
20:15	Power up and resumed UPS for testing.
20:35	UPS resumed to normal.
13/8/2014 00:00	Fallback the non-essential AC power to UPS and confirmed all normal.

5 Remedial Actions

Upon the UPS failure, the immediate action was to restore service to customers with temporary non-essential AC power.

Once NMC diagnosed the cause to be UPS failure, the COFM, facility maintenance contractor and network operation engineers were notified to attend on site for trouble shooting and service restoration. In parallel, network operation team informed and kept in close contact with senior management and customer service staff to provide information updates.

The faulty UPS parallel control board was replaced to restore the UPS power. A power cable was laid to bypass the faulty isolation transformer to prevent single point of failure before the isolation transformer fault was fixed.

6 Root Cause

The investigation suggests that the root cause of the incident was due to the double failure of the parallel control board of the UPS inverter and the isolation transformer. This was totally unexpected as WTT regularly (at quarterly intervals) inspect and carry out preventive maintenance. The latest inspection and preventive maintenance were carried out on 30 June 2014 and there was no problem identified.

Please refer to Network Diagram 1 which shows how the 2 UPS and the isolation transformer were connected to WTT's system/network of broadband and IP voice services. [Network Diagram 1 is confidential – please withhold from publication]

The root cause for the malfunction of the parallel control board of the UPS was due to hardware fault of the parallel control board. Upon replacing the parallel control board, the UPS parallel system resumed normal.

The distributed parallel system composed of 2 UPSs, UPS-A and UPS-B with one parallel control board equipped in UPS-A which controls the distributed parallel system of both UPSs. As the parallel control board was faulty, the system switched to bypass inputs that were connected to the isolation transformer.

The isolation transformer also malfunctioned, it was found vibrating and noisy. The transformer input and output power cables were connected together so as to bypass the faulty isolation transformer.

7 Communications with Customers

- IVR ad hoc message announcement was issued from 17:50 to 20:48

- Customer service agents were briefed to handle related enquires consistent with the IVR ad hoc message

8 Communications with OFCA

Communication by i-Cable on behalf of WTT 12 August 2014:

- 17:38 – telephone call was made to OFCA notifying OFCA that DHL service was down and details would be provided
- 18:16 – preliminary outage report was emailed to OFCA
- 18:31 – email acknowledgement of receipt of report from OFCA
- 18:30 – telephone call from OFCA to check status and it was informed that matter was still under investigation
- 19:24 – call to OFCA that problem was fixed
- 19:49 – email to OFCA that problem was fixed at 19:10 and outage report will be provided soon

WTT wishes to clarify that DHL service was restored by 18:07 on the same day.

9 Improvement / Preventive Action

Following the incident WTT has connected one of the 1+1 protection access switch pair to the DC power plant via inverter and the other one to UPS as an interim measure in order to avoid similar power incident (please refer to Network Diagram 2). [Network Diagram 2 is confidential – please withhold from publication]

WTT has planned to install another UPS to form dual protected power source to feed the network equipment in around two months (please refer to Network Diagram 3). Also, WTT will replace the existing UPS and faulty isolation transformer shortly after coordination with customers on planned maintenance window. [Network Diagram 3 is confidential – please withhold from publication]

With the above action, WTT is confident that similar incident would not happen.

10 Conclusion

WTT regrets the incident that has caused service impacts to its valued customers and concerns to OFCA.

We understand the importance of telecommunications service to our customers and to that end we will continue to use our best endeavor to deliver the high standard of service that our customers have come to expect from us.

In closing, we note that OFCA has just completed the industry consultation on extending the Guidelines for Fixed and Mobile Network Operators for Reporting Network Outage to SBO licensees on 22 August 2014. The new guidelines will take effect from 1 October 2014. As of today the said guidelines do not require reporting of the incident to OFCA by

SBO Licensees providing IP telephony service. In any event WTT will co-operate with OFCA and answer any queries that OFCA may have on this incident.

Thank you.

Submitted by Wharf T&T Limited

1 September 2014

