

**FINAL DECISION OF
THE COMMUNICATIONS AUTHORITY**

**INVESTIGATION INTO
SMARTONE'S NETWORK OUTAGE ON 9 APRIL 2012**

Telecommunications Licensee Investigated:	SmarTone Communications Limited and SmarTone Mobile Communications Limited (collectively "SmarTone")
Issue:	There was an outage of SmarTone's network and disruption of its telecommunications services on 9 April 2012
Relevant Instruments:	General Condition ("GC") 5.1 of SmarTone's Fixed Carrier Licence No. 007 and Unified Carrier Licence No. 018
Decision:	Breach of GC 5.1 of SmarTone's Fixed Carrier Licence No. 007 and Unified Carrier Licence No. 018
Sanction:	Financial penalty imposed
Case Reference:	OFCA/R/R/47/6/6C

BACKGROUND

At around noon on 9 April 2012, the Office of the Communications Authority ("OFCA") received enquiries from the media about disruption to the mobile voice services, short message services ("SMS") and data services provided by SmarTone. As OFCA had not received any notification from SmarTone on the service disruption then, OFCA immediately contacted SmarTone to check out the position. OFCA was told that over one hundred cell sites of SmarTone had broken down but no further details were available. After confirming with SmarTone that there was a network outage, OFCA activated its Emergency Response System¹ and kept

¹ 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.

in close touch with SmarTone throughout the outage to monitor the situation.

THE NETWORK OUTAGE

2. According to SmarTone, on 9 April 2012 at around 8:00 am, there was a sudden mains electricity supply outage at the building where SmarTone's switching system at Shatin is located. The power supply to the entire building was disrupted due to the short circuit of a main alternating current ("AC") bus bar to the earth². To maintain the operation of the switching system, SmarTone's backup power supply system for the switching system immediately took over. The services of SmarTone were unaffected at that point. However, two and a half hours later at approximately 10:35 am, SmarTone's backup power supply system failed to operate. A detailed account of the failure of SmarTone's backup power supply system is at **Appendix**. As a result, the switching system lost its power supply completely and it subsequently ceased operation.

3. According to SmarTone, the suspension of the operation of the switching system at Shatin rendered out of service approximately 25% of its cell sites in the territory³. As a result, SmarTone's customers in several areas in Hong Kong and certain MTR stations in the Kowloon area experienced difficulty in making and receiving voice calls, accessing mobile data services, SMS and other services⁴ via mobile phones. According to SmarTone's own estimation, the total number of active customers at the time of the incident was 1,075,000, and approximately 22% of them (i.e. 243,000) were affected by the network outage.

4. SmarTone indicated that its emergency restoration and recovery procedures were activated immediately after the switching system suspended operation and services were restored progressively from 12:15 pm on 9 April 2012. According to SmarTone, the voice and mobile internet services went largely back to normal from 1:00 pm; and SMS and other services were progressively resumed from 2:30 pm onwards. Some servers controlling other services which only affected a relatively small number of customers

² The mains electricity supply was finally resumed at 4:30 am on 10 April 2012.

³ The suspended operation of SmarTone's switching system at Shatin made all cell sites connecting to that switching system lost connection and out of service.

⁴ Mobile content services, voice mail services and stock quotes services.

required further manual intervention for services restoration in subsequent hours, but SmarTone claimed that it finally managed to recover all cell sites and restored all services at around 4:27 pm on 9 April 2012⁵.

THE INVESTIGATION

5. As the network outage was a critical one, affecting a substantial number of SmarTone's customers, OFCA has conducted an investigation into the incident to –

- (a) examine whether SmarTone has been in breach of GC 5.1 of its Fixed Carrier Licence No. 007 and Unified Carrier Licence No. 018, 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.....”

- (b) review the actions taken by SmarTone in handling the service outage, its communication with OFCA and affected customers and the media, and the service restoration, with a view to identifying areas that require improvements by SmarTone and the enhancement measures needed.

6. In the course of OFCA's investigation, SmarTone has as per OFCA's request submitted a preliminary report⁶ on the incident on 12 April 2012 and a full report⁷ on 27 April 2012. OFCA has examined the reports carefully, and has also met with SmarTone on 30 April 2012 to clarify and exchange views on relevant issues arising from the reports, including the

⁵ SmarTone returned OFCA's call at around 4:27 pm on 9 April 2012 and informed OFCA that all of its cell sites and services had been restored.

⁶ The preliminary report of SmarTone may be downloaded from OFCA's website at http://www.ofca.gov.hk/filemanager/ofca/common/media/smartone_report_20120412.pdf.

⁷ The full report of SmarTone may be downloaded from OFCA's website at http://www.ofca.gov.hk/filemanager/ofca/common/Industry/telecom/fbs/outage/smartone_report_20120427.pdf.

causes of the outage, the actions that SmarTone had taken in handling the outage and the improvement measures. At the meeting, SmarTone submitted to OFCA a block diagram on the configuration of its backup power supply system.

7. As part of the investigation, OFCA has examined the 24 consumer complaints it received since 9 April 2012 concerning SmarTone's network outage. About half of the complainants reported that they had called SmarTone's hotline during the outage period but could not get in touch as the hotline was either engaged or the calls were not answered. OFCA has also contacted the media to enquire about the manner in which SmarTone had responded to their enquiries during the outage period. In summary, the media found it difficult to get hold of the Public Relations Department of SmarTone before 1:00 pm on 9 April 2012. Even if their calls were connected, in most situations they were given just a holding reply. Before SmarTone issued a press statement to the media about the service outage at 5:36 pm on 9 April 2012 (i.e. seven hours after the outage had occurred), the media had not been able to obtain much details direct from the company about the outage.

8. OFCA completed its investigation and submitted its findings to the Communications Authority ("CA") on 30 May 2012. Having considered the findings of OFCA, the CA issued its Provisional Decision to SmarTone on 31 May 2012 and invited it to make representations within 14 days. At SmarTone's request, the deadline for making representations was extended by one week to 20 June 2012. SmarTone submitted its representations to OFCA by the extended deadline of 20 June 2012. On 28 June 2012, SmarTone submitted to OFCA more detailed block diagrams on the configuration of its backup power supply system.

Issues Examined During the Investigation

The Effectiveness of SmarTone's Backup Power Supply System

9. SmarTone reported that the outage was caused by the sudden cessation of operation of the generator⁸ in its backup power supply system

⁸ The generator had been running for about two and a half hours before it ceased operation.

(“Problem 1”) and the subsequent automatic restart of the generator (three times within one minute) (“Problem 2”). The latter not only caused the starter of the generator to burn out, resulting in a complete cessation of the generator’s operation, it also generated huge electric current surge into the battery system and triggered all main circuit breakers to disconnect the switching system from the battery system. As a result, the switching system at Shatin had no power supply and stopped operation.

SmarTone’s Explanation

10. In relation to Problem 1 (i.e. the generator ceased operation all of a sudden after running for two and a half hours), SmarTone has yet to identify the root cause. SmarTone said that it conducted regular drill tests on the backup power supply system, with no-load test performed bi-monthly and full-load test performed annually. The generator successfully passed inspection and drill tests on 22 February 2012 and the battery system passed tests on 5 April 2012. The generator did not experience such a problem in the drill conducted on 22 February 2012, or in any previous drills.

11. In relation to Problem 2 (i.e. the generator automatically restarted three times within one minute), SmarTone explained that, in the event of an unexpected generator stoppage, the generator should only be started manually. Also, there were procedures in place for SmarTone’s staff to disconnect the generator from the switching system before restarting the generator. SmarTone suspected that the three automatic restarts might be caused by the malfunction of the built-in control module in the generator. According to SmarTone, the problem had been fixed after the control module was replaced on 24 April 2012 with the latest model available in the market. SmarTone has tested and confirmed that in the event of an unexpected generator stoppage, the replaced control module would cut the fuel supply and place the generator in the manual restart mode. Similar mechanism has also been commissioned in the other two switching centres of SmarTone⁹ and has been tested and confirmed to function properly.

12. While the replacement of the control module seems to have rectified Problem 2, during the meeting between OFCA and SmarTone held on 30 April 2012, SmarTone admitted that it was not completely certain

⁹ SmarTone’s mobile network consists of three switching centres, one of which is located at Shatin.

whether Problem 2 was caused by the control module. To confirm that it is the real cause of Problem 2, SmarTone has sent the control module in question to the generator vendor for further investigation.

13. While SmarTone could not fully identify the root causes of the two problems, it said that it would implement a new control system consisting of a voltage sensor and an isolator. Should there be any abnormal fluctuations in the voltage output of the generator in future, the generator output will be isolated immediately to prevent the generation of huge electric current surges into the battery system.

14. SmarTone pointed out that the installation of circuit breakers between the battery system and the load was a normal protective design for overload-protection of the battery system. It emphasized that the circuit breakers had functioned properly as designed during the incident. Nonetheless, to further improve the robustness of circuit breakers in handling unexpected electric current surges, SmarTone said that a new design in the alternating current to direct current (“AC/DC”) rectifier was implemented on 24 April 2012 with different delay timer settings for each batch of rectifiers. In future, when the AC mains or generator AC supply is connected to the AC/DC rectifier, the AC/DC rectifier will only start operation batch by batch. This would prevent a high current surge from hitting all the circuit breakers simultaneously. SmarTone will also implement this new design in the other two switching centres.

15. In order to improve the robustness of the backup power supply system, SmarTone will also appoint an E&M consultant to conduct a more detailed review of its power system. The target is to complete the review for the Shatin switching centre in June 2012 and the other two switching centres by September 2012.

OFCA's Assessment

16. OFCA notes that SmarTone has yet to fully identify the root causes of Problem 1 and Problem 2, viz. why had the generator suddenly stopped operation and why had the faulty control module restarted the generator three times within one minute. To prevent high voltage surge, SmarTone would introduce a new control system (see paragraph 13) and has

implemented a new design of its AC/DC rectifier (see paragraph 14). OFCA considers that the original design of SmarTone's backup power supply system was deficient in not being equipped with effective protection against over-voltage and over-current surges, thereby handicapping SmarTone's ability to ensure an uninterrupted power supply to its switching system. According to OFCA's understanding, in general, network operators have equipped their backup power supply systems with specific devices at strategic locations to ensure multi-level protection against over-voltage surges in generators and AC/DC rectifiers. In this regard, although SmarTone is making efforts to improve the reliability of its backup power supply system after the incident, OFCA's advice is that SmarTone should expedite the E&M review in order to put in place an effective backup power supply system to ensure that the operation of all its three switching systems is well protected.

17. OFCA is also concerned that, as part of the precautionary measures, the drill tests conducted by SmarTone have failed to identify the deficiencies of the generator, particularly in regard to the potential risk of Problem 2, i.e. the malfunction of the control module of the generator (which effectively constitutes a single point of failure). SmarTone claimed that it conducted regular drill tests on the backup power supply system, with no-load test performed bi-monthly and full-load test performed annually. In OFCA's view, drill tests which are properly designed and conducted in accordance with established procedures should be able to serve their intended objective, to identify defects or deterioration and to prevent problems before fault develops or occurs. OFCA considers that there is a need for SmarTone to review the arrangement for and the effectiveness of the drill tests to improve its effectiveness in identifying potential risks. Also, SmarTone informed OFCA at the meeting on 30 April 2012 that the generator has been in service for more than 15 years. OFCA considers that generators are mature products and their performance should be rather stable. OFCA expects that the E&M consultant appointed by SmarTone to critically examine the power system of SmarTone, including whether it is necessary to replace the generator with a more reliable model.

Time and Actions Taken by SmarTone to Restore Services

18. SmarTone said that, after the outage of the power supply for its

switching system occurred at approximately 10:35 am on 9 April 2012, its duty engineers immediately inspected all tripped circuit breakers and completed the manual reset of those circuit breakers by 11:30 am. At around 1:00 pm, the voice and mobile internet services went largely back to normal and the SMS and other services were progressively resumed from 2:30 pm onwards. SmarTone finally recovered all cell sites and restored all services at around 4:27 pm.

SmarTone's Explanation

19. SmarTone claimed that the actions taken by its staff during the outage followed the proper emergency restoration and recovery procedures established by SmarTone. SmarTone also emphasized that its staff had worked very hard to restart the system and restore services within the shortest time possible. In its representations of 20 June 2012, SmarTone provided details of the emergency recovery actions it had taken during the outage period in substantiating its position that it had tried its best to restore the network and services as soon as possible.

OFCA's Assessment

20. OFCA accepts that the restoration of a switching system after a complete power failure was a complicated process and that SmarTone needed time to restore its services. That said, OFCA also notes that the primary cause of SmarTone's network outage was a sudden suspension of mains electricity supply, which is a common and not unpredictable risk to network operations. OFCA would expect that all network operators, including SmarTone, in ensuring their compliance with GC 5.1 to have put in place effective contingency plans and emergency measures to deal with such a predictable cause to network outage so as to mitigate its service impact on customers. Although on the basis of the available information, OFCA is unable to come to a conclusion that there has been a breach of GC 5.1 in relation to the time and actions SmarTone had taken to restore services, in view of the gravity of the incident and its significant impact on the 243,000 service users of SmarTone, it is OFCA's recommendation that the CA should take the above consideration into account in deciding the appropriate sanction on SmarTone.

SmarTone's Communication with OFCA over the Network Outage

21. According to the "Guidelines for Fixed and Mobile Network Operators for Reporting Network Outage" issued on 17 June 2008 (the "Guidelines"), a network operator should report to OFCA in the event of network outage. The Guidelines also specify that failure of one or more switching units at a telephone exchange for longer than 15 minutes should be considered a critical network outage, and the network operator concerned should report it to OFCA within one hour after the triggering criteria for reporting the outage are met, if the outage occurs on weekdays during the period from 9:00 pm to 7:30 am of the next day; or on Sundays or public holidays. The outage in question occurred on a public holiday.

22. The outage of SmarTone's switching system at Shatin on 9 April 2012 was clearly a critical network outage. It occurred in one of the three switching centres of SmarTone, rendering 25% of SmarTone's cell sites out of service. The outage of SmarTone's switching system occurred at around 10:35 am. SmarTone should report the outage to OFCA before 11:50 am but it had not taken any action to notify OFCA. The first contact between SmarTone and OFCA was made at 12:30 pm, out of OFCA's volition to ring up SmarTone's network operation centre following receipt of media enquiries.

SmarTone's Explanation

23. SmarTone agrees that it had not been adequately proactive in notifying OFCA of the network outage according to the Guidelines and had not updated OFCA of the details during the outage. All the communications between OFCA and SmarTone before 3:35 pm were initiated by OFCA.

24. SmarTone explained that it was the first time that SmarTone had experienced such a serious network outage and the primary focus of its staff at the time was on resuming the system and restoring services. It had not hence followed the Guidelines to keep OFCA informed on a regular basis. It has committed in its full report that in future it would inform OFCA within 15 minutes when there is a critical outage and would keep OFCA updated about the details of the incident and the progress of service restoration.

OFCA's Assessment

25. SmarTone had not followed the triggering criteria as specified in the Guidelines to classify the network outage as a critical one. It had not complied with the requirement in the Guidelines to report to OFCA within one hour after the critical network outage occurred. Though on OFCA's initiative, OFCA and SmarTone had been in contact since 12:30 pm on 9 April 2012, the information provided by SmarTone to OFCA about the outage and its impact was by no means accurate or complete. Instead of advising OFCA that the outage had occurred at its switching system in Shatin, SmarTone merely replied in response to OFCA's enquiry that over 100 cell sites were out of service. During the period between 12:30 pm to 3:35 pm, despite OFCA making repeated requests to SmarTone for more information about the outage, including the geographical areas and the number of customers affected, and for updates on progress of SmarTone's restoration works and the estimated service restoration time etc, SmarTone did not return calls to OFCA, or provide OFCA with any of the required information. OFCA also experienced difficulties in getting the calls through to SmarTone on three occasions during the period. It was not until 3:35 pm that day that SmarTone informed OFCA, by an email, that the network outage was caused by power interruption in the switching centre as well as the geographical areas that were subject to service disruption.

26. It is an established fact that SmarTone had failed to comply with the Guidelines in reporting the critical outage to OFCA within the required timeframe. The lack of initiative on the part of SmarTone to keep OFCA timely updated of areas/number of customers affected, and the progress in restoration work makes the non-compliance even more unacceptable. The inadequacy and incompleteness of the information provided by SmarTone on the causes of the outage and the impact of the service disruption is also regrettable. From OFCA's perspective, the failure of SmarTone to act in accordance with the reporting requirement in the Guidelines has restricted OFCA's ability in making an accurate assessment on the severity of the network outage and its impact on services to the public. It has also prevented OFCA from assisting in providing timely advice and guidance to users on alternative arrangements to make during service disruption e.g. switching to fixed line services, to alternate SIM cards etc. All in all, OFCA considers the manner in which SmarTone handled its communication with

OFCA on its network outage unsatisfactory.

SmarTone's Communication with Customers and the Media on the Network Outage

27. SmarTone had received public complaints and media enquiries during the service disruption. SmarTone had not provided much details about the outage to its customers, whether or not through the media, until the outage was over and services were restored.

28. OFCA has received a total of 24 complaints from the public about SmarTone's outage. The complaints can be broadly classified into the following three major areas-

- (a) SmarTone failed to provide resilient telecommunications service;
- (b) SmarTone's hotline was always engaged; and
- (c) SmarTone failed to notify customers of the service disruption in a timely manner; no announcement was made on SmarTone's website and confusing messages were delivered by SmarTone's staff at its retail outlets¹⁰.

SmarTone's Explanation

29. SmarTone said that it had made attempts to inform customers of the service disruption through the following channels on the day of the outage –

- (a) Retail and hotline staff
 - At 11:01 am and 12:26 pm on 9 April 2012, SmarTone issued two notifications through internal email to inform its retail and hotline staff about the power outage at one of its switching centres causing service disruption, and that

¹⁰ According to the complainants, some SmarTone's staff even mentioned that the outage was caused by the engineering works for the upgrading of SmarTone's network.

investigation and restoration were in progress.

- At 2:56 pm on 9 April 2012, an updated notification was issued to inform retail and hotline staff that service had been restored after the power outage.
- At 5:56 pm on 9 April 2012, a further notification was issued to inform retail and hotline staff of further details of the incident.

(b) Facebook

- At 2:13 pm on 9 April 2012, SmarTone posted the first message on Facebook to respond to customer enquires about the service disruption, advising them that there had been a power outage at one of SmarTone's switching centres and that most services, except SMS, had largely been back to normal after SmarTone carried out the emergency recovery procedures.
- At 7:46 pm and 7:51 pm on 9 April 2012, SmarTone posted full Chinese and English statements on Facebook to explain the details of the incident to the public.

(c) Email

- SmarTone sent an email message on the evening of 10 April 2012 (one day after the incident) to all customers whom SmarTone has on record their email addresses to inform them of the details of the incident.

(d) Media

- Between 12:30 pm and 5:00 pm on 9 April 2012, SmarTone responded to media enquiries that there was a network outage and the service interruption was due to a power failure at one of its switching centres.

- At 5:36 pm on 9 April 2012, SmarTone issued a press statement to the media to explain the incident and make apologies to affected customers.

OFCA's Assessment

30. After examining the action taken by SmarTone as outlined above and the complaints from the public and the media, OFCA's considered view is that SmarTone had not taken adequate measures to provide prompt information and advice on the network outage and service disruption to its affected customers. As a result, many of SmarTone's service users and the media had no idea as to what had happened with SmarTone's network and why some of SmarTone's services were disrupted. The confusion persisted until the issue of a press statement by SmarTone after the outage was over and services were restored.

31. It is clearly set out in the Guidelines that it is the responsibility of the concerned operators, having the first hand information about the operational status of their networks and services, to provide timely information to customers about the outage and service disruption. The Guidelines have not mandated the avenues through which the concerned operators should communicate with their customers on network outage. These are left to individual operator to consider in light of the circumstances of each case. That notwithstanding, it should be obvious to established operators like SmarTone that the media is an effective channel for the dissemination of information to the public, especially as regards service outage of such a large scale, with rather wide spread geographical areas being affected and services to hundreds of thousands of users disrupted. As SmarTone did not make any public announcement about the service disruption during the outage period, it had created a lot of unnecessary confusion among customers as to the severity of the incident, and the time taken for services to resume operation. If SmarTone 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 would have been better informed and hence better prepared to make alternative arrangement for phone or data services. As it is, the lack of sensitivity and initiative on the part of SmarTone 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 sum, OFCA considers that SmarTone had failed to observe the Guidelines, to provide prompt information and advice to its customers, through the media or otherwise, on the network outage and the ensuing service disruption during the course of the incident.

THE CA'S ASSESSMENT AND DECISION

33. The CA affirms OFCA's view that GC 5.1 of SmarTone's licences, namely Fixed Carrier Licence No. 007 and Unified Carrier Licence No. 018, imposes an unequivocal obligation on SmarTone to provide a good, efficient and continuous service in a manner satisfactory to the CA.

34. After examining the facts of the incident, the CA endorses OFCA's assessment in that SmarTone has –

- (a) failed to ensure that the operation of its switching system is well protected by an effective backup power supply system, leading to a critical network outage, and affecting the telecommunications service provided to a significant number of users;
- (b) failed to comply with the Guidelines to treat the incident as a critical outage and to report to OFCA within the timeframe as stipulated in the Guidelines; and
- (c) failed to notify its customers, through the media or otherwise, of the outage in a prompt and efficient manner.

35. On the basis of the above, the CA is of the view that SmarTone has not complied with GC 5.1 of its licences, to operate, maintain and provide a good, efficient and continuous service in a manner satisfactory to the CA. SmarTone should be imposed a financial penalty pursuant to section 36C(1)(a) of the Telecommunications Ordinance ("TO") (Cap. 106).

FINANCIAL PENALTY

36. 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 Telecommunications Ordinance” (the “Financial Penalty Guidelines”)¹¹. Under the Financial Penalty Guidelines, the CA has 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.

37. In this case, which is the first occasion on which a financial penalty is imposed on SmarTone for breaching GC 5.1, the maximum financial penalty stipulated by the TO is \$200,000.

38. In considering the gravity of this breach, and therefore the starting point for the level of penalty, the CA notes that the outage was a critical one as –

- (a) approximately 22% of SmarTone’s active customers were affected, amounting to 243,000 users;
- (b) there had been almost six hours of service disruption, with a complete outage of 25% of SmarTone cell sites in the initial one to two hours;
- (c) the scope of service disruption was extensive, covering voice services, SMS and data services; and
- (d) the geographical spread of the affected areas was also rather wide.

39. The CA also notes that there is no information to suggest any foul play, ill intent or serious human errors in the incident, which would have added to the severity of the breach. Taking into account also the need to allow a reasonable margin for considering aggravating factors if any, the CA

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

considers that the appropriate starting point for determining the level of financial penalty should be \$150,000.

40. In considering the mitigating factors, the CA notes that SmarTone has provided full cooperation to OFCA in the course of the investigation. It has reacted promptly and positively to the suggestions of OFCA regarding improvement measures (see paragraph 43 below). Although the root causes of the outage have not yet been identified, SmarTone has committed to engaging an E&M consultant to complete a more detailed power system review within a short period of time. SmarTone has also taken prompt action to implement preventive measures against the recurrence of similar failure of the backup power supply system. As SmarTone has taken a conscientious and responsible attitude in making amendments and improvements to enhance its capability to handle similar events 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 been able to establish 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 \$130,000 is proportionate and reasonable in relation to the breach.

IMPROVEMENT MEASURES

43. The CA recommends that SmarTone should implement a number of improvement measures to prevent the recurrence of similar incidents in future, and to enhance its capability in handling network outages. SmarTone should –

- (a) expedite the review of the backup power supply system (see paragraph 15) and to submit to OFCA the recommendations made by the E&M consultant; and put in place effective measures targeting the root causes of the problems as soon as possible;

- (b) review the system set up, remedial works and streamline the operational procedures to expedite service recovery;
- (c) develop reliable drill tests and preventive procedures to forestall possible faults of the whole power supply systems;
- (d) develop and implement effective internal control procedures to ensure compliance by its staff with the Guidelines on reporting requirement to OFCA at times of network outage; and
- (e) develop and implement effective procedures to ensure that its customers and the public will be notified timely of network outage. In this regard, SmarTone's commitment in its full report to issuing a public announcement to the media within 30 minutes of a critical network outage, and to providing hourly updates is a step towards the right direction.

The Communications Authority
July 2012

Failures of SmarTone’s Backup Power Supply System on 9 April 2012

SmarTone’s backup power supply system consists of a generator, an AC/DC rectifier and a battery system. The battery system consists of 11 set of batteries which are connected to the switching system via 11 circuit breakers. The block diagram in [Fig. 1](#) below illustrates the backup power supply system.

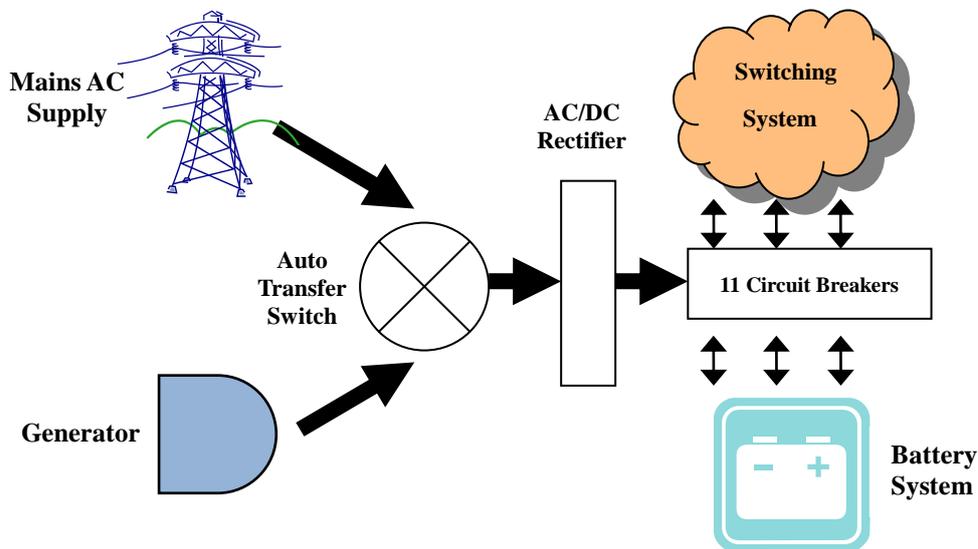


Fig. 1 SmarTone’s backup power supply system at Shatin switching centre

2. In normal operation when the mains supply is available, the AC/DC rectifier delivers electrical current to the switching system and charges up the battery system. When the mains supply is disrupted, the battery system will immediately take over the load and the generator will start within a minute and then supply the AC power. Once the generator starts operation, it will take over the role of the battery system and provide power supply to the switching system. In case the generator breaks down, the battery system will be the last source of power supply for maintaining the operation of the switching system. In general, the battery system is

designed to support the switching system for a few hours.

3. On 9 April 2012, the power supply to the entire building was disrupted due to the short circuit of a main alternating current (“AC”) bus bar to the earth. This resulted in a mains supply suspension in SmarTone’s switching system at Shatin. The battery system immediately took over and provided power supply to the switching system to ensure the continued operation of the switching system. In the meantime, the generator started within 15 seconds to provide the AC power. Once the generator started operation, it took over the role of the battery system to provide power supply to the switching system. The generator ran smoothly from 08:00 am to 10:35 am. At 10:35 am, the generator stopped suddenly and restarted three times within one minute but failed. The restart process generated surge voltage and current which not only burned the starter of the generator but also triggered all the 11 circuit breakers to disconnect the switching system from the battery system. As a result, there was no power supply to the switching system. The switching system ceased operation.

4. From 10:35 am to 11:30 am, all the tripped circuit breakers were inspected and manually reset in batches. The switching system was then re-connected back to the battery system and resumed operation.

5. At 1:00 pm, the generator starter was repaired and started up successfully. It took over from the battery system to provide power supply to the switching system.