



**Response to Consultation Paper on Proposed Spectrum Policy
Framework**

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EXECUTIVE SUMMARY

Introduction

1. This review of the spectrum policy framework for Hong Kong is long overdue. In recent years, the Telecommunications Authority (“TA”) has sought to release specific frequency bands for the provision of services such as 3G mobile, Public Wireless Local Area Network, Broadband Wireless Access (“BWA”) and currently, CDMA2000. As this has been conducted without reference to any formal spectrum policy or overall frequency allocation plan, there is a real risk that this uncoordinated approach will not make the most efficient use of the available spectrum resources in Hong Kong. The lack of a predefined spectrum policy framework also creates uncertainty for operators in the market as they have no clear view of:

- The spectrum to be released by the TA in the near future;
- How the price will be determined for the spectrum; and
- The short and long term rights pertaining to each tranche of spectrum awarded.

2. This has made it difficult for investors to analyze the market, prepare business plans and make entry decisions. If not resolved, the lack of a clear and coherent spectrum policy framework could have a delaying effect on investment and the roll out of new services in Hong Kong. It is therefore important to establish a clear policy framework for spectrum in Hong Kong before further decisions regarding spectrum allocations are made.

Specific Matters on the Policy Framework raised in the Consultation Paper

3. PCCW-HKT Telephone Limited (“PCCW”) considers that, to be effective, the spectrum policy framework should address the following matters:

4. *Spectrum policy objectives.* In addition to the objectives to facilitate the more economically and technically efficient use of spectrum, to strengthen Hong Kong’s strategic position as a world city, and to fulfil Hong Kong’s international (including China) obligations relating to the use of spectrum, it is also important to consider interference issues when designing the spectrum policy framework. Spectrum cannot be efficiently used, and consumer benefits maximized, absent a clear focus on interference management.

5. *Guiding principles in spectrum management.* Decisions regarding the use of spectrum should be largely driven by the market. The role required to be performed by the TA is merely one of “coordinator” rather than “controller”. Having said that, in view of the investment levels required to roll out wireless services, the Government should not be permitted to simply “dump” spectrum onto the market.

6. *Spectrum rights.* The TA should outline explicitly the conditions under which he is permitted to vary or withdraw the rights of the spectrum holder before expiry of the term. These are only expected to be exceptional circumstances. If the spectrum holder’s rights are to be varied or withdrawn, a notice period at least equal to one-third of the period for which the spectrum was granted should be given, subject to a minimum period of say, six months.

7. PCCW considers that, the longer the term for which the spectrum was granted (usually the same as the licence term), the greater the expectation that the spectrum rights will be renewed after expiry of the existing term, unless there are exceptional circumstances justifying non-renewal. This reflects the significant and long term investments which such licensees are normally required to undertake. In the event that the rights will not be renewed, however, then a notice period at least equal to one-third of the period for which the spectrum was granted should be given, subject to a minimum period of say, six months.

8. *Spectrum refarming.* As spectrum refarming can be extremely disruptive to both users and incumbent spectrum holders, it should not be undertaken without proper study and consultation with the industry. Should it ultimately be decided to refarm certain frequency bands, then adequate provisions should be made to enable smooth migration of existing users to alternative bands.

9. *Spectrum rights for non-licensees.* All users of spectrum, whether licensed or not, should be granted at least a certain level of basic rights. These include the right to be informed of any changes to the proposed use of the spectrum or the frequency band to be shared with other services. Licensed spectrum holders, however, should be entitled to a higher degree of protection, e.g. protection from interference. The spectrum policy framework, for completeness, should cover both licensed and non-licensed spectrum users.

10. *Spectrum supply and spectrum release plan.* Where there is demand for spectrum, it should be the Government’s role to make such resources available so that the spectrum can be equitably shared by all competitors and market entry is made possible. This would be consistent with preserving investment incentives.

11. PCCW also supports the establishment of a three-year spectrum release plan which is updated annually. This would provide clarity to the industry and facilitate business planning. On this basis, the plan should contain a certain degree of stability and not change dramatically from year to year. It is important, however, to obtain input from the industry when drawing up the spectrum release plan and subsequently, when making spectrum allocations based on the release plan.

12. *Secondary trading of spectrum.* There are substantial implementation issues to be resolved before spectrum can be freely traded in Hong Kong. In principle, however, PCCW concurs with the proposal to introduce spectrum trading as this enables more efficient use to be made of the limited frequency resources. As spectrum will become more freely available, this means lower costs for service providers and ultimately, reduced prices and a greater variety of services for consumers.

13. Of course, with greater ease to acquire frequency comes the risk that operators will “hoard” spectrum to limit competition, but this can be addressed by Sections 7K and 7L of the Telecommunications Ordinance. In addition, any financial gains or losses arising from the trading of spectrum should be treated in the same way as the disposal of other business assets.

14. *Spectrum liberalisation.* Permitting spectrum holders to change the use of their assigned frequency bands will greatly increase the utility of the spectrum and ultimately benefit consumers by allowing new services to be introduced earlier. A proposal to liberalise the use of spectrum would therefore generally be supported by PCCW. There are, however, important operational issues to be resolved, such as measures to deal with interference arising from change in use of the spectrum, before liberalisation can be effectively introduced in Hong Kong.

15. *Spectrum for Government services.* As the spectrum bands used by the Government are usually deployed in the provision of essential services, it would be reasonable to take these frequency bands out of the supply of spectrum available for commercial use. A command and control approach should therefore continue to be adopted for spectrum used by the Government.

16. It is important, however, to clearly define which types of services are considered “critical” to the public. There may be alternative uses for the Government use spectrum in the commercial sector which may yield greater value to the public. In such cases, it may be better for the spectrum to be made available for commercial use. In addition, any spectrum currently being reserved by the Government for non-essential services should be treated in the

same manner as spectrum assigned for commercial use, particularly where the service competes with similar services in the commercial sector.

17. An annual review of the spectrum used by the Government should be conducted to assess utilisation. The inaugural review could also examine the nature of the services which currently make use of Government assigned spectrum. Those services that directly compete with similar commercially available services should be reclassified such that the spectrum occupied by such services are subject to the same terms, conditions and charges as commercial use spectrum. Any spectrum which is not used by the Government should also be considered for release for commercial use.

18. *Spectrum pricing.* It is appropriate to charge for the use of spectrum given that it is a limited public resource. PCCW considers, however, that charges should only be levied if the frequency band is to be assigned to one particular party for exclusive use. In a technology neutral and market driven environment, if there are competing demands for a particular band of frequency then the party to whom the spectrum should be assigned and the price to be paid for the spectrum (Spectrum Utilisation Fee or “SUF”) should best be determined by the market via auction, subject to a list of considerations. If only one particular party is interested in using the spectrum on an exclusive basis, however, then a nominal level of SUF should be set by the TA. No charge should be levied for spectrum which is open to all users since they are provided with little protection from interference and are afforded few rights.

Conclusion

19. The Commerce, Industry and Technology Bureau (“CITB”) has suggested that, concurrently with the development of the spectrum policy framework, the TA continue to make appropriate spectrum allocation and assignments as the review progresses. In this regard, PCCW notes the TA’s recent intentions to allocate frequency for BWA and CDMA2000 services.

20. This is a dangerous approach. Any spectrum allocations made by the TA in the absence of an overall spectrum release plan are likely to be uncoordinated and potentially wasteful of the limited spectrum resources available in Hong Kong. In addition, with no clear direction as to the rights pertaining to spectrum holders (and how these rights could be varied), whether the spectrum can be traded or its use changed, operators will have great difficulty assessing the price it is willing to bid for spectrum, and this will make business planning an even more arduous task than it already is.

21. On this basis, PCCW would strongly urge the TA not to proceed with the allocation of spectrum for specific services (e.g. BWA, CDMA2000) before

the more fundamental aspects of the spectrum policy framework have been finalized. Indeed, with this consultation now underway, any basis for rushed and ad hoc decision making for BWA or CDMA2000 has been removed. This concern regarding ad hoc decision making is very real as the TA's original approach regarding BWA spectrum has proven unworkable due to problems with interference, and its second approach has raised different concerns. This experience acts to reinforce the preference for a coherent spectrum policy rather than a makeshift approach.

22. Accordingly, the separate consultations and studies on spectrum trading and liberalisation proposed by the CITB in this consultation paper should be conducted before any decisions are taken regarding the right to trade and change the use of spectrum. These should be completed as soon as possible so that a clear direction on these fundamental policy matters can be established before further spectrum auctions take place.

INTRODUCTION

23. PCCW-HKT Telephone Limited (“PCCW”) welcomes the opportunity to comment on the issues raised by the Commerce, Industry and Technology Bureau (“CITB”) in its *Consultation Paper on Proposed Spectrum Policy Framework* (“**Consultation Paper**”) released on 25 October 2006.

24. In conducting this consultation, the CITB recognizes that spectrum is a finite resource and therefore there is a need to formulate a policy for spectrum management that enables the community to reap the maximum benefits from deployment of the spectrum, particularly in the light of rapid technological advancements and a dynamic Hong Kong telecommunications market.

25. Implicitly, the CITB also recognizes that investment incentives must be established and preserved, reflected in policies which give investors the opportunity to earn reasonable returns. Without such policy considerations, Hong Kong users will not be able to enjoy the maximum benefits from deployment of spectrum, and Hong Kong will lag behind its Asian (and worldwide) counterparts as well as not fulfill its role within China.

26. The issues raised in this Consultation Paper are based on the findings of the report commissioned by the CITB on *Spectrum Policy Review* (“**Consultancy Report**”). This report was issued by Ovum in conjunction with Aegis and Independ (the “**Consultant**”) in June 2006, and covered current spectrum usage in Hong Kong as well as suggestions as to how spectrum should be managed within the territory.

The Need for a Spectrum Policy Framework

27. Hong Kong does not currently have a formal spectrum policy framework. This has made it difficult for operators in the industry to prepare their business plans, invest with confidence and roll out new services. The lack of a clearly stated policy has created uncertainties as regards:

- The timing of the availability to the market of various tranches of spectrum;
- Whether specific ranges of spectrum will be declared by the Government as being for another use in the future;
- The price to pay for spectrum being released onto the market; and
- The rights pertaining to the tranche of spectrum and whether they will be revised later on.

28. Indeed, the difficulties experienced by certain operators in the past with the auction of spectrum for 3G mobile services, and the views expressed by the industry in response to the proposals put forward by the Telecommunications Authority (“TA”) regarding the licensing of mobile services on expiry of existing licences for 2G mobile services, are testament to the problems that have resulted from the lack of a clear spectrum policy in Hong Kong.

Policy First

29. This Consultation Paper therefore comes at a critical time. The TA has already proposed to allocate frequency bands and issue licences for the provision of Broadband Wireless Access (“BWA”) services and mobile services using CDMA2000 technology. The consultations for both of these new services are still in progress.

30. As PCCW stated in the submission it made jointly with a group of fixed line, mobile and satellite operators¹, the spectrum policy framework needs to be decided first before detailed spectrum allocations are made. If not, this will add considerable uncertainty to the investment decisions to be made by operators in the industry. It is therefore important that the key matters raised in this consultation are finalized before any decisions are taken on BWA and CDMA2000. This is to ensure that the spectrum allocations for BWA and CDMA2000 are consistent with the overall spectrum policy framework that will be decided under the current review.

31. Designating specific frequency bands for BWA and CDMA2000 and issuing the respective licences prior to the overall spectrum policy framework being settled is a highly dangerous course of action that could cause severe disruption to the market if spectrum needs to be subsequently re-allocated following the outcome of the spectrum policy review.

32. It is apparent from an examination of the detailed proposals put forward in the Consultation Paper, however, that there are fundamental issues which will not be resolved under the current consultation exercise. This will simply delay the overall establishment of the spectrum policy framework. For instance, with reference to the important question as to whether the use of spectrum should be liberalised, the CITB simply postpones the decision by suggesting that further studies be conducted before considering whether spectrum

¹ Refer to Joint Operator Submission made to the Office of the Telecommunications Authority on 21 November 2005 by thirteen operators in response to the: (i) *Consultation Paper on Licensing Framework for Deployment of Broadband Wireless Access – Analysis of Comments Received, Preliminary Conclusions and Further Consultation*; and (ii) *Consultation Paper on Revision of Regulatory Regimes for Fixed-Mobile Convergence*.

liberalisation is appropriate for Hong Kong. A decision on whether spectrum trading will be permissible will also be subject to similar delays because of the CITB's proposal to seek initial views from the industry even before deciding if it is worthwhile conducting a feasibility study. The spectrum policy review cannot be considered complete until these key matters have been decided.

33. Spectrum policy is too important to be formulated on a piecemeal and ad hoc basis. The industry is clearly frustrated by the slowness of the Government in initiating this consultation. The industry also shares the TA's concerns as to delays in wireless service rollout and user benefits. The path of piecemeal and ad hoc spectrum allocation is, however, not an option where the issues involved are extremely complex as evidenced by the preliminary proposals put forward by the TA for BWA.

PCCW's Response

34. The Consultation Paper proposes a spectrum policy framework covering six aspects, namely:

- (i) Spectrum policy objectives;
- (ii) Guiding principles in spectrum management;
- (iii) Spectrum rights;
- (iv) Spectrum supply (including spectrum trading and liberalisation);
- (v) Spectrum for Government services; and
- (vi) Spectrum pricing.

35. Specific questions are raised by the CITB under each of these areas within the Consultation Paper.

36. PCCW's comments and responses to these questions are outlined in the following sections.

CONSIDERATIONS FOR A SPECTRUM POLICY FRAMEWORK

37. The CITB suggests that, in formulating the spectrum policy framework for Hong Kong, the Government should have regard to a number of factors. These include:

- (i) The ability of the policy framework to accommodate future advances in radiocommunications technology and service offerings;
- (ii) Alignment with international developments in spectrum policy and management frameworks;
- (iii) Whether the policy framework encourages investment by the industry;
- (iv) The extent to which the policy framework supports the wider strategic policy objectives for Hong Kong; and
- (v) Whether the policy framework satisfies various social needs and provides a fair compensation to the community for commercial use of the spectrum.

38. In the Consultation Paper, the CITB asks:

Do you agree that the above considerations, i.e. future shape of radiocommunications, international developments, encourage investment, strategic considerations and fair compensation for the community, should be factored into Hong Kong's spectrum policy framework and the supporting spectrum management arrangements ?

Are there any other factors or considerations that should be taken into account ?

39. PCCW largely agrees that the factors mentioned above need to be considered when formulating Hong Kong's spectrum policy framework. It is important, however, to be clear on what each of these factors mean. In particular, the factor on "strategic considerations" is vague and may invite outcomes that are contrary to current well established policy positions.

Future shape of radiocommunications

40. The CITB is correct to recognize that the future spectrum policy framework needs to be sufficiently flexible to accommodate technological developments in the telecommunications and broadcasting industry. These include developments which are already known today such as 3G (or even 4G) mobile services; digital and mobile television; telecommunications-broadcasting converged services; and innovations in the manner in which

spectrum is used more efficiently, e.g. cognitive radio technologies and underlay/ overlay systems. In order to ensure that the framework is kept up-to-date, it is also important to undertake a regular review of the framework and to make any necessary adjustments.

International developments

41. It is important to make reference to developments in spectrum management in overseas jurisdictions when designing or updating the spectrum policy framework in Hong Kong. In particular, international conventions in use of spectrum bands should logically be followed as far as possible. That is not to say, however, that Hong Kong must strictly adopt the same spectrum management policies as the more developed countries (including the Mainland). There may be unique geographical or policy considerations in Hong Kong which justify departure from these regulatory regimes.

Encourage investment

42. Continuous investment in telecommunications infrastructure is critical to the success of the telecommunications industry in Hong Kong. A spectrum policy framework which sets out clear objectives and guiding principles reduces the uncertainty associated with business planning and hence greatly assists in encouraging telecommunications investment.

43. It is of utmost importance that the Government make future spectrum decisions in a way that recognizes the levels of investment that are required and the requirement to permit operators an opportunity to earn reasonable returns. Policy positions that seek to maximize user benefits without also balancing the interests of investing operators will fail on both counts.

Strategic considerations

44. The CITB suggests that the TA should be permitted to intervene in matters relating to the use of spectrum if there are strategic reasons to do so. Such circumstances would arise where, according to the CITB, spectrum needs to be allocated for certain services in Hong Kong to ensure harmonization with Mainland China or where the TA needs to step in to designate spectrum for certain new services in order to ensure that Hong Kong does not lag behind the rest of the world in the deployment of advanced technologies.

45. PCCW is wary of the proposal that the TA could be justified in making old fashioned “command and control” spectrum management decisions for “strategic reasons”. As the market itself should be in the best position to decide how spectrum should be used, there should be no instances requiring the

TA to take direct action. In addition, given the difficulty in clearly defining what is meant by “strategic reasons”, there is a danger that the TA could wrongly make use of this opportunity to dictate the services for which specific frequency bands should be used despite the lack of demand from the market.

46. In light of the policy to be technology neutral and market driven, PCCW does not believe it necessary or wise to consider “strategic reasons” when formulating the spectrum policy framework. Indeed, “strategic reasons” appear to be merely “political reasons” which PCCW would suggest represents a very subjective and dangerous approach to policy making.

47. It is rather obvious that this consideration has been inserted into the Consultation Paper to bolster the TA’s recent proposal to allocate spectrum for CDMA2000 services in Hong Kong. Yet, the TA’s proposal is clearly contrary to two well established principles, i.e. technology neutrality and a market driven approach. It is also inconsistent with the TA’s analysis of the market just two years ago.

Fair compensation for the community

48. Spectrum is a scarce public resource. On this basis, the spectrum policy framework should be designed such that the public is properly compensated for the use of its resources. This means that fees should be imposed for the use of spectrum. The issue of how spectrum should be priced is dealt with later on this submission.

Interference management

49. In addition to the above factors, PCCW considers it important for the spectrum management arrangements to take into account the control of potential interference arising from difference services/ operators using the same/ adjacent bands of spectrum. An important objective in designing the spectrum release plan for Hong Kong must be to ensure that the potential for interference is minimized. The other policy considerations, and ultimately spectrum decisions, will be meaningless if interference management is not included as a primary policy factor.

50. PCCW is concerned that the absence of this factor relates to the TA’s continued preference to go forward with BWA spectrum licensing in spite of demonstrated interference issues which remain unresolved.²

² If this consultation is to be credible, it cannot bootstrap otherwise inconsistent decisions as to BWA or CDMA2000. Neither the industry nor the Court will accept irrational and inconsistent decision making.

PROPOSED SPECTRUM POLICY FRAMEWORK

51. Taking into account the considerations discussed in the previous section, the CITB proposes to formulate a spectrum policy for Hong Kong covering the following aspects:

- Spectrum policy objectives;
- Guiding principles in spectrum management;
- Spectrum rights (including spectrum rights before expiry of assignment, spectrum rights at the end of assignment, spectrum refarming and spectrum rights for non-licensees);
- Spectrum supply (including spectrum release plan, secondary trading of spectrum and spectrum liberalisation);
- Spectrum for Government services; and
- Spectrum pricing.

These issues are discussed individually in the following section.

Spectrum Policy Objectives

52. There are no explicitly stated spectrum policy objectives for Hong Kong. In the past, the TA has simply been guided by the requirement imposed on him in the Telecommunications Ordinance (“**Ordinance**”) to:

[...] promote the efficient allocation and use of the radio spectrum as a public resource of Hong Kong.³

This is clearly too general to be of any assistance to the regulator or to the industry. It is necessary to spell out, in greater detail, the spectrum policy objectives so as to avoid any potential misunderstanding or confusion. Based on the policy objectives, the TA can then formulate his spectrum strategy and implement his spectrum management arrangements. Ultimately, the establishment of broad policy objectives would have the result of reducing the current uncertainty faced by operators when investing in wireless services.

53. The CITB puts forward the following high level spectrum policy objectives for Hong Kong:

³ Refer to Section 32G(1) of the Ordinance.

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- (a) To facilitate the most economically and socially efficient use of spectrum with a view to attaining maximum benefit for the community;
 - (b) To achieve technically efficient use of spectrum to facilitate the introduction of advanced and innovative communications services and strengthen Hong Kong's position as a telecommunications and broadcasting hub;
 - (c) To fulfil Hong Kong's regional and international obligations relating to the use of spectrum;
 - (d) To strengthen Hong Kong's strategic position as a world city and the gateway between the Mainland of China and the world by facilitating the provision of key services in Hong Kong which are deployed, or will be deployed, globally or in the Mainland of China; and
 - (e) To ensure that necessary spectrum is reserved for Government services.

54. In the Consultation Paper, the CITB asks:

Do you agree with the proposed spectrum policy objectives ?

Are there other spectrum policy objectives that the TA should take into account when making spectrum management decisions ?

55. PCCW broadly concurs with the policy objectives proposed by the CITB. Specifically, however, it has the following comments:

Facilitate most economically and socially efficient use of spectrum

56. The spectrum policy framework should ensure that the most economically efficient use is made of the limited spectrum resources in Hong Kong. This would most logically be achieved by adopting a market driven technology neutral approach to spectrum allocation and, as far as possible, relying on a competitive auction process to decide who should be awarded the spectrum.

Technically efficient use of spectrum

57. The term “technically efficient use of spectrum”, under objective (b) above, should include the need to ensure that there is no interference between competing services or services using adjacent frequency bands. Given the problems that have been experienced with interference in the past, it is important to ensure that this issue is clearly recognized in the policy objectives.

Hong Kong's regional and international obligations

58. To ensure that Hong Kong discharges any regional or international obligations in relation to the use of spectrum, such requirements should be taken into account when formulating the spectrum policy framework.

Harmonization with China

59. It is questionable whether there is a need to devote a separate policy objective to deal with harmonization of services specifically with Mainland China. Hong Kong is an important city in the world arena, not just in relation to China. On this basis, perhaps these considerations would best be covered by an expanded policy objective under (c) above to ensure alignment with international standards and obligations relating to the use of spectrum.

60. There is no need for the Government to make special provisions to ensure that specific services deployed in the Mainland are also made available in Hong Kong. The market will drive this outcome or such an outcome should not occur.

Spectrum for Government services

61. This is perhaps the only area where it is acceptable to adopt a command and control approach to spectrum management. As spectrum is normally used by the Government to provide essential and critical services, it is important that any policy objectives recognize the need to ensure that there is an adequate supply of frequency for Government purposes. In all other instances, the TA should trust the market in making decisions in relation to the allocation and assignment of spectrum.

Guiding Principles in Spectrum Management

62. In the Consultation Paper, the CITB suggests that “regulatory principles” should be established in order to give effect to the spectrum policy objectives. Underlying these principles should be a recognition that, first and foremost, a market driven approach should be used in spectrum management, particularly where there are competing commercial demands for the spectrum. Only in instances where such an approach does not achieve the policy objectives should the TA be required to intervene.

63. In the Consultation Paper, the CITB asks:

Do you agree with the proposed guiding principle in spectrum management, especially that market-based approaches

should be considered first for spectrum where there are competing commercial demands ?

64. Generally speaking, PCCW agrees that a technology neutral, market driven approach should be used in spectrum management, particularly where there are competing demands for use of the spectrum. This is because market forces will normally result in the most effective and valuable use being made of the spectrum.

65. As recognized in the Consultation Paper, adopting a market driven approach first and foremost would also impose a discipline on the regulator to justify his actions more rigorously on occasions where he does consider intervening, thus resulting in a more stringent regulatory decision making process. That is not to say, however, that the market in all cases should have a completely free hand in how spectrum is to be managed. This is discussed further in the following section.

Can spectrum management be left completely to the market ?

66. Generally speaking, responsibility for managing spectrum can be left to the market. There are, however, certain exceptions and caveats. Firstly, a “command and control” regime remains appropriate for Government services, e.g. where health and safety are involved. Secondly, interference management requires some degree of Government coordination, monitoring and enforcement. Thirdly, decisions on spectrum availability need Government involvement. Fourthly, in order to refrain from discouraging investment, spectrum should not be permitted to be dumped onto the market.

67. Spectrum is a finite resource with competing demands from the community. Unless properly coordinated by a single party, the spectrum is unlikely to be used by the market in an orderly or efficient fashion that would attract investment and maximize benefits to users. For instance, there will be interference problems if competing services fight to use the same spectrum bands. This was typically demonstrated most recently in the proposals for BWA services to share part of the same frequency bands that are currently being used by Fixed Satellite Services (“FSS”). On this occasion, even with the TA’s attempts to coordinate use of the frequency band, a significant degree of interference was still experienced by the FSS operators, so it is possible to imagine how much worse the problem would have been without the TA’s involvement.

68. Disorderly use of frequency bands will result in sub-optimal utilization of the available spectrum. It is therefore clear that the use of spectrum cannot be left *entirely* to the market and that there still needs to be some degree of

involvement from the regulator. The question then becomes, how much involvement does the industry require from the TA ?

69. From PCCW's perspective, this should be fairly minimal. The role that needs to be performed by the TA is more one of "spectrum coordinator" rather than "controller". Rather than dictating the manner in which specific tranches of spectrum should be used and when they should be made available, the TA should let these decisions be driven by the market. His role therefore becomes one of facilitator and officiator. Save for some critical requirements which he needs to impose⁴, the TA should take very little part in deciding how spectrum should be used.

The TA's responsibility under the Telecommunications Ordinance

70. This light-handed role is consistent with that envisaged for the TA under the Ordinance. Section 32G(1) of the Ordinance merely identifies the TA's role in spectrum management as one where he is required to:

[...] promote the efficient allocation and use of the radio spectrum as a public resource of Hong Kong.

Other than this broad statutory requirement, the Ordinance does not shed any further light on the specifics as to how the TA should manage spectrum.

71. The TA's general role (as one of coordination, rather than dictating the timing of availability and use of spectrum) is further supported by the fact that, under Section 32G(2) of the Ordinance, it is anticipated that the industry would be involved in the decision making process as regards the various aspects relating to spectrum:

[...] before exercising his powers under sections 32H(2)(a) and (b) and 32I(1), the Authority shall carry out such consultation with-

- (a) the telecommunications industry; and*
- (b) such other persons who may be directly affected by the exercise of such powers, [...]*

The Ordinance clearly envisages the industry and others (including users) taking a very active part in the management of spectrum.

⁴ For instance, regulations regarding spectrum use in order to avoid interference, and alignment of use of spectrum bands with international counterparts in order to ensure service compatibility on a worldwide level, e.g. adherence to guidelines set by the International Telecommunications Union.

“Let the market decide”

72. PCCW agrees that, in general terms, a more market driven approach should be adopted for spectrum management. In fact, on a worldwide basis, the trend is moving towards greater involvement by the industry in how spectrum is managed. As the Consultant concluded in its report, after surveying a selection of countries:

In all of these countries the administrations are moving away from a traditional “command and control” management approach to one involving a greater involvement by spectrum users (particularly commercial users) and market processes in determining when and how spectrum is allocated and assigned.⁵

73. This trend is due to a number of reasons:

- (i) It is generally recognized that market driven decision making results in improved economic performance of the communications sector through increased innovation, investment and competition;
- (ii) Decisions regarding spectrum have become more complex and involved such that the regulator may not have full knowledge of all the information and hence may not be in the best position to make decisions on this area;
- (iii) Users are demanding greater certainty in the spectrum policy and more transparency in the decisions taken by the regulator because of the substantial economic value at stake; and
- (iv) Technological developments have rendered it possible to use spectrum more efficiently and in a manner which does not necessitate regulatory intervention. In fact, in some cases, the existence of regulation acts as a hindrance to the development of new services.

74. Under a market driven approach, industry participants would have a greater say in what spectrum is to be used for certain services, when the spectrum needs to be made available, and the price that should be paid for the tranche of spectrum. Whilst, this would require the TA to depart from the traditional “command and control” approach (which he has taken in the past) and trust the market, it is consistent with the TA’s increasing tendency to move away from regulation and “let the market decide”.

⁵ Page 58 of the Consultancy Report.

75. Continuing to adopt a command and control approach, other than for Government use spectrum, would be difficult to sustain in the long run since this would require the TA to always have full and timely knowledge of the technological developments, their applications, market potential, consumer acceptance and the commercial considerations in the use of spectrum such that he can decide what is the best use for each tranche of spectrum that will generate the maximum benefits for the community. Clearly, the industry itself (i.e. the market) would be in a better position to make these decisions.

76. Under a market-led approach, where there are competing demands for spectrum, the most logical solution would be to deploy an auction process to determine the party to whom spectrum is awarded. The auction would not only decide on the party who has exclusive use of the spectrum, but also the price to be paid for using the spectrum. In addition, under a policy of spectrum liberalisation, the exact use of the spectrum would be decided by the successful bidder.

77. Unfortunately, this type of approach does not seem to have been adopted by the Government when it decided to assign frequency to Asia Television Limited (“ATV”) and Television Broadcasts Limited (“TVB”) on an exclusive basis for testing the broadcasting, and subsequent provision, of high definition television services⁶. As the Consultant recognized in Chapter 2 of its Consultancy Report, the spectrum bands that have been assigned to ATV and TVB could potentially be used for other services, particularly in view of increasing multi-media service convergence. On this basis, it would have been more appropriate to at least give other interested parties the opportunity to bid for the spectrum and perhaps to allow other uses to be made of the frequency.

78. The Government should not be permitted to make unilateral spectrum assignment decisions in this manner without considering the needs of other competing operators. The specific issue at hand should be urgently addressed by the Government and indeed, PCCW has already raised its concerns with the CITB. In future, assigning spectrum in this discriminatory manner should not be allowed under the spectrum policy framework.

79. An open auction should not, however, be used where there are overriding policy reasons for the TA to intervene in the spectrum assignment process. In such a case, direct assignment by the TA or a “beauty contest” may be used to assign the spectrum. Such policy reasons should, however, be fully justified to the industry.

⁶ Refer to paragraph 9 of the Statement issued by the CITB on *The Implementation Framework for Digital Terrestrial Television Broadcasting* in July 2004 (“**DTT Broadcasting Statement**”).

Technology neutrality

80. If a true market-led approach is to be adopted, then this must extend to the choice of technology to be used by spectrum holders. When assigning spectrum to licensees, the TA should not dictate the kind of technology that must be applied. This is consistent with the comments made by the CITB in the Consultation Paper:

*[...] the TA generally adopts a market-led and **technology neutral** approach, allowing spectrum users to decide on the technical standard.⁷*
[Emphasis added]

This, however, appears to contradict what is actually happening in reality. For instance, the TA recently proposed to release the 850 MHz band for the provision of mobile services, but required interested bidders to adopt the CDMA2000 standard⁸. Surely, if a technology neutral approach were genuinely being adopted, the TA would not specify the particular technical standard to be used. Instead, he would permit the market to decide for itself how best to utilise the 850 MHz band.

81. Unless there are compelling reasons to dictate the technical standard that should be used for spectrum being released onto the market (for instance, in the interests of international harmonization), the regulator should not step in to prescribe the manner in which the spectrum should be deployed. On this basis, it seems that the proposals put forward by the TA regarding the use of the 850 MHz band in Hong Kong for a CDMA2000 service may have been influenced more by how the spectrum is currently being deployed in Mainland China than by local market demand. This approach is contrary to the market driven and technology neutral policies advocated by the Government and should not be permitted.

Spectrum Rights & Spectrum Rights before Expiry of Assignment

82. At present, it is the TA's practice to grant spectrum rights to the licensee for the entire duration of the licence period. He will not vary or withdraw the assigned spectrum without a reasonable period of notice and only on reasonable grounds. These provisions are not, however, formally prescribed in any written policy. For instance, there is no indication as to what constitutes

⁷ Paragraph 13 of the Consultation Paper.

⁸ Refer to Consultation Paper issued by the TA on 27 October 2006 on *Licensing of Spectrum in the 850 MHz Band to Enable the Provision of CDMA2000 Service* ("CDMA2000 Consultation").

“reasonable grounds” for varying or withdrawing spectrum assigned to a licensee.

83. On this basis, the CITB proposes to state explicitly under the proposed spectrum policy framework that the TA should not vary or withdraw frequencies assigned to a licensee before expiry of the spectrum assignment period except in circumstances where it is necessary for him to exercise such powers. It also proposes to make clear, under the spectrum policy framework, the minimum notice periods to be given to the affected spectrum holders so that they can make any necessary provisions.

84. In the Consultation Paper, the CITB asks:

Do you agree with the proposal to prescribe the circumstances under which spectrum assignment may be varied or withdrawn before the assignment expires ?

Are there other circumstances for variation or withdrawal of spectrum assignment before expiry that should be taken into account ?

What are your suggestions on the appropriate minimum notice periods ?

Circumstances for variation or withdrawal of spectrum rights

85. PCCW agrees that it is necessary for the TA to explicitly outline the conditions under which the rights pertaining to assigned spectrum may be varied before the term of assignment has expired. Varying the rights of the spectrum holder (during the period for which the spectrum has been granted) is likely to have severe consequences on the business plans of the licensee. Such a course of action will also have a negative effect on other licensees, who may, as a result of the TA’s actions, decide to curtail their investments. This will ultimately have a detrimental effect on users. Accordingly, the TA should not seek to vary or withdraw spectrum rights except under very exceptional circumstances. In the event that the spectrum holder’s rights are to be varied, this should ideally be done at the end of the spectrum assignment period rather than during an assignment term.

86. Varying the rights of the spectrum holder during the period of assignment is a serious matter since licensees would have made their business plans for the entire duration of the assignment period. Should such exceptional circumstances arise, the TA should have a very heavy burden of proof and should only act with cause, e.g. where there is a serious licence or statutory breach involved.

87. In the Consultation Paper, the CITB suggests that spectrum rights may only be varied before expiry of the assignment period where:

- Public interest;
- Government policies;
- International obligations; or
- Existence of interference between users

would require the existing rights of the spectrum holder to be varied or withdrawn. These factors are, however, too general and may be abused.

88. In a market driven and technology neutral regime, it is difficult to envisage a “public interest” ground that would justify the variation or withdrawal of a spectrum holder’s rights. The public interest grounds for undertaking this course of action would need to be more fully explained. The same would also apply to the “Government policies” ground.

89. On the other hand, compliance with international obligations is an appropriate concern. Even in this case, however, it should be Government policy to vary or withdraw the rights of the spectrum holder only as a last resort.

90. Interference is also an appropriate concern. It would, however, be useful if mediation and other options were explored as a means of resolving the problem rather than resorting to variation or withdrawal of the spectrum holder’s rights.

91. Specifying the conditions under which the TA will intervene should provide greater certainty to the industry and facilitate business planning. As noted above, it would be unfortunate if the Government’s position on this matter had a chilling effect on investment. Finally, Basic Law rights also arise which must be addressed.

Notice period

92. A sufficiently long notice period should be granted by the TA before the variation to the rights is to take effect. The longer the period for which the spectrum has been assigned i.e. the longer the licence period, the longer the notice period should be. This is to give spectrum holders sufficient time to adjust their investment plans. As long term licences normally require longer term and more substantial investments, such operators should be given a longer notice period compared to those service providers on short term licences, who would not be expected to make significant long term investments.

93. As a rule of thumb, a notice period at least equal to one-third of the period for which the spectrum was granted should be given, subject to a minimum notice period of say, six months. This notice period should be explicitly stated under the policy framework. Of course, should notice be required to be given, the Government should consider appropriate compensation to the spectrum holder.

Spectrum Rights at the End of Assignment

94. The previous section looked at the circumstances under which spectrum rights may be varied or withdrawn *before* the expiry of the spectrum assignment period. In this section, the CITB examines the rights pertaining to the incumbent spectrum holder at the end of the term of assignment.

95. Whilst the CITB recognizes there is an unwritten presumption by licensees that their spectrum rights will be renewed after their current licence term has expired, it has, nevertheless, proposed not to set any expectation that spectrum holders have an automatic right of renewal. Instead, it suggests to deal with this matter by granting a sufficiently long notice period for licences where substantial investment in underlying infrastructure is required.

96. In the Consultation Paper, the CITB asks:

Do you agree with the proposal of status quo for spectrum right after the expiry of a spectrum assignment, i.e. no legitimate expectation for renewal ?

What is your suggestion of the minimum notice period for the intention to change or not to renew the spectrum assignment of a licence where substantial investment in the underlying infrastructure is required ?

Expectation of renewal of spectrum rights

97. Like the preceding issue, this question raises both legal and policy issues:

- Is there a legitimate expectation of renewal ?
- Under what circumstances do such expectations arise ?
- If no such expectation arises, how will this affect investment levels ?
- How will users be affected ?
- Will Government policy objectives be met ?

It is PCCW's view that, to maximize investment and user benefits and, consistent with emerging global best practices, the Government should send a clear message to the industry that they can expect their rights to be renewed unless there are exceptional circumstances. If not, such a climate of uncertainty will mean that investments are likely to be made on a very short term basis and users will ultimately suffer.

98. The longer the term for which the spectrum has been granted (usually the same as the licence term), the greater the need for spectrum rights to be renewed, and such renewal should occur prior to expiry of the existing term. This is necessary given that a significant amount of investment is likely to have been undertaken and a substantial customer base built up by the licensee over the period of assignment. If the spectrum rights are not renewed for the licensee, there is a danger that investment flows will slow dramatically, service quality and innovation will decline, and a significant number of customers will be left stranded. For other licensees, an approach that does not affirmatively create legitimate expectations will only establish a cloud over all investment decisions and this will have a detrimental effect on users.

99. This approach is also consistent with the fact that long term licences are usually only awarded to operators with "carrier" status who are expected to make substantial and long term investments in rolling out their service. By providing assurance to the spectrum holder that its licence will be renewed upon expiry of the current spectrum assignment period unless there are exceptional circumstances, this makes it easier for the operator to make investment decisions.

100. In contrast, service providers who operate based on short term annual licences (e.g. external telecommunications service providers) are normally short term players in the market. They are expected to neither have a significant customer base nor make significant investments in providing service. Failing to renew the spectrum rights (or licences) of such service providers would therefore have relatively little impact on the licensee's investment and consumers at large compared to the decision not to renew the spectrum rights pertaining to a carrier. There is therefore no legitimate basis for such service providers to expect their rights to be automatically renewed.

101. PCCW would therefore suggest that, first and foremost, the Government should make it clear that the spectrum rights belonging to "carriers" will automatically be renewed upon expiry of their licence term unless there are exceptional circumstances (i.e. cause) justifying their non-renewal. For instance, if the licensee has committed a licence breach that cannot be remedied or if there is a major exercise to reallocate the spectrum band for a different purpose, then the TA may be justified in varying/ withdrawing the

rights of the spectrum holder. No automatic right of renewal should be afforded to short term “services-based” licensees.

Relationship with auction pricing

102. Naturally, whether or not spectrum rights will be renewed at the end of the term will be reflected in the auction price for the spectrum. That is why it is important for the TA to confirm, prior to the auction, whether the spectrum rights are intended to be renewed at the end of the assignment period. Based on the above, and to maximize auction revenues, an undertaking from the Government that the spectrum rights will be renewed upon expiry should be part of the auction price and process.

Relationship with spectrum trading

103. The CITB has expressed its concern that continually renewing the spectrum rights for incumbent holders will result in spectrum hoarding, close off access to spectrum by new market entrants and hence dampen service innovation. This is unlikely to occur, however, if spectrum trading is permitted. In a free market, with many spectrum holders available and willing to trade their unwanted spectrum, new entrants should not have difficulty acquiring spectrum in the second hand market at a price which still permits them to build a viable business case. In any event, the TA can address this concern more appropriately under Sections 7K and 7L of the Ordinance.

Relationship with spectrum refarming

104. In the Consultation Paper, the CITB comments that granting incumbent spectrum holders a perpetual renewal right might hinder the TA in reviewing and adjusting the spectrum allocation, i.e. changing the designated use of the particular frequency range or “spectrum refarming”. On this basis, it suggests that the TA should have the discretion at the end of a spectrum assignment period to reallocate the spectrum to a more valuable use.

105. Firstly, spectrum refarming is a significant exercise. As the CITB states in paragraph 48 of the Consultation Paper:

[...] spectrum farming is, after all, a significant regulatory intervention in which the TA decides that the benefits to the consumers and new spectrum users from the new use of spectrum outweigh the costs arising from the different options to accommodate the new use of spectrum [...].

Accordingly, the TA would not be expected to make spectrum reallocations without good reason and without undertaking a thorough study and consultation. Such exercises are therefore not expected to occur frequently.

106. Secondly, it is normally convenient to reallocate spectrum bands upon expiry of specific spectrum assignment terms, since spectrum holders would have constructed their business plans in phases, based on each term of assignment. Thus, whilst incumbent spectrum holders should expect to be able to renew their rights at the end of the spectrum assignment period, the TA should still be able to exercise his right to refarm the spectrum (if indeed the decision to the refarm spectrum is justified) as long as: (i) the refarming exercise occurs at the end of a spectrum assignment period; and (ii) adequate notice is given to the existing spectrum holders.

107. Thirdly, and perhaps more importantly, a technology neutral and market driven environment (in which spectrum liberalisation is permitted) would naturally result in frequency bands being used where they are most valuable, thus rendering it unnecessary for the TA to redesignate the use of the spectrum via refarming. Indeed, PCCW is not convinced that this is anything other than a short term issue.

Minimum notice period for intention to change or not renew spectrum rights

108. The advantages of creating a legitimate expectation of renewal in terms of investment and benefits have been described above. If the Government would seek to challenge a renewal then it should give a substantial notice period.

109. It would generally be expected that spectrum rights will be renewed for long term licences where substantial investment has been made unless there is cause not to do so, or if there are exceptional grounds justifying non-renewal. For instance, if the licensee has operated unlawfully, failed to satisfy certain conditions relating to its licence or the use of the spectrum, used the spectrum for purposes not permitted by its licence or the TA is required to perform a spectrum reallocation exercise, then it would be reasonable not to renew the licensee's spectrum rights.

110. On this basis, PCCW would, again, suggest that, as a guide, a notice period at least equal to one-third of the duration of the spectrum assignment period should be given, subject to a minimum period of say, six months. In this case, the minimum notice period represents the minimum number of months *before expiry of the licence* by which the spectrum holder must be advised that his rights will be changed or not renewed. This notice period should be explicitly stated under the policy framework. This would allow sufficient time for the licensee to consider several (not mutually exclusive) options: curtailing its investment plans, negotiating alternative outcomes, migrating customers and challenging the Government's decision.

Spectrum Refarming

111. Redesignating bands of spectrum for a different use is a significant task. This exercise invariably involves requesting existing spectrum users to vacate the frequency bands in question so that they can be deployed more efficiently or allocated for a higher value or more important use. Understandably, therefore, because of the disruptive nature of the exercise, spectrum refarming is not expected to be undertaken frequently by the TA, and only after careful study and consideration. Indeed, the CITB suggests that the TA should be required to appraise the different courses of action open to him before deciding to refarm spectrum.

112. In the Consultation Paper, the CITB asks:

Do you agree that the TA should be required undertake impact appraisals before initiating spectrum refarming exercises ?

What other arrangements should be put in place for spectrum refarming exercises ?

Impact appraisals

113. Given the potentially adverse consequences of a spectrum refarming exercise on the operators, particularly on those operators who are requested to vacate the spectrum, it is imperative that the TA studies the overall effect on the industry and consumers, and consults the industry on the merits and demerits of redesignating the use of the frequency range before he decides to refarm the spectrum. Such studies would naturally include impact appraisals, as the CITB suggests in the Consultation Paper⁹.

Other arrangements

114. If the TA refarms certain spectrum frequencies, it is possible that this will disrupt the services of the existing spectrum users. These users may have a large customer base and hence requiring them to provide their services using a different frequency range, even if technically possible, may prove to be a significant task. It is therefore critical that, once the TA has decided to refarm spectrum (after having conducted all the required studies and consulted the

⁹ Interestingly, despite the potential magnitude of the impact on the industry, the TA has not seen it fit to conduct such impact appraisals when considering the withdrawal of regulation in anticipation of fixed-mobile convergence.

industry), he must implement arrangements to allow incumbent spectrum users to smoothly migrate their services to the newly designated frequency band.

115. It would also be appropriate for the TA to offer the incumbent spectrum user the first right of refusal on the spectrum which is to be redesignated for a different use.

116. In any case, if the market were able to decide of its own accord how best to make use of spectrum resources, and spectrum trading and liberalisation were permissible in Hong Kong, the Government would not need to undertake any spectrum refarming exercises (except in the most unusual circumstances) since operators would naturally wish to migrate the use of their spectrum to the new services.

Spectrum Rights for Non-Licensees

117. It is a matter for debate whether users of spectrum who are making use of the spectrum for free should be granted any specific rights. As such users do not need to acquire any licence to use the frequency, it is perhaps inappropriate for them to be given any protection from interference or for them to assume that the particular spectrum range they are using will not be deployed for any other services in the future. In any case, the CITB does not consider it necessary to deal with this issue under the present review of the spectrum policy framework.

118. In the Consultation Paper, the CITB asks:

For non-licensees under the TO, do you have demand for spectrum rights ?

If so, what kind of spectrum rights would you seek ?

For licensees under the TO, what are your views on our proposal not to cover spectrum rights for non-licensees in the spectrum policy framework ?

119. PCCW considers that very limited rights, if any, should be afforded to non-licensed users of spectrum. Such users should recognize the risk of using spectrum for which they have not been required to pay and for which no licence is needed. On this basis, they cannot expect any significant protection from day-to-day interference nor can they expect to be able to use the frequency band exclusively.

120. Having said that, all existing users of the spectrum, whether licensed or not, should, as the incumbent spectrum users, expect to be granted certain basic

rights. These include the right to be informed of any changes to the existing use of the spectrum (such as refarming) or proposals for the frequency band to be shared with other services.

121. For completeness sake, the spectrum policy framework should cover the rights pertaining to all users of spectrum, both licensed and non-licensed users. PCCW sees no reason why the rights of non-licensees should be excluded from the policy framework.

Spectrum Supply & Spectrum Release Plan

Spectrum supply

122. As the CITB states in the Consultation Paper, the ability to access spectrum is critical for entry into the relevant communications market by a new player. In fact, under the existing regime, if the appropriate frequency bands are not assigned to operators who are in need of the spectrum, they will not be able to provide service.

123. One case worth mentioning at this point is that pertaining to spectrum used for Electronic News Gathering (“ENG”) services. Such services enable live coverage of news events and are essential to quality news broadcasters, particularly to those who have just entered the highly competitive pay-television market. Making ENG spectrum available to these new entrants would create a level playing field for all news broadcasters.

124. ENG spectrum is currently being used by ATV, TVB and Hong Kong Cable Television Limited. Despite requests from operators, no further assignments of ENG spectrum have been made by the TA on the basis that resources are tight. Whilst this may appear to be the case at first glance, it is not impossible to find tranches of spectrum which may be allocated for ENG services. For instance, on page 37 of the Consultancy Report, Ovum suggests:

2025 – 2110 MHz, being the 3G centre gap, renders it unsuitable for related mobile applications but it could be considered for FWA or ENG. It can be noted that this band is sometimes paired with 2200 – 2290 MHz but this is already being used for ENG.

There are also other suitable bands which are currently not in use but simply “reserved” for other services.

125. On this basis, it would seem unfair of the TA to deprive new entrants of ENG spectrum to compete against the incumbent news broadcasters. Indeed, where there is demand, it should be the Government’s role to make spectrum

resources available so that they can be equitably shared by all competitors. The CITB should instruct the TA or Broadcasting Authority to promptly release some of the idle frequencies to relieve imminent demand for ENG services in the short term. Release of this spectrum would not equate to dumping or in any way deter investment, and thus should occur immediately.

Spectrum release plan

126. Being able to ascertain in advance when various tranches of spectrum will become available for use is important to service providers when preparing their business plans for new services. On this basis, the CITB proposes that the TA publish a spectrum release plan showing the spectrum to be supplied to the market in the following three years via an auction process. This plan is to be updated annually on a rolling three year basis so that account can be taken of the latest developments concerning utilization of spectrum.

127. In the Consultation Paper, the CITB asks:

Do you support the proposal to publish 3-year rolling spectrum release plans for spectrum to be released to the market through open, competitive bidding processes ?

What types of information would you propose to include in the plans ?

3-year spectrum release plan

128. It is important to have clarity and predictability in the TA's decisions in spectrum management since this enables the telecommunications industry to make better informed investment decisions. Without this transparency, operators may be reluctant to commit resources to provide new services because of the risk of unforeseeable changes in the regulatory environment affecting their investments. In turn, without this certainty, neither investment levels nor user benefits will be maximized.

129. The preparation of a spectrum release plan would provide some degree of certainty to the industry. It will serve the purpose of informing the industry of the TA's intentions as regards the timing of future releases of spectrum and how each tranche of spectrum is intended to be used. This would facilitate operators in making their investments plans and is particularly important in the absence of spectrum liberalisation, since under such a regime, operators would be free to make use of the spectrum for whatever purposes they deem appropriate and hence would not need to refer to a spectrum release plan to ascertain how the spectrum bands are to be deployed. On this basis, PCCW supports the publication of a three-year spectrum release plan by the TA.

130. To make the plan meaningful, however, it is important that the TA, when drawing up the spectrum release plan, take into account the following:

- The plan should contain some degree of stability. It would be difficult for operators to make their business plans if, for example, proposed allocations for each spectrum band changed dramatically from year to year;
- The TA must give due consideration as to how the particular frequency band has been/ will be used internationally;
- The technology and equipment which will use the spectrum and their availability should be taken into account; and
- Feedback from the industry should form an important input into how the spectrum should be used.

Types of Information

131. PCCW recognizes that the spectrum release plan will not necessarily bind the TA as to how he chooses to subsequently allocate and assign the spectrum bands outlined in the plan. PCCW would suggest, however, that the plan be followed unless there are unusual circumstances. The information in the spectrum release plan should serve to provide useful input into the operators' business planning process. In any case, PCCW would request that the industry be consulted before any specific spectrum allocations are made based on the release plan.

132. On this basis, inclusion of the following minimum details within the spectrum release plan would be most useful:

- Frequency bands to be released and date on which the releases are planned;
- Proposed initial use for each piece of spectrum¹⁰; and
- Method by which the spectrum will be assigned to interested parties, e.g. auction.

Secondary Trading of Spectrum

133. At the outset, secondary trading of spectrum enables more efficient use to be made of the limited spectrum resources. By enabling a spectrum holder

¹⁰ Obviously, if spectrum liberalisation were permitted, the use of the spectrum could be subsequently changed by the spectrum holder.

to transfer part or all of its spectrum to another party (for a fee), this ensures that the amount of unused spectrum is kept to a minimum. In a situation where one operator requires more spectrum in order to service its expanding customer base and another operator has excess spectrum, secondary trading can benefit both parties.

134. The CITB proposes that secondary trading of spectrum should be considered in Hong Kong if there is support from the industry for such a scheme. It recognizes, however, that there are substantial implementation issues to be resolved before secondary trading can be introduced, such as:

- Rights conferred on the spectrum holder;
- Length of the period for which parties assigned spectrum have a right to use the spectrum and whether these rights may be renewed;
- Availability of information regarding current title to each tranche of spectrum and how much of the spectrum is being used to facilitate identification of potential spectrum sellers;
- How to deal with spectrum hoarding;
- Circumstances under which trades need to be approved;
- The treatment of financial gains (and losses) arising from the trading of spectrum; and
- Interference management.

135. In the Consultation Paper, the CITB asks:

Do you agree that the introduction of secondary trading of spectrum in Hong Kong can improve the efficient use of spectrum ?

How should potential anti-competitive behaviour in the spectrum market be addressed ?

How should gains in spectrum trading be treated ?

What are your views on other implementation issues identified by the consultant ?

Secondary trading of spectrum

136. PCCW generally agrees that allowing spectrum to be traded (i.e. sold) between operators would benefit Hong Kong given the limited amount of spectrum available. Indeed, in the Consultation Paper, the CITB notes that

spectrum trading would bring net economic benefits to Hong Kong to the tune of some HK\$83 million over a twenty year period.

137. Spectrum trading should result in the spectrum being used more efficiently by both existing operators and new entrants. Several examples can easily demonstrate the benefits of a regime which encourages spectrum resources to be used efficiently. Firstly, existing operators may sell or obtain additional capacity according to their ongoing requirements. Secondly, in the case of new entrants who do not initially require a large amount of spectrum to roll out their service, the desired amounts of spectrum can immediately be acquired from existing spectrum holders at market price instead of having to wait for the next round of formal spectrum assignments to be conducted by the TA. Any unused spectrum held by the new entrant in its initial years of operation may, similarly, be sold to other operators. If secondary trading were not permitted, in this situation, the operator selling the spectrum would have been left with unused spectrum and the operator buying the spectrum would not have had enough spectrum to accommodate its users.

138. Secondary trading not only benefits operators but also the consumers, since more freely available spectrum must mean lower costs for service providers (and hence lower retail prices to consumers) who make use of the spectrum to offer services. These lower retail prices are not just a result of operators being able to purchase and sell unused tranches of spectrum on the market, but also because the greater availability of spectrum encourages market entry and hence competition. Consumers also benefit from new and more innovative services being introduced onto the market by these new entrants.

139. PCCW recognizes that there are implementation issues to be resolved before spectrum trading can be permitted in Hong Kong. However, in principle, PCCW concurs that spectrum holders should be allowed to trade their spectrum. In the event that spectrum trading cannot be introduced in the near term, PCCW would suggest that the TA undertake a careful study of its first spectrum release plan to ensure that all relevant services are taken into account, e.g. spectrum for mobile television services.

Anti-competitive behaviour

140. Detecting whether spectrum hoarding by an operator raises anti-competitive concerns requires a market and competition analysis under Sections 7K and 7L of the Ordinance. This is the same analysis which is required for any anti-competitive conduct allegation.

141. Hoarding is a very emotive term. PCCW would therefore emphasize that what is to be combated is hoarding which equates to anti-competitive

conduct under Sections 7K and 7L of the Ordinance. If the conduct is not anti-competitive, then no Government intervention is appropriate, i.e. the market should be trusted.

142. Anti-competitive conduct is clearly unacceptable, but sometimes the anti-competitive results are the inadvertent product of Government actions. For example, in the case of spectrum exclusively assigned to ATV and TVB to provide high definition broadcasting services, the CITB has committed not to release other frequency bands for providing high definition broadcasting services until ATV and TVB have confirmed the spectrum could successfully be used to supply such services:

*Out of the five multiplexes available in Hong Kong, ATV and TVB shall share the one based on multiple frequency network (MFN) configuration for broadcasting their four existing programme channels in digital format alongside analogue broadcasting. In addition, each of them will take up one additional multiplex based on single frequency network (SFN) configuration for new high-definition broadcasting services. The remaining two SFN multiplexes will be assigned at a later stage after ATV and TVB have confirmed the technical feasibility of the SFN configuration.*¹¹ [Emphasis added]

On this basis, ATV and TVB could be tempted to deliberately slow down progress on their trials of high definition broadcasting services in order to delay competition. In any event, allowing a market participant to directly or indirectly decide when a potential competitor can enter the market is on its face inappropriate.

143. The Government should minimize the distortion/ damage that this has imposed on the market and immediately release the remaining two SFN channels for use by interested operators. These two channels should be awarded via auction to the highest bidder to ensure best use of the available spectrum. This would also greatly contribute to Government revenues.

144. In order to ensure a level playing field, ATV and TVB should also be asked to pay a fair market price for the spectrum with which they have been assigned. After all, the spectrum with which they have been assigned will be used to offer services which directly compete with other operators. The price could be established with reference to, for instance, the average auction price fetched for the two remaining SFN channels. If it is impractical to require

¹¹ See paragraph 9 of the DTT Broadcasting Statement.

ATV and TVB to pay for their spectrum then an alternative solution should be found which does not discriminate against other operators.

Trading gains

145. PCCW does not object to operators gaining financially from their spectrum trading activities just as other persons and entities do. If an operator paid a fair market price when it originally acquired the spectrum (and the assumption must be that it did) then any financial gains or losses arising from the subsequent sale of that spectrum should be wholly due to or borne by the operator.

146. Spectrum should be treated just like any other business asset which can be acquired or sold. Any gains arising from the sale of spectrum should therefore be treated in the same manner as profits resulting from the sale of other business assets. This would extend to the manner in which gains resulting from the sale of fixed assets are taxed. Likewise, losses arising from the sale of spectrum must be fully recognized by the spectrum holder and dealt with in the same way as losses on the sale of other assets.

Other implementation issues

147. The Consultation Paper identifies several implementation issues surrounding the introduction of spectrum trading which need to be resolved. PCCW's comments are outlined below.

148. Spectrum rights. As far as possible, these should not be altered during the period for which the spectrum rights were originally granted. On this basis, the rights which were associated with the originally holder of the spectrum should transfer to the new holder of the spectrum upon the spectrum being traded unless there are clear limitations/ provisions in the existing licence specifying the contrary.

149. Duration and renewal of licences. The same level of legitimate expectation should be held by the original and subsequent spectrum holders. Indeed, secondary trading of spectrum would only be practical if (absent unusual circumstances¹²) the original spectrum holder's legitimate expectations regarding licence renewal continued to be valid. If not, the party acquiring the spectrum from the original holder would have no assurance that it is able to continue using the spectrum.

¹² These would include: a Government decision that the spectrum is required by another, more valuable, service; the refusal of the licensee to pay a renewal fee or the licensee contravening the terms of its licence; compliance with international regulations; and public interest reasons.

150. Availability of information on spectrum use. To create a successful market for spectrum trading, it is important that sufficient information is available to those who are interested in buying and selling spectrum. As a minimum, details regarding:

- Frequency bands held by each operator;
- Service being provided over the frequency range;
- Geographical area served by the frequency; and
- Interference management requirements

should be made publicly available (via a register maintained by the TA) to facilitate spectrum trading.

151. Spectrum hoarding. PCCW's suggestions on how to deal with this matter per Section 7K and 7L of the Ordinance have been discussed above.

152. Approval of trades. As far as possible, the spectrum trading process should be handled entirely by the two parties involved. There should be little need for the TA to interfere in the transaction as this will simply slow down the process. There is a need to trust the market; to follow the dictum of "small government, big market". This, however, means that the two parties should ensure that the transfer of the spectrum satisfies basic considerations such as:

- No licence conditions or other regulations are breached via the transfer;
- All relevant licence fees are fully paid up; and
- No interference arises as a result of the transfer.

153. There should be little reason to seek the TA's approval for a particular trading transaction. Sections 7K and 7L of the Ordinance are relevant and the TA's actions under these Sections are always possible. For administrative reasons, however, it would be useful if all successful trades were notified to the TA and recorded by him in a register.

154. Trading gains. PCCW's suggestions on how to deal with this matter have been discussed above.

155. Interference management. Under a spectrum trading scheme in which the TA has little involvement, operators are expected to take a more active role in ascertaining whether there are any interference issues arising from the transfer of spectrum and, if so, to resolve the problem amongst themselves. Interference problems are, obviously, less likely to occur if the operator acquiring the spectrum does not change the use to which the spectrum is put.

156. If there are interference issues, the TA could act as arbitrator in the event that there are disputes requiring resolution.

Spectrum Liberalisation

157. Permitting operators to change the use for which the spectrum was originally assigned to them should ensure that the most efficient use is made of spectrum resources and that consumers benefit from early availability of the most innovative services at the lowest cost. Such a proposal would be a natural progression from the existing technology neutral and market driven approach which the TA purports to adopt in the assignment of spectrum to licensees. Under a true technology neutral and market driven approach, operators would be allowed to select the technology and standard to be used¹³.

158. As spectrum liberalisation has not yet been proven in a small, densely populated area such as Hong Kong, and there are considerable coordination and implementation issues to be resolved before operators can be permitted to change the use of spectrum, the CITB proposes that spectrum liberalisation not be introduced at this point, but that further study be conducted before deciding whether such a scheme is suitable for Hong Kong.

159. In the Consultation Paper, the CITB asks:

Do you agree that we should further monitor developments in other jurisdictions regarding spectrum liberalisation before considering whether we should introduce it to Hong Kong ?

160. There are considerable financial benefits associated with the introduction of spectrum liberalisation in Hong Kong. In the Consultancy Report, the Consultant estimates that the introduction of secondary trading and spectrum liberalisation would bring combined net economic benefits of around HK\$149 million over a twenty year period as compared with just HK\$83 million if only secondary trading were allowed. On this basis, a proposal to allow operators to change the use of their assigned spectrum should generally be supported as this will ensure that spectrum resources are always deployed where there is the greatest demand and value.

161. If spectrum liberalisation were to be introduced, however, there are important operational issues to be sorted out. For instance, the management of

¹³ Interestingly, this supposedly “technology neutral” approach does not seem to have been adopted by the TA in his proposals to licence spectrum in the 850 MHz band specifically for the provision of CDMA2000 services. See CDMA2000 Consultation.

potential interference arising from the change of use of spectrum would require clear procedures to be established by the TA to enable such problems to be identified and resolved by the operators involved. In addition, the industry should still be required to adhere to certain specifications contained in the spectrum allocation plan, particularly where the plan has been designed to take into account international requirements that will ensure consistent use of certain frequency bands on a worldwide basis.

162. On this basis, whilst the CITB's suggestion to monitor developments in other jurisdictions regarding spectrum liberalisation is helpful in deciding how to proceed with such a scheme in Hong Kong, much more useful would be a detailed study (with input from the industry) into how spectrum liberalisation can be implemented in Hong Kong. This study would deal with all the implementation issues associated with the decision by an operator to change the use of its assigned spectrum and offer proposed solutions. Only if the study offers a feasible way to introduce spectrum liberalisation in Hong Kong should the TA proceed with such a scheme. PCCW would suggest that any such study be completed within a reasonable timeframe and the matter brought back for consultation thereafter.

Spectrum for Government Services

163. Spectrum used by the Government requires special treatment. Such spectrum is usually deployed in the provision of essential public services such as communications systems for emergency services, radar for detecting the location and movement of aircraft, etc. These bands of spectrum therefore need to be reserved for Government use and subject to a command and control approach. Spectrum of this nature needs to be made unavailable to the industry even if this means a loss of potential revenue.

164. There are, however, certain frequency bands currently being used by the Government which may not be considered "critical" for essential public services. For instance, spectrum used by RTHK to broadcast arts radio programs could conceivably be regarded as falling outside the category of frequency used for emergency or essential services. On this basis, it is questionable whether spectrum needs to be set aside for such use when there may be more valuable uses to which the spectrum can be put in the commercial sector. Even if it is decided that these services need to be maintained, there is the issue of how much spectrum is considered sufficient for such purposes and whether the spectrum should be treated differently to spectrum used in the commercial sector, especially when the services compete directly with similar services being offered commercially.

165. As the reservation of adequate spectrum for essential public services is considered an important policy objective, the CITB suggests that the present command and control approach for spectrum used in respect of Government services continue to be maintained.

166. In the Consultation Paper, the CITB asks:

Do you agree that the command and control approach for spectrum management should continue to be applied to spectrum for government services ?

167. PCCW recognizes the importance of reserving certain spectrum ranges for the provision of essential public services, and hence agrees that these frequency bands should be taken out of the supply of spectrum to be made available to the industry for commercial use¹⁴. It is important, however, to clearly define what are genuinely regarded as “essential public services” and to assess whether the amount of spectrum already allocated for such services is sufficient or indeed excessive.

168. On this basis, PCCW considers that the spectrum reserved for Government use should, just like commercially used spectrum, be subject to a review process in order to ensure that the spectrum assigned to the Government is being used efficiently. Under this process, the TA should undertake a regular review of how the Government is using its spectrum. If it is found that there is excess frequency which has lain idle for some time, these spectrum bands should immediately be released to the industry for commercial use. Similarly, if it found that there is insufficient spectrum to cater for essential public services then more spectrum should be assigned to the Government from the available spectrum resources.

169. The inaugural review would also be an ideal opportunity to re-examine the types of Government use spectrum which are currently classified as being for “essential public services” to determine whether the frequency bands in question would, more appropriately, be treated in the same manner as spectrum used in the commercial sector, and also whether the correct amount of spectrum has been assigned for such purposes. Adjustments to the amount of Government spectrum can then be made.

170. As to the frequency at which the review should be conducted, PCCW considers that this should be in line with the proposed annual review of the

¹⁴ Having said that, there is an argument that even the management of spectrum for essential public services, e.g. emergency communications could be handled by the commercial sector without any loss of quality as long as sufficiently high service standards are set for the service provider.

spectrum release plan. The advantage of conducting both reviews concurrently is that any necessary adjustments between the allocation of Government and commercial use spectrum can be made at the same time.

Spectrum Pricing

171. Spectrum is a limited public resource and hence it is only appropriate to charge for use of the spectrum. Today, such charges, where levied, take the form of a Spectrum Utilisation Fee (“SUF”) payable to the Government. The level of the SUF, particularly where determined via public auction, acts to ensure that the spectrum is awarded to the operator who most values it. The logic is that spectrum that can create more value for customers should be able to command a higher SUF.

172. It has been suggested in the Consultation Paper that SUF should only be levied where there are competing demands for spectrum, since the spectrum should be worth nothing if no operator wishes to make use of it. In fact, forcibly imposing an SUF on spectrum of this nature would only discourage operators from using it, rendering the frequency band virtually valueless to the community.

173. The CITB, however, takes a different view, proposing that all users of spectrum should be required to pay SUF regardless of whether or not there are competing demands. This is because by making use of the spectrum alone, the operator is denying other users access to the spectrum and hence it should be required to pay for the privilege of using the frequency band. Such a scheme would also be consistent with the general principle that users should pay to use public resources. As most spectrum users today do not need to pay SUF, this proposal would require careful implementation.

174. Where there are competing demands for the same tranche of spectrum, obviously, public auction is the best means of determining the appropriate level of the SUF. If there are no competing demands, however, the CITB suggests that the SUF should be set to reflect the opportunity cost of the spectrum. The opportunity cost would be defined with reference to the value fetched by similar spectrum in another auction or by considering the least cost alternative method to use of the spectrum.

175. In the Consultation Paper, the CITB asks:

Do you agree that SUF should be applicable to commercial use of spectrum irrespective of whether there is competing commercial demand ?

Do you agree that SUF for spectrum not released through auction should be set to reflect the opportunity costs of the spectrum ?

When should spectrum be subject to SUF ?

176. PCCW would suggest that only spectrum which is intended to be used *exclusively* by one operator should be subject to an SUF. If there are competing demands for the spectrum, both the party entitled to use the spectrum and the level of the SUF should be determined via auction. If there are no competing demands for the tranche of spectrum at the time the frequency band is made available, then the operator intending to use the spectrum exclusively should be required to pay a nominal SUF which is set to reflect the opportunity cost of the spectrum¹⁵. With the payment of SUF brings exclusive use of the tranche of spectrum and certain rights.

177. Where use of the spectrum is shared by multiple users, however, e.g. consumers using wireless Local Area Networks, such users should not expect to be granted any rights and hence should not be subject to any payment of SUF. Of course, users who do not pay SUF have no recourse if they experience interference.

Assessing the level of the SUF

178. It is difficult to determine the appropriate level for SUF. The SUF should be based on the market value of the spectrum. This, however, requires a future looking analysis into a market where, for instance, spectrum trading and liberalisation may occur.

179. In a technology neutral and market driven environment, the level of the SUF should generally be set via auction. The SUF should, however, also take into account the following factors:

- Past SUF levels (e.g. 3G) and/ or minimum bids are relevant and stand as precedents which cannot be ignored.
- For the public purse, generally, the higher the level of the SUF the better.
- Investment incentives and competitive impacts must be analyzed to ensure that they are not adversely affected.

¹⁵ The opportunity cost could be established with reference to the price fetched for similar spectrum in another auction or the least cost alternative method to using the spectrum, as proposed by the CITB in the Consultation Paper.

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- Substantial changes in the price of spectrum due to dramatic fluctuations in market values should be smoothed out when determining the level of the SUF so as not to unduly place market entrants at a financial (and hence competitive) advantage/ disadvantage to later entrants in the event of a significant change in the market price of spectrum.

180. On this basis, if the TA were to allocate spectrum for certain services, he should adhere to these principles when setting the level of the SUF. For example, where the spectrum being released is to be used for services which directly compete with existing services (e.g. CDMA2000 services), an appropriate approach would be to subject the spectrum to open auction but set the minimum SUF at the same level being paid by the operators who are currently offering similar services¹⁶. This would ensure a level-playing field for all market participants and prevent non-market driven factors from determining the SUF.

¹⁶ In fact, given the approach the TA intends to take with regard to the allocation of spectrum for CDMA2000 services and the payment of SUF, perhaps this is a timely opportunity to review the levels of SUF currently being paid by existing spectrum holders such as the 3G mobile licensees.

CONCLUSION

181. In view of the number of new services utilizing spectrum which the Government intends to license in recent years, this review comes at a timely moment. The consultation on spectrum policy covers an extensive set of issues which, once finalized, should provide users of spectrum in Hong Kong with a much needed, clear and comprehensive framework in which to operate.

182. There are, however, a great deal of issues to be resolved in devising this framework. The CITB sees the consultation as addressing a complex set of matters and thus the formulation process requiring a substantial amount of time. It therefore suggests that, concurrently with the development of the spectrum policy framework, the TA continue to make appropriate spectrum allocation and assignments as the review progresses. In this regard, PCCW notes the TA's recent intentions to allocate frequency for BWA and CDMA2000 services.

183. PCCW considers this to be both unnecessary and dangerous. Firstly, PCCW does not consider the "complex" set of issues to be time-consuming in this consultation. Secondly, without having defined certain fundamental aspects of the policy framework, the TA cannot possibly be sure that he is making the right decisions regarding the future allocation of spectrum. Thirdly, any spectrum allocations made by the TA in the absence of an overall spectrum release plan are, by definition, ad hoc and are hence likely to be uncoordinated and potentially wasteful of the limited spectrum resources available in Hong Kong.

184. In addition, with no decisions made as to the rights pertaining to spectrum holders (and how these rights could be varied), and whether the spectrum can be traded or its use changed, operators will have great difficulty assessing the price it is willing to bid for spectrum. This will make business planning an even more arduous task than it already is. Certainly, the public purse will suffer.

185. On this basis, PCCW would strongly urge the TA against proceeding with the allocation of spectrum for specific services (e.g. BWA, CDMA2000) before the fundamental aspects of the spectrum policy framework have been finalized. Indeed, with this consultation now underway, any basis for rushed and ad hoc decision making for BWA or CDMA2000 has been removed. This concern regarding ad hoc decision making is very real as the TA's original approach regarding BWA spectrum has proven unworkable due to problems with interference, and its second approach has raised different concerns. This

experience acts to reinforce the preference for a coherent spectrum policy rather than a makeshift approach.

186. The TA should therefore hold off on any exercise to allocate spectrum for BWA and CDMA2000 (and any other services) when an exercise to devise a spectrum policy framework has already commenced (and is in full progress) and the establishment of this framework will have significant bearing on spectrum allocations.

187. As a priority, the separate consultations and studies on spectrum trading and liberalisation proposed by the CITB in the Consultation Paper should be conducted before any decisions are taken regarding the right to trade and change the use of spectrum. An early resolution to these matters would enable a more comprehensive framework for Hong Kong's spectrum policy to be formulated. This would provide a clear direction for present and prospective spectrum users and facilitate business planning and investment decision making.

SUMMARY OF PCCW'S RESPONSE TO ISSUES RAISED IN THE CONSULTATION PAPER

188. The following table briefly summarizes PCCW's position on each of the specific matters raised in the Consultation Paper:

	Issue	PCCW's Position
1.	Considerations for spectrum policy framework	Generally agree that the considerations outlined in the Consultation Paper should be factored into Hong Kong's spectrum policy framework. In addition, interference management should be included as a consideration.
2.	Spectrum policy objectives	Generally agree with the policy objectives put forward by the CITB in the Consultation Paper.
3.	Guiding principles in spectrum management	Agree that market driven approach should be adopted as guiding principle. This approach should extend to the choice of technology. It would therefore be inconsistent if the TA were to dictate the specific technical standard to be used.
4.	Spectrum rights before expiry of assignment	<ul style="list-style-type: none"> ▪ Agree that the circumstances under which spectrum rights are varied/ withdrawn before assignment term expires should be clearly spelled out beforehand. ▪ Notice period for varying/ withdrawing spectrum rights before end of assignment term should be set at one-third of the total term for which the spectrum rights have been assigned, subject to a minimum period of say, six months.
5.	Spectrum rights at end of assignment	<ul style="list-style-type: none"> ▪ Disagree that spectrum holders have no legitimate expectation that their rights will be renewed at end of assignment term. ▪ The longer the period of assignment, the greater the expectation that rights will be

Issue	PCCW's Position
	<p>renewed upon expiry. Thus, short term (e.g. one year) licensees should not expect their licences to be automatically renewed upon expiry.</p> <ul style="list-style-type: none"> ▪ If it is intended that the rights not be renewed then a notice period (before the end of the assignment period) should be set at one-third of the total assignment period, subject to a minimum period of say, six months.
6. Spectrum refarming	<p>Agree that the TA should undertake impact assessment (including consultation with industry) before deciding to refarm spectrum.</p>
7. Spectrum rights for non-licensees	<ul style="list-style-type: none"> ▪ Non-licensees should have limited rights, e.g. they should not have exclusive right to use certain frequency bands. ▪ Both licensed and non-licensed users of spectrum should, however, be entitled to a basic level of rights, e.g. be given notice of any proposed changes to the use of the spectrum. ▪ The spectrum policy framework should cover all users of spectrum and hence should include non-licensees also.
8. Spectrum release plan	<p>Agree with the proposal to publish a 3-year rolling spectrum release plan indicating the future spectrum to be released to the market via auction and the proposed use of each frequency band.</p>
9. Secondary trading of spectrum	<ul style="list-style-type: none"> ▪ Agree that secondary trading of spectrum can improve the efficient use of spectrum and hence should be introduced. ▪ Financial gains (and losses) arising from the trading of spectrum are rightfully due to the spectrum

Issue	PCCW's Position
	<p>holder and should be treated in the same manner as any other business asset.</p> <ul style="list-style-type: none"> ▪ There are, however, certain implementation issues that need to be sorted out before spectrum trading can be introduced, e.g. provisions to control interference.
10. Spectrum liberalisation	<p>Agree that spectrum liberalisation should be supported but that further study is required on the implementation aspects before it is introduced.</p>
11. Spectrum for Government services	<p>Agree that the command and control approach should continue to be adopted in respect of spectrum for Government services given its critical importance and the greater need for such spectrum to be coordinated. A review should, however, be conducted to determine whether the spectrum is being used for “essential services” and if so, whether the appropriate amount of spectrum has been allocated for such services.</p>
12. Spectrum pricing	<ul style="list-style-type: none"> ▪ SUF should only be payable if the spectrum is to be used exclusively by the operator. ▪ In a technology neutral and market driven environment, the SUF should generally be set via auction (subject to a list of considerations) if there are competing demands, otherwise, a nominal fee should be payable.