

Frequency Layout Plan Of In-Building Coaxial Cable Distribution Systems

Statement of the Telecommunications Authority

15 July 1999

Introduction

As a result of the 1998 Review of Television Policy, the Secretary for Information Technology and Broadcasting announced Government's decision in December 1998 to further open up the television broadcasting market in Hong Kong. The review has also identified that one of the hurdles to further opening up of the market is the limited capacity of the in-building distribution systems in high-rise residential buildings. On 31 March 1999, the Office of the Telecommunications Authority (OFTA) issued a consultation paper on the frequency layout plan of in-building coaxial cable distribution systems (IBCCDSs), the technical standards of distribution and the associated set-top boxes for the introduction of new telecommunications and television services (the Consultation Paper). 55 submissions were received. On 8 June 1999, OFTA published the result of the public consultation and OFTA's initial responses. On 11 June 1999, OFTA conducted an industry workshop to present the results of the consultation and OFTA's initial responses and invited the attendees to express further views and comments on the Consultation Paper. Attendees were also invited to submit further views in writing by 19 June 1999. Three further submissions were subsequently received.

Considerations and Conclusions

2. Having considered the views and comments expressed in the 55 submissions, at the workshop and in the three further submissions after the workshop, the Telecommunications Authority (TA) has come to the conclusions on the frequency layout plan of IBCCDS and the technical arrangement for set-top boxes as set out below.

Channel Plan

3. In order to minimize interference in the allocation of frequency spectrum in the IBCCDS, it was proposed in the Consultation Paper to adopt an 8 MHz channel plan and 6 MHz NTSC signals would also be allowed to be distributed if their vision carriers were aligned with the 8 MHz channel plan.

4. In the first round of the consultation, the proposal was supported by the majority of submissions. The result of the consultation and OFTA's initial response are given in paragraphs 2 and 3 of the Result of Public Consultation paper issued by OFTA on 8 June 1999. No further comments on the issue were received in the workshop held on 11 June 1999 or after the workshop.

5. The TA **concludes** that an 8 MHz channel plan should be adopted in order to facilitate the allocation of frequency spectrum in the IBCCDS. 6 MHz NTSC signals would also be allowed to be distributed if their vision carriers are aligned with the 8 MHz channel plan. Details of the plan are given in Annex 1.

Allocation of Spare Channels

6. In order to ensure that the frequency spectrum of the IBCCDS will be used in an efficient and effective manner, it was proposed in the Consultation Paper that the spare channels in the existing IBCCDS should be allocated to licensed service providers employing spectrum efficient technologies.

7. In the first round of consultation, the majority of submissions supported the proposal and there were comments that a timetable should be set for digitizing the IBCCDS. OFTA's initial response was to adopt the proposal and a review on whether a timetable should be set for digitizing all IBCCDSs could be conducted when digital terrestrial television has been introduced. These were given in paragraph 5 of the Result of Public Consultation paper issued on 8 June 1999. No further comment on the proposal was received in the workshop held on 11 June 1999 or after the workshop.

8. The TA therefore **concludes** that spare channels in the existing IBCCDS should be allocated by the TA to licensed service providers employing

spectrum efficient technologies and a review on whether a timetable should be set for digitizing all IBCCDSs could be conducted when digital terrestrial television has been introduced.

Digital Compression

9. It was proposed in the Consultation paper that a compression ratio of 6 or more should be employed. Digital channels would be allocated to licensed service operators in whole or part of an 8 MHz block and the plan would be reviewed when digital terrestrial television had been introduced.

10. In the first round of consultation, some commented that to specify the compression ratio of 6 or more was not appropriate as it would limit the flexibility of the operators to offer high quality television programme services, especially HDTV.

11. In paragraph 15 of the Result of Public Consultation issued by OFTA on 8 June 1999, OFTA clarified that the proposed compression ratio of 6 or more referred to the capability of a system. A revised suggestion of a minimum data rate of around 20 Mbps for an 8 MHz channel was proposed as an alternative criterion. The capacity could be used either for more standard definition programmes or for a smaller number of higher definition programmes.

12. The Result of Public Consultation issued by OFTA on 8 June 1999 was presented to the industry in the workshop conducted on 11 June 1999. No comment was made on this issue during the workshop and no further submission was received.

13. The TA **concludes** that when digital compression is used, the minimum data rate should be around 20 Mbps for an 8 MHz channel. The capacity could be used either for standard definition programmes or for a smaller number of higher definition programmes.

Use of Adjacent Channels of IBCCDS

14. In order to increase the channel capacity of IBCCDS to meet future demand, it was proposed in paragraph 27 of the Consultation Paper to use all the available channels on an adjacent channel configuration. In the first round of consultation, the majority of the submissions supported the proposal but there were concerns about the adoption of a fixed channel plan because of cost implications. After considering all the submissions, OFTA made the following revised proposal in paragraph 7 of the Result of the Public Consultation issued on 8 June 1999:-

- (a) adjacent channel configuration should be adopted in Hong Kong;
- (b) the present channel configuration in existing IBCCDSs may continue unchanged if no new service is added;
- (c) when a new service is to be added to an existing IBCCDS and the capacity of the system is insufficient to handle all the services, the relevant equipment and apparatus should be upgraded to support adjacent channel operation at the frequency channels in 54-470 MHz and/or 470-862 MHz; and
- (d) when a new licensed operator wishes to have access to an IBCCDS, it may approach the owners to reach agreement on the arrangement, including allocation of costs, for upgrading the distribution of the four terrestrial television channels so that the IBCCDS can work on adjacent channel configuration at any frequency channels in 470-862 MHz.

15. There was no further comment on the revised proposal in the workshop held on 11 June 1999 or after the workshop. Therefore the TA **concludes** that the following approach should be adopted in order to increase the channel capacity of IBCCDS to meet new demand:-

- (a) to adopt adjacent channel configuration in Hong Kong;

- (b) the present channel configuration in existing IBCCDSs may continue unchanged if no new service is added;
- (c) when a new service is to be added to an existing IBCCDSs and the capacity of the system is insufficient to handle all the services, the relevant equipment and apparatus should be upgraded to support adjacent channel operation at the frequency channels in 54-470 MHz and/or 470-862 MHz; and
- (d) when a new licensed operator wishes to have access to an IBCCDS, it may approach the owners to reach agreement on the arrangement, including the allocation of costs, for upgrading the distribution of the four terrestrial television channels so that the IBCCDS can work on adjacent channel configuration at any frequency channels in 470-862 MHz.

Channel Numbers as Displayed on Set-top Boxes

16. In order to avoid confusion caused to the viewers when selecting different television programme channels from a set-top box, it was proposed in paragraph 28 of the Consultation Paper to fix the channel numbers for different television programmes and reserve channel numbers 1 to 4 for the four terrestrial television channels. In the first round of consultation, there were mixed views. OFTA subsequently revised the proposal suggesting that the current practice of setting channel numbers 1 to 4 for the four terrestrial television programmes in set-top boxes should continue and the issue may be reviewed when digital terrestrial television has been introduced. Complaints about unequal access and unfair trading will be dealt with in accordance with the fair competition provisions in the broadcasting and telecommunications licences. The revised proposal is given in paragraph 9 of the Result of Public Consultation paper issued on 8 June 1999.

17. There was no comment on the revised proposal in the workshop held on 11 June 1999 or after the workshop. The views of the Broadcasting Authority (BA) were also sought on this issue. The BA supported the revised proposal.

18. The TA therefore **concludes** that the current practice of setting channel numbers 1 to 4 for the four terrestrial television programmes in set-top boxes should continue and the issue may be reviewed when digital terrestrial television has been introduced. Any complaint about unequal access and unfair trading in relation to the assignment of channel numbers on set-top boxes will be dealt with in accordance with the fair competition provisions in the broadcasting and telecommunications licences.

Priorities for Distribution in IBCCDS

19. In paragraph 32 of the Consultation Paper, the following priorities for distribution in IBCCDS were proposed :-

- (a) all existing services including the four terrestrial channels, 31 Cable TV channels, one Closed Circuit TV (CCTV) channel, one Video Cassette Recorder (VCR) Radio Frequency (RF) output channel, one Video on Demand (VOD) RF output channel, one set-top box RF output channel should continue to be distributed;
- (b) all licensed satellite television channels which are already in service (at present four channels of STAR TV) should continue to be distributed;
- (c) up to 10 channels in the 470-862 MHz band should be reserved for services as decided by the residents of a building, such as for distributing free television programmes of their choice including terrestrial and satellite services, or other localized services; and
- (d) the rest of the spare channels mentioned in paragraphs 15 and 16 of the Consultation Paper to be allocated to licensed services employing digital or other spectrum efficient technologies.

20. In the first round of consultation, some commented that digital terrestrial television services should also be given due priority. OFTA accepted the idea and a revised proposal to add priority for digital terrestrial television service was given in paragraph 11 of the Result of Public Consultation paper issued on 8 June 1999. There was no further comment on the revised proposal

in the workshop held on 11 June 1999 or after the workshop.

21. The TA **concludes** that the following priorities should be adopted for distribution of signals in IBCCDS:-

- (a) Distribution of all existing services including the four terrestrial channels, 31 Cable TV channels, one CCTV channel, one VCR RF output channel, one VOD RF output channel, one set-top box RF output channel will continue.
- (b) Distribution of digital terrestrial television channels.
- (c) Distribution of all licensed satellite television channels which are already in service (at present four channels of STAR TV) will continue.
- (d) Up to 10 channels in the 470-862 MHz band to be allocated to services, such as for distributing free television programmes of their choice including terrestrial and satellite services, or other localized services will be concluded by the residents of a building.
- (e) The rest of the spare channels, excluding those reserved for the protection of essential services or those that suffered from interference, will be allocated to licensed services employing digital or other spectrum efficient technology.

Public Access of IBCCDS Database

22. In order to facilitate system planning by service providers, it was proposed in paragraph 33 of the Consultation Paper to publish the database of IBCCDS for public access.

23. The proposal received majority support during the consultation (please see paragraphs 12 and 13 of the Result of Public Consultation issued by OFTA on 8 June 1999). No further comment was received during the workshop held on 11 June 1999 or after the workshop.

24. The TA **concludes** that the database of IBCCDSs will be published by the TA for public access.

Use of Intermediate Frequency (IF) Distribution Method

25. IF Distribution method can increase the channel capacity of IBCCDS. In paragraph 43 of the Consultation Paper, the TA indicated no objection to the use of IF distribution method but the following criteria should apply if these systems were installed:-

- (a) The IF distribution should be used for distributing satellite television signals or radio signals only;
- (b) The use of IF distribution method should not affect the transmission and access of signals below 862 MHz including the upstream signals; and
- (c) The satellite receiver for decoding the television signals should satisfy the basic requirements for set-top box.

26. In the first round of consultation, no adverse comment was received. However some submissions put forward the view that telecommunications services and other television signals should also be permitted to use the IF distribution method.

27. OFTA has revised the proposal to allow distribution of telecommunications services by IF method in paragraph 17 of the Result of Public Consultation paper issued on 8 June 1999. No comment on the revised proposal was received during the workshop or after the workshop.

28. The TA therefore **concludes** that the use of IF distribution method should be permitted with the following conditions:-

- (a) The IF distribution method may be used for distributing television signals, radio broadcasting signals or telecommunications services;

- (b) the use of IF distribution method should not affect the transmission and access of signals below 862 MHz including the upstream signals; and
- (c) the satellite receiver used in customer premises for decoding television signals should satisfy the basic requirements for set-top boxes as per paragraph 51(b) below.

Use of Parallel Distribution Network

29. The use of a parallel distribution network will increase the channel capacity in the vertical drop cable of an IBCCDS. In paragraphs 44 and 45 of the Consultation Paper, it was proposed that licensed operators willing to adopt this method should be encouraged to do so but the following criteria would apply if these systems were to be installed:-

- (a) after the installation of a new parallel distribution cable network, a viewer should still have the choice of access to all the television signals of the original network;
- (b) some basic channels, such as the four existing terrestrial television channels and possibly other future channels designed as basic channels by the Government, must be carried in all the vertical cable networks to enable recording and separate viewing of these channels; and
- (c) operators maintaining a parallel vertical drop cable system should provide a technical means to ensure that all types of upstream signals would not be affected regardless of which vertical drop cable a viewer selects.

30. In the first round of consultation, the industry supported the proposal but indicated concerns on the “Basic Channels”. In paragraphs 18 and 19 of the Result of Public Consultation, OFTA proposed that free-to-air terrestrial television, free-to-air BSS channels and radio broadcast channels should be considered as “Basic Channels” and invited further views from the industry. No comment or views were received in the workshop held on 11 June 1999 or

after the workshop. The BA also agreed with the proposal set out in paragraphs 18 and 19 of the Result of Public Consultation Paper.

31. The TA therefore **concludes** that licensed operators willing to adopt a parallel vertical drop cable system should be permitted to do so with the following conditions:

- (a) after the installation of a new parallel vertical drop cable, a viewer should still have a choice and be able to access to all the television signals of the original system;
- (b) the basic channels, namely the four existing terrestrial television channels, free-to-air broadcasting-satellite service (BSS) channels, radio broadcasting channels and the internal security CCTV signals should be carried in each and every vertical drop cables to enable recording and/or separate viewing of these channels; and
- (c) operators maintaining a parallel vertical drop cable system should provide the technical means to ensure that all types of upstream signals would not be affected regardless of which vertical drop cable a viewer selects.

Frequency Spectrum for Upstream Signals

32. To meet the demands of telecommunications services and broadcast-related data signals in the use of up stream channels, it was proposed in paragraph 46 of the Consultation Paper that 5-50 MHz should be allocated by the TA for upstream signals of pay television and telecommunications services on a need basis. The TA would only allocate a minimum block of spectrum to licensed operators for meeting their initial needs. Additional allocation to the operators would be made based on proven increase in demand.

33. In the first round of consultation, the industry had divergent views. In paragraphs 20 and 21 of the Result of Public Consultation Paper, OFTA maintained that the band should be allocated for upstream use instead of being left unallocated. No further comment was received on this point in the workshop held on 11 June 1999 or after the workshop.

34. The TA therefore **concludes** that 5-50 MHz should be allocated by the TA for upstream signals of pay television and telecommunications services on a need basis. The TA would only allocate a minimum block of spectrum to licensed operators for meeting their initial needs. Additional allocation to the operators would only be made based on proven increase in demand.

Frequency Spectrum for Downstream Signals

35. In order to fully utilize the spectrum of the IBCCDS, it was proposed in the Consultation Paper that some of the vacant frequency bands with bandwidths less than 8 MHz in 54-470 MHz should be allocated for downstream signals of telecommunication services.

36. In the first round of consultation, the proposal was supported by the industry but some commented that digital television services should also be included. OFTA revised the proposal to include digital television as described in paragraphs 22 and 23 of the Result of Public Consultation paper. No further comment on the issue was received in the workshop held on 11 June or after the workshop.

37. The TA **concludes** that the vacant frequency bands with bandwidths less than 8 MHz in 54-470 MHz should be allocated to telecommunications and digital television services.

Guard Band between Upstream and Downstream Signals

38. One of the further submissions received after the workshop has proposed to allow a guard band to separate the upstream and downstream signals. OFTA has studied the issue and considers that a guard band of 3.275 MHz at 50-53.275 MHz is sufficient to separate the upstream and downstream signals. Considerations and discussions on this issue could be found in paragraph 8 of the Comments Expressed at and after the Industry Workshop paper issued on 14 July 1999.

39. The TA **concludes** that a guard band of 3.275 MHz in 50-53.275 MHz should be reserved to separate the upstream and downstream signals.

Frequency Allocation Plan

40. The frequency allocation plan of IBCCDS was proposed in paragraphs 48 and 49 of the Consultation Paper. In the first round of consultation, the majority supported the plan but wished to reserve certain channels for telecommunications services. OFTA has considered the comments and revised the proposal to allocate 3 contiguous channels in the VHF band and 3 contiguous channels in the UHF band for telecommunications services. The revised proposal is given in paragraph 25 of the Result of Public Consultation paper.

41. In the workshop held on 11 June 1999, there was a comment that a total of 6 frequency channels allocated for telecommunications services was not sufficient to meet the expected demand. OFTA responded that it would examine whether there was a supply and demand problem after receiving all licence applications for television and telecommunications services. (Please see paragraph 7 of the paper on Comments Expressed at and after the Industry Workshop). Sufficient flexibility would be incorporated to allow subsequent adjustments to the plan to cater for an increase in demand, particularly when television channels are being digitized.

42. For both the VHF and UHF bands, the 3 contiguous channels have a total continuous bandwidth of 24 MHz and could, if required, be used for four 6 MHz channels instead of three 8 MHz channels. As a matter of fact, many available equipment for the distribution of telecommunications services employ 6 MHz channelling. The channels are therefore chosen so that they would also match a 6 MHz channelling plan for the use of these equipment. Accordingly, Channels C49 (438-446 MHz), C50 (446-454 MHz) and C51 (454-462 MHz) in the VHF band and E51 (710-718 MHz), E52 (718-726 MHz) and E53 (726-734 MHz) in the UHF band have been selected for allocation to the distribution of telecommunications services.

43. The TA **concludes** that the following frequency allocation should be adopted:-

- (a) to use the frequency allocation plan as set out in Annex 2;
- (b) to use 3 channels for RF outputs of set-top boxes;
- (c) to allocate channels C49 (438-446 MHz), C50 (446-454 MHz) and C51 (454-462 MHz) in the VHF band and E51 (710-718 MHz), E52 (718-726 MHz) and E53 (726-734 MHz) in the UHF band for telecommunications services and consider any necessary adjustments later on based on demand; and
- (d) to align the vision carrier frequencies of all 6 MHz television signals with those of the 8 MHz channel plan to avoid uneven harmonics.

Requirements for Upgrading IBCCDS

44. In order to meet the demand for distributing television and telecommunications services, the requirements for upgrading the IBCCDS given in paragraph 50 of the Consultation Paper have been proposed. In the first round of consultation, there was majority support for the proposal. No further comment was received during the workshop held on 11 June 1999 or after the workshop.

45. The TA **concludes** that the following requirements should be adopted for upgrading IBCCDS:-

- (a) to use an 8 MHz channel plan with the use of all the adjacent channels (Please refer to Annex 1);
- (b) to follow the frequency allocation plan set out in Annex 2;
- (c) a minimum data rate of around 20 Mbps for an 8 MHz channel should be used for digital transmission;
- (d) new IBCCDS or existing IBCCDS to be upgraded should be able to operate up to 862 MHz;

- (e) the channels to be used for new services are to be specified by the TA;
- (f) subject to the requirements set out in paragraph 28, IF distribution is permitted to be used for carrying satellite television programmes and telecommunications services; and
- (g) subject to the requirements set out in paragraph 31, the use of parallel vertical drop cable is permitted.

Implementation Arrangements

46. The implementation arrangements have been proposed in paragraph 51 of the Consultation Paper. In the first round of consultation, many respondents remarked that there should be no financial burden to existing residents. OFTA reiterated in paragraph 29 of the Result of Public Consultation paper that if the residents of a building do not wish to access new television or telecommunications services, there is no need to upgrade the IBCCDS and there will be no cost implication. If the residents want to receive new services by the existing IBCCDS, upgrading would only be necessary when the capacity of the IBCCDS is full. No further comment was received on the revised proposal during the workshop held on 11 June 1999 or after the workshop.

47. The TA **concludes** that the following implementation arrangements should be adopted for the upgrading of IBCCDS:-

- (a) For buildings where the residents do not wish to have new television programmes or telecommunications services to be distributed by the IBCCDS, the IBCCDS may remain unchanged and upgrading work is not necessary.
- (b) For buildings where the residents want to receive new television programmes or telecommunications services by using the IBCCDS, the IBCCDS is required to be upgraded when the capacity of the IBCCDS is full. When the IBCCDS is required to be upgraded, the requirements set out in paragraph 45 should be followed. The cost for the upgrading work would be subject to commercial agreement among

the residents, the licensed television service providers, the licensed telecommunications service providers and the parties concerned who wish to distribute the services to the building.

Set-top Boxes

48. The proposals on the basic requirements and supply of set-top box were given in paragraphs 53 to 54 of the Consultation Paper and are repeated below:-

Basic requirements of set-top box

- (a) set-top boxes should not distort, restrict or prevent competition in broadcasting or telecommunications services. The set-top boxes should not lead to consumer choice being unreasonably constrained, whether in relation to consumer equipment, the range of services available via that equipment or the packaging of those services;
- (b) set-top boxes should be equipped with by-pass outputs so that signals within the frequency range 50-862 MHz can by-pass the set-top boxes with minimum attenuation. The noise introduced by the set-top boxes should be as low as possible and should be less than 5 dB;
- (c) set-top boxes should be capable of operating on adjacent channels so that they will be compatible with the channel plan as proposed in paragraph 27 of the Consultant Paper;
- (d) set-top boxes should be tunable in the range of 54-862 MHz;
- (e) set-top boxes should be equipped with audio/video (A/V) outputs to simplify the connection with the television set and other audiovisual equipment;
- (f) the above requirements should apply to all new set-top boxes except:
 - (i) the set-top boxes for digital terrestrial television services (additional requirements may be determined later); and

- (ii) the set-top boxes that are in use by existing licensees.

Requirements on supply of set-top box

- (a) service providers should separate security functions from non-security functions;
- (b) service providers should provide, upon request, technical information concerning interface parameters that are needed to permit set-top boxes to operate with their systems and consumers should have the right to attach any compatible set-top box to a service provider's system;
- (c) service providers are prohibited from taking action which would prevent competitive supply of set-top boxes; and
- (d) service providers may not offer set-top boxes that have security and non-security functions integrated.

49. In the first round of consultation, there was no adverse comment on the proposed basic requirements for set-top box but the majority of submissions do not support the setting of a single standard for set-top box, the separation of security and non-security functions and disclosure of interface specifications. After considering the comments, OFTA made a revised proposal in paragraph 31 of the Result of Public Consultation paper issued on 8 June 1999, as follows:-

- (a) the basic requirements as proposed in paragraph 53 of the Consultation Paper should be adopted;
- (b) a single standard for set-top box, separation of security and non-security functions of set-top box, disclosure of interface specifications and other related issues should be reviewed around 2001 when the policy on digital terrestrial television is finalized; and

- (c) sections 36A, 36B and 36C of the Telecommunication Ordinance should apply to disputes on interconnection to or sharing of set-top boxes.

50. Further comments on setting a single standard for set-top box were received during the workshop and after the workshop. Only one submission supported the setting of a single standard for set-top box. OFTA considers that the majority view of the industry does not support the setting of a single standard for set-top box at this stage and considers that the revised proposal is acceptable.

51. The TA therefore **concludes** that the following should be adopted for set-top boxes:-

- (a) The proposals on a single standard for set-top boxes, separation of security and non-security functions of set-top boxes, and disclosure of interface specifications would not be adopted at this stage. Instead a review on the policy and technical requirements for set-top boxes will be conducted around 2001 when the policy on DTT is finalized.
- (b) In the mean time, the following basic requirements should be adopted for set-top boxes except for those that are currently in use in existing licensed television or telecommunications services and which have been previously approved by the TA:-
 - (i) Set-top boxes should not distort, restrict or prevent competition in broadcasting or telecommunications services. The set-top boxes should not lead to consumer choice being unreasonably constrained, whether in relation to consumer equipment, the range of services available via that equipment or the packaging of those services.
 - (ii) Set-top boxes should be equipped with by-pass outputs so that signals within the frequency range 50-862 MHz can by-pass the set-top boxes with minimum attenuation. The noise introduced by the set-top boxes should be as low as possible and shall be less than 5 dB.

- (iii) Set-top boxes should be capable of operating on adjacent channels so that they are compatible with the channel plan as set out in Annex 1.
 - (iv) Set-top boxes should be tunable in the range of 54-862 MHz.
 - (v) Set-top boxes should be equipped with audio/video (A/V) outputs to simplify the connection with the television set and other audiovisual equipment.
- (c) Any disputes on interconnection to or sharing of set-top boxes should be dealt with in accordance with sections 36A, 36B and 36C of the Telecommunication Ordinance.

Connection of Set-top Boxes for Upstream Signals

52. OFTA proposed two options for connection of set-top boxes for upstream signals in paragraph 57 of the Consultation paper. In the first round of consultation, both options have been supported by different operators. OFTA clarified that the arrangement was optional and had no preference for either option. No further comment was received during the workshop held on 11 June 1999 or after the workshop.

53. The TA **concludes** that both options of connection method for set-top boxes for supporting upstream signals as set out in Annex 3 are acceptable.

Way Forward

54. The TA will have regard to these conclusions in exercising his powers under the Telecommunication Ordinance and the Television Ordinance, including, in particular, the approval of the transmission plan of a subscription television broadcasting licensee under section 18(4)(aa) of the Television Ordinance.

Relevant Documents

55. The following relevant documents can be downloaded from OFTA's website:-

- (a) Consultation Paper on Frequency Layout Plan of In-building Coaxial Cable Distribution Systems issued on 31 March 1999
(<http://www.ofta.gov.hk/report-paper-guide/paper/consultation/ibccds.pdf>)
- (b) Submissions to the Consultation Paper on Frequency Layout Plan of In-building Coaxial Cable Distribution Systems
(<http://www.ofta.gov.hk/report-paper-guide/report/list-of-submissions.html>)
- (c) Frequency Layout Plan on In-building Coaxial Cable Distribution Systems - Result of Public Consultation issued on 8 June 1999
(<http://www.ofta.gov.hk/report-paper-guide/report/rp990608.pdf>)
- (d) Notes of Discussion in the Industry Workshop on Frequency Layout Plan of the In-building Coaxial Cable Distribution Systems Conducted by OFTA on Friday, 11 June 1999
(<http://www.ofta.gov.hk/report-paper-guide/report/rp990623.html>)
- (e) Frequency Layout Plan on In-building Coaxial Cable Distribution Systems – Comments Expressed at and after the Industry Workshop and OFTA's Responses issued on 14 July 1999
(<http://www.ofta.gov.hk/report-paper-guide/report/ibccds-oftas-response.pdf>)

Telecommunications Authority
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Channel Plan (54-470 MHz, Channel Width = 8 MHz)

Frequency Range	Channel Number
54-62 MHz	C 1
62-70 MHz	C 2
70-78 MHz	C 3
78-86 MHz	C 4
86-94 MHz	C 5
94-102 MHz	C 6
102-110 MHz	C 7
110-118 MHz	C 8
118-126 MHz	C 9
126-134 MHz	C 10
134-142 MHz	C 11
142-150 MHz	C 12
150-158 MHz	C 13
158-166 MHz	C 14
166-174 MHz	C 15
174-182 MHz	C 16
182-190 MHz	C 17
190-198 MHz	C 18
198-206 MHz	C 19
206-214 MHz	C 20
214-222 MHz	C 21
222-230 MHz	C 22
230-238 MHz	C 23
238-246 MHz	C 24
246-254 MHz	C 25
254-262 MHz	C 26
262-270 MHz	C 27
270-278 MHz	C 28
278-286 MHz	C 29
286-294 MHz	C 30
294-302 MHz	C 31
302-310 MHz	C 32
310-318 MHz	C 33
318-326 MHz	C 34
326-334 MHz	C 35
334-342 MHz	C 36
342-350 MHz	C 37
350-358 MHz	C 38
358-366 MHz	C 39
366-374 MHz	C 40
374-382 MHz	C 41
382-390 MHz	C 42
390-398 MHz	C 43
398-406 MHz	C 44
406-414 MHz	C 45
414-422 MHz	C 46
422-430 MHz	C 47
430-438 MHz	C 48
438-446 MHz	C 49
446-454 MHz	C 50
454-462 MHz	C 51
462-470 MHz	C 52

Channel Plan (470-862 MHz, Channel Width = 8 MHz)

Frequency Range	Channel Number
470-478 MHz	E 21
478-486 MHz	E 22
486-494 MHz	E 23
494-502 MHz	E 24
502-510 MHz	E 25
510-518 MHz	E 26
518-526 MHz	E 27
526-534 MHz	E 28
534-542 MHz	E 29
542-550 MHz	E 30
550-558 MHz	E 31
558-566 MHz	E 32
566-574 MHz	E 33
574-582 MHz	E 34
582-590 MHz	E 35
590-598 MHz	E 36
598-606 MHz	E 37
606-614 MHz	E 38
614-622 MHz	E 39
622-630 MHz	E 40
630-638 MHz	E 41
638-646 MHz	E 42
646-654 MHz	E 43
654-662 MHz	E 44
662-670 MHz	E 45
670-678 MHz	E 46
678-686 MHz	E 47
686-694 MHz	E 48
694-702 MHz	E 49
702-710 MHz	E 50
710-718 MHz	E 51
718-726 MHz	E 52
726-734 MHz	E 53
734-742 MHz	E 54
742-750 MHz	E 55
750-758 MHz	E 56
758-766 MHz	E 57
766-774 MHz	E 58
774-782 MHz	E 59
782-790 MHz	E 60
790-798 MHz	E 61
798-806 MHz	E 62
806-814 MHz	E 63
814-822 MHz	E 64
822-830 MHz	E 65
830-838 MHz	E 66
838-846 MHz	E 67
846-854 MHz	E 68
854-862 MHz	E 69

**A. Frequency Allocation Plan for Various Categories of Services
(5-54 MHz)**

Frequency Range	Existing Assignment	New Allocation
5-8.3 MHz	To be planned	Upstream signals of TV and telecommunications services
8.3-10.4 MHz	Pay TV (upstream signals)	
10.4-21 MHz	To be planned	
21-25 MHz	Cable telephony (upstream signals)	
25-50 MHz	To be planned	
50-53.275 MHz	To be planned	Guard band
53.275-53.425 MHz	Pay TV (downstream data)	TV (downstream data)
53.425-54 MHz	To be planned	To be planned

**B. Frequency Allocation Plan for Various Categories of Services
(54-470 MHz, Channel Width = 8 MHz)**

Channel Number	Frequency Range	Existing Assignment	New Allocation	Remark
C 1	54-62 MHz	Pay TV	TV or telecommunications services	
C 2	62-70 MHz	Pay TV	TV or telecommunications services	
C 3	70-78 MHz	To be planned	TV or telecommunications services	74.8-75.2 MHz (prohibited for use)
C 4	78-86 MHz	To be planned	To be planned	strong signals from mobile radio systems
C 5	86-94 MHz	86-87 MHz (to be planned) 87-108 MHz (FM radio)	86-87 MHz (TV or telecommunications services)	108-110 MHz (prohibited for use)
C 6	94-102 MHz		87-108 MHz (FM radio)	
C 7	102-110 MHz			
C 8	110-118 MHz	To be planned	To be planned	110-117.975 MHz (prohibited for use)
C 9	118-126 MHz	To be planned	To be planned	121.3-121.7 MHz (prohibited for use)
C 10	126-134 MHz	Pay TV	TV or telecommunications services	
C 11	134-142 MHz	Pay TV	TV or telecommunications services	
C 12	142-150 MHz	Pay TV	TV or telecommunications services	
C 13	150-158 MHz	To be planned	TV or telecommunications services	156.6-157 MHz (prohibited for use)
C 14	158-166 MHz	Pay TV	TV or telecommunications services	
C 15	166-174 MHz	To be planned	To be planned	strong paging signals
C 16	174-182 MHz	Pay TV	TV or telecommunications services	
C 17	182-190 MHz	Pay TV	TV or telecommunications services	
C 18	190-198 MHz	Pay TV	TV or telecommunications services	
C 19	198-206 MHz	Pay TV	TV or telecommunications services	
C 20	206-214 MHz	Pay TV	TV or telecommunications services	
C 21	214-222 MHz	Pay TV (for temporary use)	TV or telecommunications services	
C 22	222-230 MHz	Pay TV	TV or telecommunications services	
C 23	230-238 MHz	Pay TV (for temporary use)	TV or telecommunications services	
C 24	238-246 MHz	To be planned	TV or telecommunications services	242.8-243.2 MHz (prohibited for use)
C 25	246-254 MHz	Pay TV	TV or telecommunications services	
C 26	254-262 MHz	Pay TV (for temporary use)	TV or telecommunications services	
C 27	262-270 MHz	Pay TV	TV or telecommunications services	
C 28	270-278 MHz	Pay TV	TV or telecommunications services	
C 29	278-286 MHz	To be planned	To be planned	strong paging signals
C 30	286-294 MHz	Pay TV	TV or telecommunications services	
C 31	294-302 MHz	Pay TV (for temporary use)	TV or telecommunications services	
C 32	302-310 MHz	Pay TV	TV or telecommunications services	
C 33	310-318 MHz	Pay TV	TV or telecommunications services	
C 34	318-326 MHz	Pay TV	TV or telecommunications services	
C 35	326-334 MHz	To be planned	TV or telecommunications services	328.6-335.4 MHz (prohibited for use)
C 36	334-342 MHz	To be planned		
C 37	342-350 MHz	Pay TV	TV or telecommunications services	
C 38	350-358 MHz	Pay TV	TV or telecommunications services	
C 39	358-366 MHz	Pay TV	TV or telecommunications services	
C 40	366-374 MHz	Pay TV	TV or telecommunications services	
C 41	374-382 MHz	Pay TV	TV or telecommunications services	
C 42	382-390 MHz	Pay TV	TV or telecommunications services	
C 43	390-398 MHz	Pay TV	TV or telecommunications services	
C 44	398-406 MHz	Pay TV	TV or telecommunications services	405.85-406.25 MHz (prohibited for use)
C 45	406-414 MHz	Pay TV	TV or telecommunications services	
C 46	414-422 MHz	Pay TV (for temporary use)	TV or telecommunications services	To allocate this channel to existing pay TV service operating on channel C 51 (454-462 MHz)
C 47	422-430 MHz	Pay TV	TV or telecommunications services	
C 48	430-438 MHz	Pay TV	TV or telecommunications services	
C 49	438-446 MHz	To be planned	Telecommunications services	
C 50	446-454 MHz	To be planned	Telecommunications services	
C 51	454-462 MHz	Pay TV	Telecommunications services	To allocate this channel to telecommunications services
C 52	462-470 MHz	462-466 MHz (cable telephony) 466-470 MHz (to be planned)	TV or telecommunications services	

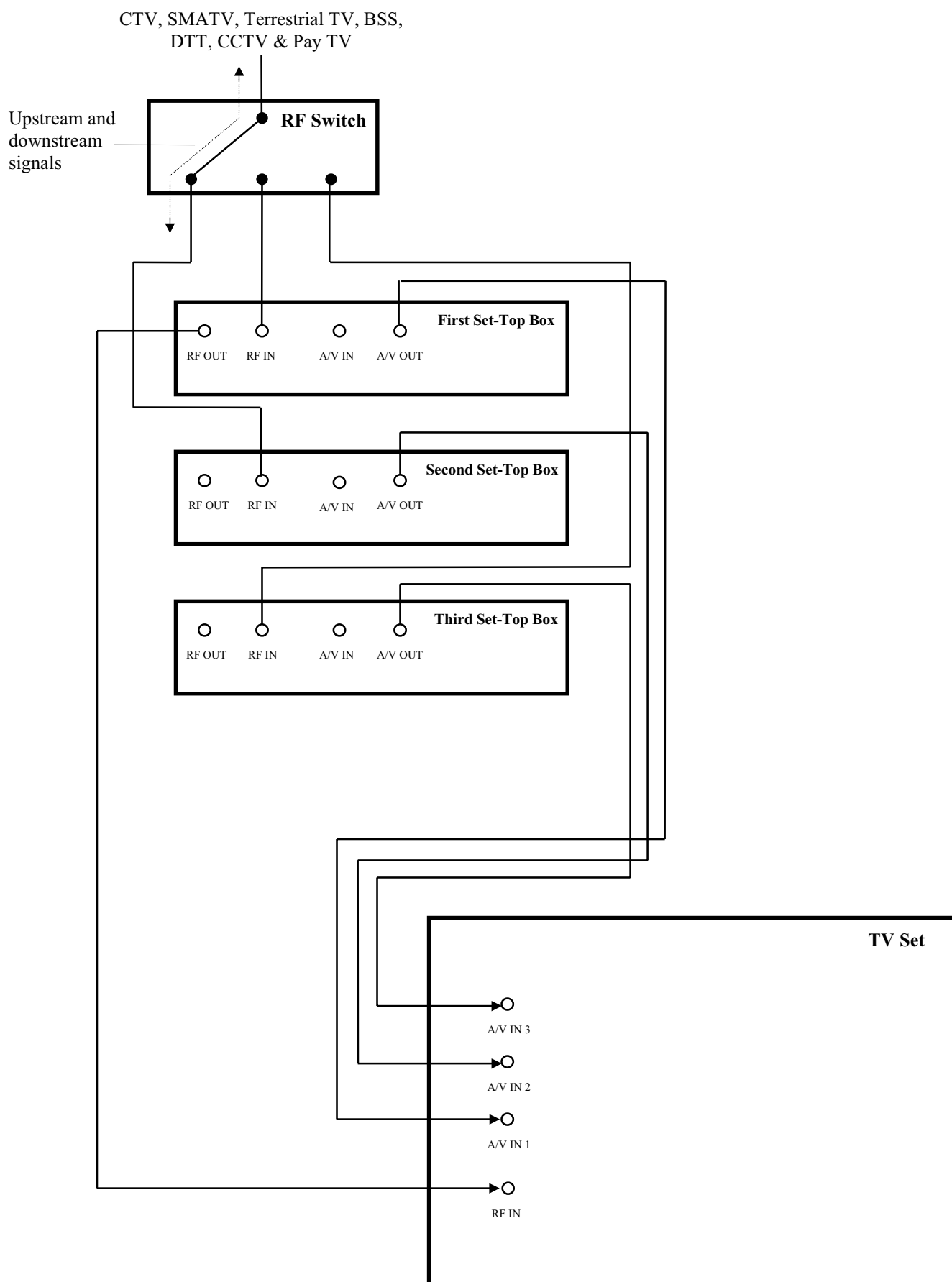
**C. Frequency Allocation Plan for Various Categories of Services
(470-862 MHz, Channel Width = 8 MHz)**

Channel Number	Frequency Range	Existing Assignment	New Allocation
E 21	470-478 MHz	Terrestrial TV, SMATV, VCR CCTV and VOD	TV or telecommunications services
E 22	478-486 MHz		TV or telecommunications services
E 23	486-494 MHz		TV or telecommunications services
E 24	494-502 MHz		TV or telecommunications services
E 25	502-510 MHz		TV or telecommunications services
E 26	510-518 MHz		TV or telecommunications services
E 27	518-526 MHz		TV or telecommunications services
E 28	526-534 MHz		TV or telecommunications services
E 29	534-542 MHz		TV or telecommunications services
E 30	542-550 MHz		TV or telecommunications services
E 31	550-558 MHz		TV or telecommunications services
E 32	558-566 MHz		TV or telecommunications services
E 33	566-574 MHz		TV or telecommunications services
E 34	574-582 MHz		TV or telecommunications services
E 35	582-590 MHz		TV or telecommunications services
E 36	590-598 MHz		TV or telecommunications services
E 37	598-606 MHz		TV or telecommunications services
E 38	606-614 MHz		TV or telecommunications services
E 39	614-622 MHz		TV or telecommunications services
E 40	622-630 MHz		TV or telecommunications services
E 41	630-638 MHz		TV or telecommunications services
E 42	638-646 MHz		TV or telecommunications services
E 43	646-654 MHz		TV or telecommunications services
E 44	654-662 MHz		TV or telecommunications services
E 45	662-670 MHz		TV or telecommunications services
E 46	670-678 MHz		TV or telecommunications services
E 47	678-686 MHz		TV or telecommunications services
E 48	686-694 MHz		TV or telecommunications services
E 49	694-702 MHz		TV or telecommunications services
E 50	702-710 MHz		TV or telecommunications services
E 51	710-718 MHz		Telecommunications services
E 52	718-726 MHz		Telecommunications services
E 53	726-734 MHz		Telecommunications services
E 54	734-742 MHz		TV or telecommunications services
E 55	742-750 MHz		TV or telecommunications services
E 56	750-758 MHz	To be planned	TV or telecommunications services
E 57	758-766 MHz	Terrestrial TV	TV or telecommunications services
E 58	766-774 MHz	Terrestrial TV and RF outputs of set-top boxes	RF outputs of set-top boxes
E 59	774-782 MHz	RF outputs of set-top boxes	RF outputs of set-top boxes
E 60	782-790 MHz	Terrestrial TV and RF outputs of set-top boxes	RF outputs of set-top boxes
E 61	790-798 MHz	To be planned	TV or telecommunications services
E 62	798-806 MHz		TV or telecommunications services
E 63	806-814 MHz		TV or telecommunications services
E 64	814-822 MHz		TV or telecommunications services
E 65	822-830 MHz		TV or telecommunications services
E 66	830-838 MHz		TV or telecommunications services
E 67	838-846 MHz		TV or telecommunications services
E 68	846-854 MHz		TV or telecommunications services
E 69	854-862 MHz		TV or telecommunications services
	862 MHz or above		TV or telecommunications services

Notes:-

- (1) Channel bandwidth: 8 MHz.
- (2) Use of all adjacent channels.
- (3) The vision carrier frequencies of all 6 MHz television signals to be aligned with those of the 8 MHz channel plan.
- (4) Priorities of allocation:-
 - (a) distribution of all existing services including the four terrestrial channels, 31 cable TV (CTV) channels, one closed circuit TV (CCTV) channel, one video cassette recorder (VCR) radio frequency (RF) output channel, one video-on-demand (VOD) RF output channel, one set-top box RF output channel to be continued;
 - (b) distribution of digital terrestrial television channels;
 - (c) distribution of all licensed satellite television channels which are already in service (at present four channels of STAR TV) to be continued;
 - (d) up to 10 channels in the 470-862 MHz band to be allocated to services as decided by the residents of a building, such as for distributing free television programmes of their choice including terrestrial and satellite services, or other localised services;
 - (e) the rest of the spare channels, excluding those reserved for the protection of essential services and suffered from interference, to be allocated to licensed services employing digital or other spectrally efficient technology.
- (5) Channels E58 (766-774 MHz), E59 (774-782 MHz) and E60 (782-790 MHz) are used for RF outputs of set-top boxes.
- (6) channels C49 (438-446 MHz), C50 (446-454 MHz), C51 (454-462 MHz), E51 (710-718 MHz), E52 (718-726 MHz) and E53 (726-734 MHz) are allocated for telecommunications services.
- (7) The vacant frequency bands with bandwidths less than 8 MHz in 54-470 MHz to be allocated to telecommunications and television services.

A. Use RF Switch for Connection of the Set-Top Boxes (Option 1)



B. Use Splitter for Connection of the Set-Top Boxes (Option 2)

