

# Second Consultation on Development of Mobile Television Services



Communications and Technology Branch,  
Commerce and Economic Development Bureau and  
Office of the Telecommunications Authority

January 2008

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## **Contents**

Executive Summary	3
1. Preamble	5
2. Overview	7
3. Spectrum Availability	10
4. Spectrum Allocation	15
5. Spectrum Assignment	17
6. Licensing Arrangements	19
7. Access to Hilltop Transmission Sites and Geographical Coverage for Broadcasting-type Mobile Television	24
8. Work Plan	26
9. Glossary and Definitions	27

## **Executive Summary**

With the favourable industry and public responses to our consultation on “Digital Broadcasting: Mobile Television and Related Issues” carried out in early 2007 and in accordance with our market-led, technology-neutral and facilitating regulatory approach, the Government has mapped out a draft implementation framework to facilitate development of mobile TV services in Hong Kong for further consultation.

2. Taking into account the spectrum availability, the potential demand for spectrum by other broadcasting services and the spectrum allocation decisions of World Radiocommunication Conference 2007, the Telecommunications Authority (TA) would like to consult the public under section 32G(2) of the Telecommunications Ordinance (TO) (Cap. 106) on the allocation of one multiplex in UHF Band and two multiplexes in Band III for deployment of broadcast-type (i.e., point-to-multipoint) mobile TV services in Hong Kong.

3. We welcome your views on the release of such frequency spectrum for mobile TV services. We also welcome your views on the release of frequency spectrum in L Band and S Band for mobile TV services.

4. For the allocation of the multiplexes in UHF Band and Band III, we propose to adopt a pro-mobile TV approach. Specifically, at least 50% of the transmission capacity should be used to carry mobile TV content, while the remaining capacity can be used to provide other ancillary services, e.g. digital audio broadcasting, datacasting. To allow flexibility for the operators, the 50% mandatory percentage of transmission capacity dedicated for mobile TV content will be subject to review by the Office of the Telecommunications Authority (OFTA) in five years’ time after service launch.

5. Mobile TV is a commercial video service for personal consumption on the move. Based on the Spectrum Policy Framework we have adopted, we propose that the frequency spectrum should be assigned through auction, which is widely accepted as a fair and effective means. Pre-qualification and rollout obligations should be

required to safeguard the effectiveness and efficiency in the assignment of the frequency spectrum. The spectrum utilisation fee would be determined by the auction process.

6. Mobile TV is a nascent and personally-tailored service. To foster the growth of mobile TV and having regard to international practices and the need to protect public morals and children, we suggest adopting a light-handed approach for licensing and regulating content provided over the mobile TV platform. We seek views on two options: either to license and regulate mobile TV as a new category of television programme service under the Broadcasting Ordinance (BO) (Cap. 562), or to regulate mobile TV by general laws as it is now but to require the industry to implement a code of practice for self-regulation.

7. In the light of the scarcity of hilltop transmission sites, we should ensure that these facilities would be used efficiently and effectively to meet the needs of telecommunications, broadcasting, etc including mobile TV. The sharing of these hilltop sites and facilities with existing users is subject to mutual agreements through commercial negotiation, but the TA has the power to intervene and adjudicate if mutual agreement cannot be reached.

8. Local broadcasting and telecommunications operators have indicated interest in rolling out mobile TV services. Your further views will help us to firm up the implementation plan. Subject to the comments received in this consultation exercise, we plan to announce the implementation framework in mid 2008, to be followed by the making of the necessary subsidiary legislation under the TO. The TA aims to auction the relevant frequency spectrum in early 2009.

## Chapter 1 Preamble

1.1 In response to market development and technology advancement, we launched in end January 2007 a three-month public consultation<sup>1</sup> on the development of mobile TV services<sup>2</sup> in Hong Kong. OFTA in parallel has invited broadcasting and telecommunications operators to express interest in bidding for spectrum for the provision of mobile TV or other digital broadcasting services.

1.2 There is general consensus that we should continue our market-led, technology-neutral and facilitating approach in introducing new and innovative services into Hong Kong, and we have witnessed market interest in the launching of mobile TV services from the above consultation exercise. Taking into account the feedback received, we have mapped out an implementation framework for further consultation to spur the development of mobile TV services. The TA also takes this opportunity to carry out public consultation under section 32G of the TO on the allocation of spectrum to support the development of mobile TV services.

1.3 Your views will help us to firm up the implementation framework. Please send your comments on the issues covered in this consultation paper to the Communications and Technology Branch of the Commerce and Economic Development Bureau/OFTA by 28 April 2008 through any of the following means:

By post      Communications and Technology Branch  
Commerce and Economic Development Bureau  
2/F, Murray Building,  
Garden Road  
Hong Kong

By fax      (852) 2511 1458  
(852) 2827 0119

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<sup>1</sup> The consultation document, namely “Digital Broadcasting: Mobile Television and Related Issues”, is available on [www.cedb.gov.hk/ctb](http://www.cedb.gov.hk/ctb).

<sup>2</sup> In the context of this paper, mobile TV refers to both point-to-multipoint (i.e., broadcast type) mobile TV transmitted through a broadcasting network to handheld devices and point-to-point (i.e., streaming type) mobile TV transmitted through the existing 2.5G/3G mobile network.

By e-mail [mobiletv@cedb.gov.hk](mailto:mobiletv@cedb.gov.hk)

1.4 We assume that all comments received in this consultation exercise are not made in confidence unless specified otherwise. We may reproduce and publish the submissions received in whole or in part in any form and to use, adapt, or develop any proposals put forward. Unless you specify a reservation, we shall assume that you have given us permission to do so.

## Chapter 2 Overview

2.1 Mobile TV, combining mobility and TV with unprecedented convenience on handheld devices, exemplifies technology advancement and media convergence. The market has called for timely response from governments and regulators of advanced economies to facilitate the launch and growth of this innovative service. In Hong Kong, some broadcasting and telecommunications operators have indicated interest in rolling out mobile TV, and a number of them have applied to OFTA for carrying out technical trials for the purpose.

2.2 In a bid to promote investment, innovation and competition for the benefits of consumers and the entire communications sector, we launched a public consultation exercise on mobile TV and related services from January to May 2007 and have put forward the following four issues specific to the development of mobile TV services in Hong Kong to seek public views:

- (a) Spectrum availability – whether the frequency spectrum available in Band III (174MHz – 230MHz) and L Band (1466MHz – 1480MHz), as well as the two multiplexes in UHF Band (470MHz – 806MHz) reserved under the current policy framework of digital terrestrial television (DTT), should be made available for mobile TV or other digital broadcasting services;
- (b) Spectrum allocation – whether we should adopt a service-neutral approach by allowing spectrum users to decide on their own which digital broadcasting services should be launched, a conventional approach by allocating frequencies to specific uses of DTT, DAB and mobile TV respectively, or a pro-mobile TV approach by allocating frequencies primarily for mobile TV purpose but also allowing other services to run as ancillary services;
- (c) Spectrum assignment – whether we should adopt a market-led approach whereby the available frequencies should be assigned by auction with appropriate rollout obligations, and whether a spectrum utilisation fee should be charged for such

uses; and

- (d) Licensing arrangements – whether mobile TV programme services should be licensed under the BO.

2.3 During the earlier consultation, we received 23 submissions<sup>3</sup>, all from the broadcasting and telecommunications industry. Their views are summarised at **Annex A**. The majority of respondents support early introduction of various mobile TV services in Hong Kong, though they have different views on the various specific issues under consultation. In parallel, OFTA received 14 submissions<sup>4</sup> in response to its invitation for expression of interest, which show that there are clear market interests in bidding for spectrum in different frequency bands to launch mobile TV services in Hong Kong.

2.4 Taking into account the feedback collected, we have prepared the draft implementation framework at **Annex B** for further consultation, the main proposals of which are summarised below:

- (a) one multiplex (i.e., a frequency channel for digital transmission) in UHF Band and two multiplexes in Band III should be allocated primarily for the development of broadcast-type mobile TV services;
- (b) L Band and relevant portion of S Band should be reserved for the time being, subject to further comments from the public;
- (c) spectrum identified in (a) above should be assigned through auction, subject to appropriate rollout obligations and payment of spectrum utilisation fees; and
- (d) successful bidder should use at least 50% of the spectrum identified in (a) above for mobile TV services.

2.5 We shall go through the justifications for these proposals in

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<sup>3</sup> The 23 submissions are posted on [www.cedb.gov.hk/ctb](http://www.cedb.gov.hk/ctb).

<sup>4</sup> The identity of these respondents and their submissions are confidential.

Chapters 3 to 7 below.

2.6 A snapshot of mobile TV development in other places is at **Annex C**.

## Chapter 3 Spectrum Availability

3.1 There is competing use of the available spectrum by different broadcasting or telecommunications services engaging various technologies. The table below summarises the potential uses of Band III, L Band, UHF Band and relevant part of S Band.

Frequency Band	Mobile TV	DTT	DAB	Remarks on possible uses for International Mobile Telecommunications (IMT) <sup>5</sup> Services
Band III (174 MHz – 230 MHz)	✓	×	✓	N.A.
UHF Band (470 MHz – 806MHz)	✓	✓	×	The World Radiocommunication Conference (WRC) 2007 has recently decided to identify the frequency band 790 – 960 MHz for IMT applications in Region 3, covering mainly Asia (except Japan), Middle East and Australia.
L Band (1466MHz – 1480 MHz)	✓	×	✓	N.A.
Part of S Band (2635MHz – 2660MHz)	✓	×	×	The WRC 2000 has identified the 2500 MHz – 2690 MHz band for IMT applications. However, the Mainland China has planned to launch a satellite for providing mobile satellite services in the 2635 – 2660 MHz band. The transmission signals of this satellite would cause interference to IMT applications in the 2635 – 2660 MHz band in Hong Kong.

(a) *Band III (174MHz – 230MHz)*

3.2 A 1.5MHz multiplex in Band III can provide not more than

<sup>5</sup> IMT is the root name that encompasses both IMT-2000 and IMT-Advanced collectively. While IMT-2000 remains for describing mobile technologies such as 3G, IMT-Advanced is defined as the name of future generation radio technologies beyond IMT-2000.

three broadcast-type mobile TV channels using T-DMB technology, or 7 CD-quality audio channels using Eureka 147 technology. Out of the four multiplexes currently reserved in Band III, one is immediately available (217.872MHz – 219.408MHz) and the other three will be ready for release by 2009 (216.160MHz – 217.696MHz and 219.584MHz – 222.832MHz) upon clearance of the frequency band by requiring the existing users to return the frequencies or migrating the existing users to other frequency bands.

3.3 Although South Korea has successfully implemented mobile TV in Band III by adopting T-DMB technology, only two local respondents propose that available Band III spectrum should be allocated for mobile TV services based on the same technology, which would enable the roaming of mobile TV services between Hong Kong and the Mainland, with the latter having conducted trials on the use of T-DMB technology. Only one respondent has indicated to OFTA its interest in bidding for Band III spectrum to provide DAB.

3.4 As evidenced by the public responses, the demand for Band III spectrum to launch mobile TV services is not high. On the other hand, Band III spectrum is suitable for the provision of DAB which could be used for commercial or public purposes.

3.5 In view of these competing demand, the TA would like to propose that two out of the four multiplexes in Band III should be made available for assignment to one or two operators for providing mobile TV services. This will allow a maximum of 6 mobile TV channels in Band III. The use of the remaining two multiplexes will be further reviewed later having regard to market demand and technological development.

*(b) UHF Band (470MHz – 806MHz)*

3.6 Compared to Band III, a UHF multiplex of 8 MHz has a higher transmission capacity and is capable of carrying some 20 broadcast-type mobile TV channels in Hong Kong based on the recent field trials.

3.7 According to the implementation framework for DTT, there are two multiplexes<sup>6</sup> in UHF Band which are currently kept in reserve and which could be assigned after Asia Television Limited (ATV) and Television Broadcasts Limited (TVB) have confirmed the technical feasibility of using single frequency network technology for the rollout of DTT. As technology advances, on top of DTT services, the two multiplexes reserved can be used to provide mobile TV services.

3.8 Nine respondents, which constitute a majority of those respondents in the first consultation exercise and which have indicated preference on spectrum availability, consider UHF frequencies suitable for the development of mobile TV services having regard to the sophistication of available technologies and receivers, the cost-effectiveness of transmission network and economy of scale. Three respondents indicated to OFTA their interests in providing mobile TV services, and one respondent in providing DTT, using UHF Band. This indicates that the two available UHF multiplexes could be vied for at least both mobile TV and commercial DTT services.

3.9 In fact, UHF frequencies are a very valuable public resource which could also be used for public service broadcasting as well as innovative telecommunications services. Competing demand for UHF multiplexes to launch different broadcasting and telecommunications services are an international phenomenon, mainly because UHF spectrum has superiority over other frequency bands with respect to optimum utilisation of the transmission network and capacity as well as the propagating characteristics of signal transmissions. There is a trend that more and more jurisdictions (notably Italy, Finland, the US, Vietnam and Australia) have used or will use UHF Band spectrum to roll out mobile TV services. The World Radiocommunication Conference 2007 has recently decided to identify the frequency band 790 – 960 MHz for IMT applications in Region 3, covering mainly Asia (except Japan), Middle East and Australia.

3.10 In the light of the competing demand in the UHF Band, the TA would like to propose that one UHF Band multiplex at the lower

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<sup>6</sup> The two multiplexes are Frequency Channel No. 47 (678MHz-686MHz) and Frequency Channel No. 62 (798MHz-806MHz).

frequency (i.e., 678MHz – 686MHz) should be allocated for mobile TV services<sup>7</sup>. The other multiplex (i.e., 798MHz – 806MHz) will be reserved for future DTT services, either commercial or otherwise, or other broadcasting and telecommunications services when technology further evolves.

*(c) L Band (1466MHz – 1480MHz)*

3.11 Spectrum in L Band is available for broadcast-type mobile TV services based on either T-DMB or DVB-H technology, and there are eight multiplexes capable of providing 24 mobile TV channels based on T-DMB technology. In the earlier consultation, two respondents suggest that L Band should be used for mobile TV.

3.12 L Band is not commonly used worldwide yet for the development of major electronic communications services including mobile TV, and in fact no respondents indicated interest in bidding for L Band multiplexes for digital broadcasting services in the expression of interest solicited by OFTA. Our preliminary position is therefore to reserve this frequency band subject to further market studies and responses.

3.13 Nonetheless, subsequent to our earlier consultation, the European Commission has designated L Band as the fallback frequency band for Member States to consider implementing mobile TV since July 2007. This decision may catalyze the implementation of mobile TV in L Band. In the light of the latest overseas development, the TA would like to seek public views on whether L Band multiplexes should be allocated together with Band III and UHF Band multiplexes in the spectrum release plan for the development of mobile TV services.

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<sup>7</sup> Local broadcasting and telecommunications operators have conducted technical trials of mobile TV using the spare UHF multiplexes. As submitted by a telecommunications operator and equipment manufacturers, the UHF multiplex at a higher frequency (i.e. 798 – 806 MHz) poses a more stringent technical constraint on the equipment design for mobile TV. This multiplex at the higher frequency also falls within the band identified by WRC 2007 (i.e. the frequency band 790 – 960 MHz) for IMT applications in Region 3. Thus, OFTA suggests releasing the multiplex at the lower frequency and reserving the one at the higher frequency.

*(d) S Band (2500MHz – 2690MHz)*

3.14 Satellite mobile TV in South Korea and Japan operates in S Band. It is reported that the Mainland plans to launch countrywide satellite mobile TV in S Band in 2008 based on the China Multimedia Mobile Broadcasting (CMMB) technology, the industry mobile TV standard promulgated by the State Administration of Radio, Film and Television (SARFT). It is also reported that this service may cover Hong Kong.

3.15 In Hong Kong, the spectrum of 2500MHz – 2690MHz in S Band is currently allocated for the expansion of 3G services. Only one respondent proposes that S Band should be released for mobile TV as soon as possible because China will roll out satellite mobile TV in 2008 and Hong Kong should follow to benefit from the early launch. On the other hand, eight respondents, mainly the local telecommunications operators, consider that S Band should be reserved for mobile broadband or expansion of 3G services, and mobile TV in S Band would interfere with the existing 3G services operating in neighbouring frequency bands. In the expression of interest, one respondent has shown interest in operating mobile TV, and another in operating 3G services, using S Band.

3.16 The Mainland has set aside 2635 MHz – 2660 MHz on a primary basis for mobile satellite broadcasting (i.e. CMMB). As CMMB will have its footprint covering the Mainland and Hong Kong, it may not be feasible to harness this portion of S band for other terrestrial services as it may give rise to mutual interference with CMMB. The TA would like to seek public views on whether the spectrum should be allocated for CMMB, or for other purposes provided that there should not be any electromagnetic compatibility issue.

**We welcome your views on the allocation of one multiplex in UHF Band and two multiplexes in Band III for the development of mobile TV services. We also welcome your views on the release of frequency spectrum in L Band and S Band for the purpose.**

## **Chapter 4     Spectrum Allocation**

4.1        As indicated in our first consultation paper, unless under exceptional circumstances with overriding policy reasons, we generally adopt a technology-neutral approach in the allocation of spectrum to let the market determine the best technology to be adopted for meeting the needs of the public. The respondents overwhelmingly support allocating spectrum in a technology-neutral manner.

4.2        With respect to the services to be provided through the spectrum to be released, we have proposed the following options in the first consultation paper:

- (a) the “service-neutral” approach, whereby an operator of the spectrum may decide on the services to be provided;
- (b) the conventional approach, whereby we earmark the available frequency segments for mobile TV, DAB and DTT services respectively in accordance with our policy objectives; and
- (c) the “pro-mobile TV” approach, whereby we allocate the available spectrum primarily for mobile TV services, and at the same time allow DAB and datacasting services as ancillary services.

4.3        Out of the 13 respondents who expressed views on the above three options in the earlier consultation exercise, six are in favour of and one have opposed to the pro-mobile TV approach, while two support the service-neutral approach and four are in favour of the conventional approach. Internationally, we note that relevant spectrum, particular Band III spectrum, is primarily allocated for mobile TV with DAB, datacasting provided as ancillary services.

4.4        Taking into account the market trend and the respondents’ views, the TA considers that the allocation of the multiplexes in Band III and UHF Band proposed for release should follow the pro-mobile TV approach whereby at least 50% of the transmission capacity should be used to carry mobile TV content. The remaining capacity can be used to provide other ancillary services. This approach has the advantage of

both driving mobile TV and promoting service variety.

4.5 To provide further flexibility, the TA proposes that the percentage of spectrum capacity dedicated for mobile TV may be mandated for five years from service launch and would be subject to review by OFTA, taking into account the development of the market and the emergence of new services riding on these frequency multiplexes.

**We welcome your views on whether the pro-mobile TV approach should be adopted, whereby at least 50% of the transmission capacity should be used to carry mobile TV content.**

## Chapter 5 Spectrum Assignment

5.1 The Spectrum Policy Framework<sup>8</sup> published by the Government in April 2007 states that:

- (a) the policy inclination is that a market-based approach<sup>9</sup> in spectrum management will be used for spectrum wherever the TA considers that there are likely to be competing demand from providers of non-Government services, unless there are overriding public policy reasons to do otherwise; and
- (b) in principle, Spectrum Utilisation Fee (SUF) will be applicable to all non-government use of spectrum.

5.2 Mobile TV is a commercial audiovisual service for personal consumption on the move. From the feedback we have collected from the industry, there exist competing demand for Band III and UHF spectrum for mobile TV purpose. We do not see any overriding public policy reasons that would entail the TA to deviate from the market-based approach in spectrum assignment entrenched in the Spectrum Policy Framework.

5.3 Most respondents in the earlier consultation support the levy of SUF, regardless of spectrum assignment mechanism. Of the 14 respondents which have indicated preference for spectrum assignment method, seven of them support auction to let market determine the value of the spectrum, and some also advocate the adoption of various safeguards (e.g., rollout obligations, pre-qualification, etc.). Five others are in favour of assigning spectrum by beauty contest based on the merits of the proposals received, citing that auction would result in high cost and entry barrier, and that high auction price would limit the development of mobile TV.

5.4 Auction is widely viewed as a fair and efficient method to assign spectrum to the potential operators. It is an established practice

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<sup>8</sup> Available at [www.cedb.gov.hk/ctb](http://www.cedb.gov.hk/ctb).

<sup>9</sup> Market-based approach for spectrum management means methods relying on market forces to ensure the efficient use of spectrum as a public resource.

in Hong Kong. Spectrum for 3G services and new CDMA2000 3G was auctioned off in 2001 and 2007 respectively. Some overseas countries like Australia and the US also assign spectrum for mobile TV through auction.

5.5 Based on the Spectrum Policy Framework and after considering the feedback of the respondents in the earlier consultation, we propose that spectrum allocated for mobile TV should be assigned through auction whereby pre-qualification would be required in the exercise and rollout obligations with performance bonds (e.g., to commence operation within 18 months after licensing and achieve stipulated geographical coverage within a specified time after commencement of operation) on successful bidders should be imposed. The SUF will be determined by the auction process.

5.6 In the previous 3G and CDMA auction exercises, the pre-qualification criteria are relatively simple. As mobile TV is a nascent service, the TA considers that simple pre-qualification criteria should likewise be adopted and that ownership or cross-holding restrictions should not be imposed on mobile TV operators. This is in line with the light-handed approach we propose for licensing mobile TV services which will be discussed in Chapter 6.

**We welcome your views on the adoption of market-based approach for the development of mobile TV services and the assignment of spectrum and the levy of Spectrum Utilisation Fee through auction.**

## Chapter 6 Licensing Arrangements

6.1 Under the TO, the operator of the network for transmitting mobile TV via the assigned spectrum is required to obtain a mobile carrier licence or a unified carrier licence (proposed by OFTA to replace both fixed and mobile carrier licence in future). Content service providers do not need a telecommunications licence for provision of information or programme service if they make use of the transmission network of a licensed carrier for conveyance of information/programme from their servers to their customers.

6.2 Since mobile TV, either broadcast over a broadcasting network or streamed through a 2.5G/3G mobile network, targets audience on the move and is neither intended nor available for reception by audience of specified premises as defined in the existing BO<sup>10</sup>, mobile TV is generally not a licensable service under the BO<sup>11</sup>. We need to consider the licensing and content regulatory arrangements for mobile TV.

6.3 The main considerations that we have to examine are:

- (a) the need for a favourable, light-handed regulatory environment to foster the growth of mobile TV which is still in its nascent phase;
- (b) the extent of the pervasiveness of mobile TV;
- (c) whether mobile TV would be a substitute for conventional TV services;

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<sup>10</sup> Under the existing BO, there are four categories of licensable television programmes services:

- (a) domestic free television programme service, available for reception by audience of over 5 000 specified premises (i.e., residential premises or hotel rooms) free-of-charge;
- (b) domestic pay television programme service, available for reception by audience of over 5 000 with payment of subscription;
- (c) non-domestic television programme service not primarily targeting Hong Kong (but may still be available for reception in Hong Kong);
- (d) other licensable television programme services for reception by audience of not more than 5 000 specified premises or hotel rooms only

<sup>11</sup> The only exception is satellite mobile TV. See paragraph 6.9 below.

- (d) the time required and the process involved if legislative amendments are to be made to the BO to allow for public debate, legislative scrutiny and consensus building on all involved and proposed provisions;
- (e) the availability of alternative regulatory means (e.g., self-and/or co-regulation by the industry); and
- (f) the regulatory symmetry with respect to broadcast-type and streaming-type mobile TV as well as conventional TV services.

6.4 Most respondents in the earlier consultation accept that mobile TV content should be subject to some form of regulation for public good (e.g., protection of public morals and children). Ten respondents support, at the initial stage, a light-handed regulatory approach whereby the BO should not be applied to mobile TV for the time being, whereas five respondents submit that mobile TV should be regulated under the BO. Some respondents consider that broadcast-type and streaming-type mobile TV should be treated equally.

6.5 In the light of the above feedback and having regard to overseas experience, we propose two possible light-handed approaches.

*(a) Self-regulatory approach*

6.6 We note that some overseas jurisdictions in the wish to promote the development of mobile TV (e.g., the US and the UK) are taking steps or proposing to formulate conducive, business-friendly policies with a relatively light-handed approach to content regulation. They encourage the industry to develop co-regulatory or self-regulatory codes of practice and/or provide restricted access system to ensure the protection of public morals and children, in addition to regulation by general laws.

6.7 We could adopt similar approach whereby content of mobile TV, may it be streaming-type offered on the existing 2.5G/3G mobile network or broadcast-type through the proposed allocation of spectrum in UHF Band and Band III, is regulated as that provided over the

Internet. Key features of this approach are as follow

- (a) content provided on the mobile TV services, including both streaming-type and broadcast-type, should be subject to regulation by general laws, including the Control of Obscene and Indecent Articles Ordinance (Cap. 390) and the Prevention of Child Pornography Ordinance (Cap. 579) but not the BO; and
- (b) mobile TV operators should be required to draw up an industry code of practice for voluntary compliance, which should include access control mechanism for adult contents and general principle of good practice in conducting business and providing content, with a view to strengthening protection of public morals and children.

6.8 If this approach is adopted, no amendment to the BO is required and mobile TV content will not be subject to the regulatory regime stipulated under the BO as compared with content provided on conventional TV services.

6.9 This approach may give rise to a regulatory asymmetry in that a domestic mobile TV service will be a non-licensable service whereas a non-domestic mobile TV service, e.g. provided through the satellite, is subject to licensing requirement under the BO. The provision of mobile TV by means of satellite broadcasting, although unlikely to be primarily targeting Hong Kong, would require a licence of “non-domestic television programme service” (which, unlike domestic television programme services, is not tied to provision of services to specified premises) under the BO. Satellite TV services, including satellite mobile TV, can be receivable by many places due to the very wide geographical footprint of satellites. As such, we need to require providers of such services originating from Hong Kong to observe the “good neighbour” principle by ensuring that their services are acceptable in the recipient places which may have different cultural, religious and socio-political background. Mobile TV using satellite broadcasting is no exception and the regulatory asymmetry is therefore justifiable.

6.10 DAB services, either on their own or as value added services

ancillary to mobile TV, will continue to be regulated by the existing sound broadcasting licensing and regulatory framework under Part IIIA of the TO and Part IV of the Broadcasting Authority Ordinance (BAO) (Cap. 391) in the same way as the existing analogue sound broadcasting services. Providers of DAB services will be required to operate with a sound broadcasting licence and take on the editorial responsibility required under the relevant radio codes of practice promulgated by the Broadcasting Authority (BA).

*(b) Licensing mobile TV under the BO*

6.11 While mobile TV content is not as pervasive as that provided on conventional TV services especially at the early stage, there is public expectation for some form of regulation for public good, including protection of public morals and children. Relying on the general laws alone may not be considered adequate. Also, conventional and mobile TV technologies and services could converge fast as technology advances (e.g., the development of handheld and desktop terminals for mobile TV services to be readily received both at home and on the move). And unlike content provided over the Internet, mobile TV operators are likely to be based in Hong Kong. Thus, there may be a case for amending the BO so as to create a new category of television programme services for reception on the move as follows:

- (a) a new category of licence could be created by amending the BO;
- (b) given that mobile TV services are at an infant stage and are unlikely to be as pervasive as domestic free and pay television programme services, the new category of licence could be issued by the BA under the BO as in the case of “other licensable television programme services” at present; and
- (c) codes of practice under the BA could be developed to cater for mobile TV in consultation with the industry and the public. The codes of practice should adopt the broadcasting principles generally accepted by the community and form part of the existing generic codes of practice on television programme and advertising standards. Content complaints in respect of

mobile TV could be dealt with by the BA, similar to existing established practice in regulating conventional TV services.

6.12 Currently, the BO already provides for a category of licences for “other licensable television programme services”, which caters for television services serving niche markets such as smaller communities and hotel rooms and are issued by the BA upon application. We may consider amending the BO to provide for “mobile TV services” as one of the sub-categories of “other licensable television programme services”. The content regulation standards stipulated under the BA’s generic codes with respect to other licensable television programme services can be suitably amended and adopted for regulation of mobile TV content.

6.13 Generally speaking, broadcast-type and streaming-type mobile TV should be treated in the same way to maintain a level playing field and regulatory symmetry. Nevertheless, given that streaming-type mobile TV services already available on 2.5G/3G mobile networks are not subject to broadcasting regulation at present, we need to consider whether a grace period should be provided to bring them under regulatory control, or to grandfather all mobile TV services which have commenced operation prior to a cut-off date.

6.14 As we mentioned in Chapter 5, we do not consider it necessary to impose ownership or cross-holding restrictions on mobile TV which is a nascent service. The cross-media ownership restrictions under the BO will be suitably amended in this connection.

6.15 For avoidance of doubt, while DAB services offered by a mobile TV operator will be subject to the existing sound broadcasting licensing framework under Part IIIA of the TO and the regulatory regime under Part IV of the BAO with the relevant radio codes of practice on programme and advertising standards, any third party operators leasing the capacity from mobile TV operators to provide DAB services will be similarly caught.

**We welcome your views on the above two light-handed regulatory approaches, and your suggestions on which approach should be adopted for development of mobile TV.**

## **Chapter 7 Access to Hilltop Transmission Sites and Geographical Coverage for Broadcast-type Mobile Television**

7.1 Some respondents are concerned about the access to the hilltop transmission sites which may be required for the provision of mobile TV services. They submit that the existing broadcasting and telecommunications operators should make available their transmission stations at hilltop sites to new entrants for the speedy rollout of mobile TV services.

7.2 In the light of the scarcity of hilltop transmission sites, OFTA has issued a guideline<sup>12</sup> on the use of hilltop radio sites resources to ensure that such sites and facilities thereon are used efficiently and effectively to meet the needs for telecommunications, utilities and other public services. The future users of the two currently reserved UHF multiplexes may seek to accommodate their network elements in the hilltop transmission sites of ATV and TVB constructed for the provision of DTT services.

7.3 The sharing of these hilltop sites and facilities is subject to mutual agreement through commercial negotiation, but the TA has the power to intervene and adjudicate if mutual agreement cannot be reached. These provisions ensure that new entrants can rent the existing hilltop sites to roll out their mobile TV services in line with their business plans.

7.4 Traditionally, the rollout requirements for conventional free-to-air sound and television broadcasting network and mobile telecommunications network are different. Free-to-air broadcasting is a major source of information, education and entertainment for the general viewing and listening public, and is therefore subject to more stringent requirement to provide a virtually universal coverage over the whole territory. On the other hand, the market of mobile telecommunications service is fully competitive and is therefore traditionally subject to lighter requirement. An example is the new licence which will be granted to the CDMA2000 service, the rollout requirements of which

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<sup>12</sup> Available on OFTA's website at [http://www.ofta.gov.hk/en/report-paper-guide/guidance-notes/gn\\_20050407.pdf](http://www.ofta.gov.hk/en/report-paper-guide/guidance-notes/gn_20050407.pdf)

mainly focus on strategic areas such as central business areas and railway and public transport tunnels. Another example is the four 3G licences issued in 2001, where the licensees were required to meet a population coverage obligation of not less than 50% by a specified deadline.

7.5 While there are merits in imposing lighter rollout requirements for conventional telecommunications services, we see a rising expectation from the public on the geographical coverage of innovative broadcasting and telecommunications services. As mentioned in paragraphs 7.2 and 7.3 above, there is an established mechanism for sharing of scarce hilltop resources in order to expand the geographic coverage of proposed broadcast-type mobile TV services widest possible. With this safeguard, we consider that prospective broadcast-type mobile TV service providers should be able to make use of the hilltop transmission sites as the existing free-to-air broadcasters. As such, we are inclined to require that broadcast-type mobile TV service providers should extend the geographical coverage by phases similar to that done by existing free-to-air broadcasters if hilltop transmission sites are to be deployed. Suitable milestones should be imposed on the rollout of mobile TV services accordingly.

**We welcome your views on the requirement that mobile TV services should provide the same geographical coverage as free-to-air broadcasters.**

## Chapter 8 Work Plan

8.1 Subject to comments to be received in this consultation exercise, we will proceed in line with the following work plan:

<b>Date</b>	<b>Action</b>
Jan – Apr 2008	<ul style="list-style-type: none"><li>• Second round of public consultation</li></ul>
Jul 2008	<ul style="list-style-type: none"><li>• Announcement of implementation framework</li></ul>
Second half of 2008	<ul style="list-style-type: none"><li>• Preparation of subsidiary legislation under the TO</li><li>• Preparation of legislative amendments to the BO for licensing mobile TV (if necessary)</li></ul>
First half of 2009	<ul style="list-style-type: none"><li>• Spectrum auction and licensing of the mobile TV services</li></ul>

## Chapter 9 Glossary and Definitions

### What is Mobile TV?

9.1 As a general term, mobile TV using DVB-H, MediaFLO, etc. technologies refers to the wireless transmission of video for reception on the move by mobile or portable devices. The defining characteristics distinguishing it from traditional television services are mobility and personalised consumption through mobile terminals such as mobile phones or other hand held terminals. Mobile TV in the form of video-on-demand or video streaming is already available in Hong Kong on the 2.5G or 3G mobile telecommunications platform, supporting mainly point-to-point transmission with limited transmission capacity<sup>13,14</sup>. Mobile TV services of this kind require no extra spectrum to support them.

### Mobile TV Technologies

9.2 Competing point-to-multipoint, high transmission capacity technologies have been developed for mobile TV, which require the assignment of extra spectrum. Such technologies include:

- **DVB-H:** This is a member of the European DVB broadcasting standards<sup>15</sup>. A multiplex using DVB-H in UHF Band can carry about 30 mobile TV channels (some 22 channels based on the trials so far conducted in Hong Kong) for 7-inch displays.
- **T-DMB (Eureka 147):** T-DMB refers to a variant application of the Eureka 147 technical standard originally developed for DAB. The development of this technology, conducted in South Korea, optimises the potential of Eureka 147 into a broadcasting technology for transmitting mobile multimedia services, instead of just DAB. A 1.5 MHz multiplex using

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<sup>13</sup> One mobile operator is offering mobile TV service based on a proprietary point-to-multipoint transmission standard.

<sup>14</sup> A new technology, known as Multimedia Broadcast Multicast Service (MBMS), is also designed to operate over the 3G platform, but the timing in respect of the availability of equipment is still uncertain.

<sup>15</sup> DVB-T standard for DTT is widely adopted internationally.

T-DMB technology in Band III or L Band can carry two to three mobile TV channels for 7-inch displays.

- **S-DMB:** This is a technology for transmitting mobile multimedia services to handheld devices via geostationary satellite and terrestrial networks. Japan and South Korea launched an S Band satellite in 2004, followed by S-DMB based services in October 2004 and May 2005 respectively.
- **MediaFLO:** Qualcomm, a US company that specialises in wireless technologies, develops this technology. It is designed to reinforce mobile phone technologies to support high capacity video transmission.
- **Others:** ISDB-T in Japan, DAB-IP in the UK and China CMMB promulgated by SARFT, etc.

Communications and Technology Branch,  
Commerce and Economic Development Bureau and  
Office of the Telecommunications Authority  
January 2008

## **Consultation on Digital Broadcasting: Mobile Television and Related Issues**

### **Outcome of Consultation**

#### **Introduction**

- In end January 2007, the then Commerce, Industry and Technology Bureau (presently Commerce and Economic Development Bureau) launched a three-month public consultation on Digital Broadcasting: Mobile Television and Related Issues. Specifically, the public were invited to comment on four issues, viz., spectrum availability, allocation and assignment as well as licensing arrangement.
- A total of 23 submissions were received, all from the telecommunications and broadcasting industry. At **Appendix A** is the list of respondents whose views are tabulated at **Appendix B**.
- Separately, OFTA received 14 submissions in response to its invitation for expression of interest in bidding for spectrum for mobile TV or other digital broadcasting services. The identity and submissions of these 14 respondents shall not be disclosed.
- The views of the respondents are summarized below.

#### **Overall**

- The majority of the respondents welcome early introduction of mobile TV into Hong Kong to spur further development of the telecommunications and broadcasting industry, though they may not agree on all the specific issues put forward for consultation.
- Several respondents think that the market conditions and regulatory environment are not ready for rolling out mobile TV at this stage.

#### **Spectrum Availability**

- Nine respondents consider UHF frequencies suitable for mobile TV on the grounds of sophistication of available technologies and receivers, cost-effectiveness of transmission network, and economy of scale. One

respondent thinks that the two spare UHF frequencies should not be released until the two terrestrial free-to-air broadcasters have successfully implemented their single frequency network (SFN) multiplexes since they may need extra frequencies in case SFN technology is not workable in Hong Kong.

- Two respondents propose that available Band III frequencies should be allocated for mobile TV based on T-DMB technology, which enables roaming between Hong Kong and the Mainland. Two respondents consider that L Band should also be used for mobile TV. By contrast, one respondent is concerned about using L Band for mobile TV or DAB services because of possible interference with its existing pay TV services transmitted through satellite and microwave distribution network. One respondent suggests reserving spectrum for standalone DAB services without specifying the desirable frequency band.
- One respondent wants S Band to be released for mobile TV as soon as possible because the Mainland will launch satellite mobile TV in 2008 and Hong Kong should follow to benefit from such harmonization and early launch. This is permissible according to the International Telecommunications Union's recommendations on the use of S Band. However, eight respondents consider S Band inappropriate for mobile TV because S Band should be reserved for mobile broadband or expansion of 3G services, and mobile TV in S Band could interfere with the existing 3G services operating in the neighbouring frequency bands. One respondent agrees that the use of S Band for mobile TV cannot be considered until after the World Radio-communication Conference to be held in October 2007.
- One respondent suggests making available as much spectrum as possible for mobile TV and seven others take a neutral stance.
- Two respondents consider it too early to decide on designation of frequency bands for mobile TV. One of them holds the view that possible interference between existing and future wireless services should be examined and the potential demand for spectrum from other wireless services should be considered.

## **Spectrum Allocation**

- The majority of respondents support a technology-neutral approach to allocating spectrum.
- Regarding the three approaches to allocating spectrum, namely, pro-mobile, service neutral and conventional approach, ten respondents take a neutral stance; six respondents favour and one respondent opposes the pro-mobile TV approach; two respondents favour the service neutral approach; and four respondents favour the conventional approach.

## **Spectrum Assignment**

- Most respondents support the levy of spectrum utilization fee (SUF), irrespective of spectrum assignment method, though some of them propose different charging mechanisms, like fixed fee structure, share of revenue and payment over the licence term. One respondent suggests that the Government should review and assess whether SUF should be levied on broadcasters providing free digital audio broadcasting service which have been required to pay a licence fee.
- Regarding the method to assign spectrum, seven respondents support auction to let market decide the value of spectrum. Some of them advocate safeguards (e.g., rollout obligations, pre-qualification, etc.) should be put in place so as not to distort the market. Individual respondents submit that the reserve price and SUF should be set at a level comparable to those for the 3G spectrum.
- Five respondents support beauty contest based on the merits of the proposals, citing that auction would result in high cost and entry barrier, and that high auction price would limit the development of mobile TV. They argue that beauty contest would lead to faster business ramp-up and better business environment for mobile TV.
- Two respondents wish to be directly assigned with spectrum to launch DAB and DTT services respectively. The remaining nine respondents take a neutral stance.

## **Licensing Arrangements**

- Most respondents agree that mobile TV content should be adequately regulated for public good (e.g., protection of public morals and children).
- Ten respondents support, at least at the initial stage, a light-touch regulatory approach (i.e., not regulated by the BO like other conventional TV services). Some of them are of the view that broadcast-type and streaming mobile TV should be treated equally.
- Five respondents opine that mobile TV should be regulated by the BO, some of whom suggest that streaming mobile TV should continue to stay outside the BO's remit.
- Eight respondents take a neutral stance, some of which suggesting equal treatment of broadcast-type and streaming mobile TV, whatever the regulatory regime is to be applied.

## **Other Views**

- Some respondents point out the need to make the existing hilltop sites accessible to new entrants to facilitate early introduction of mobile TV and maintain a level playing field.
- Some respondents opine that the BO should be reviewed comprehensively to respond to the trend of technology integration and media convergence.
- Some respondents caution the possible interference of mobile TV services with the existing telecommunications services.

## **Expression of Interest**

- Of the 14 respondents who responded to OFTA's invitation for expression of interest in bidding for spectrum for mobile TV or other digital broadcasting services, one respondent indicates interest in providing digital audio broadcasting service in Band III.
- Three respondents indicate interest in operating mobile TV in UHF Band, while one respondent indicates interest in operating DTT in this Band.

- Two respondents indicate interest in operating mobile TV and 3G mobile services respectively in S Band.
- The remaining seven respondents do not indicate any preference over the frequency bands, services to be provided or technology to be deployed.

Communications and Technology Branch  
Commerce and Economic Development Bureau

Office of the Telecommunications Authority

**Consultation on Digital Broadcasting:  
Mobile Television and Related Issues**  
**List of Submissions**  
(in alphabetical order)

1. Alcatel-Lucent
2. Asia Television Limited
3. Broadcast Australia Pty Limited
4. Cable & Satellite Broadcasting Association of Asia (CASBAA)
5. China Mobile Broadcasting Satellite Limited
6. China Mobile Peoples Telephone Company Limited
7. Ericsson Limited
8. Hong Kong Broadband Network Limited
9. Hong Kong Cable Television Limited
10. Hong Kong CSL Limited and New World PCS Limited
11. Hutchison Telecommunications (Hong Kong) Limited
12. Metro Broadcast Corporation Limited
13. Mobile Entertainment Forum
14. Motorola
15. Nokia
16. PCCW-HKT Telephone Limited
17. Qualcomm International
18. Radio Television Hong Kong
19. Revenco and Guangdong Mobile Television Medial Company Limited
20. SmarTone Mobile Communications Limited and SmarTone 3G Limited
21. Star Group Limited
22. Television Broadcasts Limited
23. Vlaamse Radio Maatschappij (VRM) bvba

Summary of Responses to the Consultation on Digital Broadcasting: Mobile TV and Related Issues

	Respondent	Spectrum Availability	Spectrum Allocation	Spectrum Assignment	Licensing Arrangement	Others
1.	Alcatel-Lucent					<ul style="list-style-type: none"> <li>▪ DVB-SH standard allows a hybrid (satellite and terrestrial) system for direct signal reception on a mobile device, which could be deployed in S Band.</li> </ul>
2.	ATV	<ul style="list-style-type: none"> <li>▪ Government should allocate DAB frequency bands for DAB mobile TV.</li> <li>▪ Government should designate frequency bands for mobile TV instead of letting market decide to avoid chaos and confusion.</li> <li>▪ The two spare UHF SFN multiplexes should be assigned to ATV and TVB for fixed and mobile TV.</li> </ul>		<ul style="list-style-type: none"> <li>▪ Auction cause high costs to operators, limiting development of new technology.</li> <li>▪ Spectrum should be assigned through beauty contest based on proposal diversity.</li> <li>▪ Fee can be charged based on operating revenue.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Mobile TV should be licensed under BO but regulated to a lesser extent.</li> <li>▪ Eventually, mobile TV and all free and pay TV should be regulated in the same way.</li> <li>▪ BO should be reviewed as soon as possible.</li> </ul>	

	<b>Respondent</b>	<b>Spectrum Availability</b>	<b>Spectrum Allocation</b>	<b>Spectrum Assignment</b>	<b>Licensing Arrangement</b>	<b>Others</b>
3.	Broadcast Australia <sup>1</sup>	<ul style="list-style-type: none"> <li>▪ HK, like Australia, is a small market that must adopt spectrum and technology solutions consistent with those adopted by large markets.</li> <li>▪ Skeptical about S Band suitability for mobile TV, which requires multiple infill and in-building repeaters.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Spectrum should be allocated in a technology-neutral manner.</li> <li>▪ Restrictions on spectrum use should be predominantly driven by interference minimization.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Support auction to let market decide the value of spectrum.</li> <li>▪ Safeguards (e.g., pre-qualification; service first, revenue second; realistic reserve price; rollout obligations; quality of service obligations; and interferers pays) should be in place so as not to distort the market.</li> <li>▪ Maintain a level playing field for incumbents and new entrants.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Support light-touch regulation of mobile TV.</li> <li>▪ Government should provide a level-playing field for broadcast-type and streaming mobile TV.</li> <li>▪ Recognize the need to regulate mobile TV content for public good without undue restrictions.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Its various trials have proved the prospects of mobile TV.</li> </ul>
4.	CASBAA	<ul style="list-style-type: none"> <li>▪ Support using a spectrum band that allows more mobile TV channels.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Support pro-mobile TV approach.</li> </ul>		<ul style="list-style-type: none"> <li>▪ Generally support technology-neutral and light-handed approach.</li> <li>▪ Broadcast-type and streaming mobile TV should be treated by</li> </ul>	

<sup>1</sup> Broadcasting Australia, wholly owned by Macquarie Communications Infrastructure Group, is Australia's leading broadcast transmission provider. Its principal customers are ABC and SBS. It also operates in the Asia-Pacific Region providing technical and business consultancy services and seeking partnerships in the development and operation of digital broadcast networks. It has conducted a number of trials of mobile TV in the past few years.

	<b>Respondent</b>	<b>Spectrum Availability</b>	<b>Spectrum Allocation</b>	<b>Spectrum Assignment</b>	<b>Licensing Arrangement</b>	<b>Others</b>
					<p>the same rules.</p> <ul style="list-style-type: none"> <li>▪ Some of its members favour self-regulation and assessment of licensing requirements after the formation of the Communications Authority; other members believe mobile TV should be regulated to the same extent as pay TV under the BO for fair competition.</li> </ul>	
5.	China Mobile Broadcasting Satellite <sup>2</sup>	<ul style="list-style-type: none"> <li>▪ Strongly disagree to delay the award of S Band after WRC-07 and urge Government to release this band as soon as possible.</li> <li>▪ ITU recommends that S Band could be used for fixed/mobile/broadcasting satellite services in addition to 3G</li> </ul>	<ul style="list-style-type: none"> <li>▪ Support service-neutral approach to maximize economic value of scarce spectrum and eliminate subjective judgment by Government.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Support using auction to assign spectrum.</li> <li>▪ Reserve price should be set realistically to reflect current market value of spectrum.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Support light-handed approach to reduce regulatory burden.</li> <li>▪ Support maintaining the current licensing regime of not applying the BO to mobile TV.</li> <li>▪ COIAO already provides sufficient content protection</li> </ul>	

<sup>2</sup> CMB Satellite is majority owned by EchoStar Communications Corporations in the US, which is also one of the major investors in the TU Media which is the sole provider of satellite digital multimedia broadcast service in South Korea. CMB Satellite has partnered with the State Administration of Radio, Film and Television (SARFT) of the Mainland to provide satellite capacity for mobile TV in the Mainland scheduled for launch before the 2008 Beijing Olympic Game. It actively participates in the China Mobile Multimedia Broadcasting (CMMB) Working Group on the development of technical standard of mobile TV in the Mainland.

	<b>Respondent</b>	<b>Spectrum Availability</b>	<b>Spectrum Allocation</b>	<b>Spectrum Assignment</b>	<b>Licensing Arrangement</b>	<b>Others</b>
		<p>expansion.</p> <ul style="list-style-type: none"> <li>▪ China will launch satellite mobile TV in 2008 and HK should follow to benefit from such harmonization and early launch.</li> <li>▪ Reserving S Band for one particular service (e.g., 3G expansion) violates market-led principle advocated by the Government.</li> </ul>			and the industry can adopt co-regulation.	
6.	China Mobile Peoples	<ul style="list-style-type: none"> <li>▪ Consider it too early to make any decision on the frequency bands for mobile TV and availability of affordable products uncertain at present.</li> <li>▪ S Band must be reserved for 3G expansion as telecom services have become indispensable.</li> <li>▪ Hold a preliminary view that UHF Band may be the most viable band for mobile TV after simulcast period.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Support the conventional 2-stage allocation process: first to decide the type of service on a frequency band, then to invite bidding for spectrum under technology neutral principle.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Support levying spectrum utilization fee and imposing rollout obligations.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Support equal regulatory treatment of broadcast type and streaming mobile TV.</li> </ul>	<ul style="list-style-type: none"> <li>▪ The mass market demand for mobile TV, especially live broadcasts, is not clear at this stage.</li> </ul>

	<b>Respondent</b>	<b>Spectrum Availability</b>	<b>Spectrum Allocation</b>	<b>Spectrum Assignment</b>	<b>Licensing Arrangement</b>	<b>Others</b>
7.	Erisson	<ul style="list-style-type: none"> <li>▪ UHF spectrum (470-862 MHz) should be used to provide mobile TV rather than dedicated usage like digital broadcasting.</li> <li>▪ S Band (2500-2690 MHz) should be designated as an expansion band for 3G systems to allow high speed transmission.</li> </ul>				
8.	HKBN	<ul style="list-style-type: none"> <li>▪ Support any allocation of frequency bands that facilitate the development of mobile TV.</li> <li>▪ Government should allow market force to work and decide on technology and frequency bands for mobile TV unless there is market failure.</li> <li>▪ Government may adopt the conventional approach as an interim solution and further consider the feasibility of service neutral or pro-mobile TV approach after the details of the proposed spectrum release plan as suggested in the Radio Spectrum Policy Framework is available.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Government should release spectrum to the industry by beauty contest as soon as possible.</li> <li>▪ Terms and conditions for the use of new spectrum should not be more favourable than those of existing users.</li> <li>▪ Auction may not be the most appropriate means to promoting mobile TV, because (i) auction does not facilitate entry by new operators and hence is not good for competition; (ii) auction presents a risk of a very high and economically nonviable auction price; and (iii)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Government should establish a clear regulatory regime and pave the way for rollout of mobile TV.</li> <li>▪ Government should set up a level playing field with light and flexible regulation to be achieved through co- and self-regulation.</li> </ul>	<ul style="list-style-type: none"> <li>▪ The current market environment is suitable for the rollout of mobile TV.</li> <li>▪ Mobile TV services should not cause harmful interference to other services.</li> </ul>	

	Respondent	Spectrum Availability	Spectrum Allocation	Spectrum Assignment	Licensing Arrangement	Others
				<p>auction is susceptible to manipulation.</p> <ul style="list-style-type: none"> <li>▪ SUF should be paid over the term of the licence to lower the entry barriers.</li> </ul>		
9.	HKCSL and New World PCS	<ul style="list-style-type: none"> <li>▪ Government should reveal its position on the Chinese CMMB standard, given that the TA will mandate the use of CDMA2000.</li> <li>▪ Consider it inappropriate at this stage to use S Band for mobile TV. Potential interference of mobile TV in S Band with 3G services should be looked at.</li> <li>▪ At this stage tend to view UHF Band appropriate for mobile TV.</li> <li>▪ Allocation approach cannot be assessed until mobile TV is clearly defined.</li> <li>▪ Spectrum used for mobile TV should also not be used for bi-lateral or multi-lateral voice communications or video-telephony services.</li> </ul>		<ul style="list-style-type: none"> <li>▪ Levies on spectrum use should be set at levels comparable to other access platforms so as not to distort the market.</li> <li>▪ Implementation of mobile TV should be aligned and consistent with Government's Spectrum Policy Framework.</li> <li>▪ Spectrum should be auctioned off in the same manner as the 3G auction in 2001.</li> <li>▪ Reserve price and SUF should be at least equal to those for the 3G spectrum.</li> <li>▪ ATV and TVB may use DTT platform to provide mobile TV. SUF should also</li> </ul>	<ul style="list-style-type: none"> <li>▪ The licensing arrangements should in no way restrict or inhibit the existing mobile carriers to provide mobile TV-like services.</li> <li>▪ Further information about unified carrier licence and generic radio frequency licences should be provided.</li> <li>▪ BO should apply to broadcast-type, but not streaming mobile TV. Mobile TV licensees should pay licence fees as pay TV licensees do.</li> <li>▪ Government should clarify how existing rules and initiatives (e.g., cross media ownership, foreign</li> </ul>	<ul style="list-style-type: none"> <li>▪ Government should clarify the definition of mobile TV in view of several emerging wireless technologies capable of transmitting mobile content to portable devices.</li> <li>▪ All mobile operator should have the same rights as ATV and TVB to access hilltop sites in order to maintain a level playing field.</li> </ul>

	<b>Respondent</b>	<b>Spectrum Availability</b>	<b>Spectrum Allocation</b>	<b>Spectrum Assignment</b>	<b>Licensing Arrangement</b>	<b>Others</b>
				apply in such case.	ownership, media convergence, interconnection, copyright and competition, public service broadcasting review, universal service obligation) will affect mobile TV to ensure policy consistency.	
10.	HKCTV	<ul style="list-style-type: none"> <li>▪ The two spare UHF SFN multiplexes should be licensed to new entrants instead of incumbent DTT and mobile operators to foster competition, widen consumer choice and expedite launch of mobile TV.</li> <li>▪ Concerned about using L Band for mobile TV/DAB services, because of possible interference with HKCTV's satellite reception and MMDS services. Government should conduct detailed technical field tests to quantify the interference.</li> </ul>			<ul style="list-style-type: none"> <li>▪ Mobile TV should be licensed under the BO since similar services should be subject to the same regulation.</li> <li>▪ Mobile TV could attain an audience reach similar to traditional TV, though not a full substitute.</li> </ul>	
11.	Hutchison Telecom (HK)	<ul style="list-style-type: none"> <li>▪ S Band should continue to be earmarked for 3G expansion to provide planning certainty.</li> </ul>		<ul style="list-style-type: none"> <li>▪ Spectrum assignment should be subject to payment of SUF and rollout requirements.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Disagree to inclusion of all forms of mobile TV as broadcasting activities subject to broadcasting licence and regulation.</li> <li>▪ Only terrestrial broadcasting of</li> </ul>	

	<b>Respondent</b>	<b>Spectrum Availability</b>	<b>Spectrum Allocation</b>	<b>Spectrum Assignment</b>	<b>Licensing Arrangement</b>	<b>Others</b>
					mobile TV should be regulated like other terrestrial broadcasting services.	
12.	Metro Broadcast	<ul style="list-style-type: none"> <li>▪ Oppose pro-mobile approach of spectrum allocation.</li> <li>▪ Government should adopt a balanced view in the assessment of DAB development by looking at overseas experience.</li> <li>▪ DAB should continue to be pursued in HK on its own rather than being part of mobile TV.</li> <li>▪ The value of DAB to the public warrants Government's reserving to it distinctive and separate spectrum for standalone DAB services.</li> <li>▪ Pro-mobile TV approach contradicts the recently published Spectrum Policy Framework that there will exist a mix of command and control approach and market-based approach.</li> </ul>		<ul style="list-style-type: none"> <li>▪ Incumbent sound broadcasters interested in DAB should be granted with relevant spectrum for a period of, say, 5 years, like in the case of DTT.</li> <li>▪ After the 5-year period, competitive entry into DAB market should be allowed by way of beauty contest.</li> <li>▪ Government to review and assess whether SUF should be levied on broadcasters providing free DAB service which already are required to pay a licence fee.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Mobile TV should not be regulated by BO.</li> <li>▪ Mobile TV is highly likely to be a subscription service. Hence more light-handed regulation is acceptable.</li> </ul>	

	<b>Respondent</b>	<b>Spectrum Availability</b>	<b>Spectrum Allocation</b>	<b>Spectrum Assignment</b>	<b>Licensing Arrangement</b>	<b>Others</b>
13.	Mobile Entertainment Forum <sup>3</sup> (MEF)	<ul style="list-style-type: none"> <li>▪ Does not have a stance on issues such as spectrum availability, allocation assignment and licensing.</li> <li>▪ Regulation should uphold five principles: transparency, accountability, proportionality, consistency and targeting.</li> <li>▪ Current rules and obligations designed with traditional TV should not be applied to infant mobile multimedia.</li> <li>▪ MEF has good track record on developing self/co-regulatory codes of best practice in numerous countries. It would like to do the same in HK.</li> </ul>				
14.	Motorola	<ul style="list-style-type: none"> <li>▪ Support technology neutrality in the launch of mobile TV</li> <li>▪ S Band should be used for mobile broadband.</li> <li>▪ Support service neutrality in the allocation of spectrum.</li> </ul>		<ul style="list-style-type: none"> <li>▪ Neutral on spectrum assignment approach, though spectrum should be assigned to those who will put it to the best use for the benefit of the community.</li> </ul>	No comments.	
15.	Nokia	<ul style="list-style-type: none"> <li>▪ UHF is the most suitable and efficient band for mobile TV from the perspective of technicality and network rollout cost.</li> <li>▪ L Band implementation will be very limited worldwide.</li> <li>▪ Neutral on spectrum allocation approach.</li> </ul>		<ul style="list-style-type: none"> <li>▪ Prefer beauty contest to assign spectrum with revenue-sharing agreement, which leads to faster business ramp-up and better business environment.</li> <li>▪ Consumers can be protected via licence obligations and broadcasters can</li> </ul>	<ul style="list-style-type: none"> <li>▪ Neutral, though believe light-regulated environment stimulates best business results and services.</li> </ul>	<ul style="list-style-type: none"> <li>▪ DVB-H is the best among the various mobile TV technologies in terms of technicality and market development.</li> </ul>

<sup>3</sup> Founded in 2001, MEF is a global trade body representing all participants in the mobile entertainment value chain. It has over 140 members throughout Europe, the Americas and Asia. Nevertheless, no Hong Kong mobile operators have joined MEF.

	<b>Respondent</b>	<b>Spectrum Availability</b>	<b>Spectrum Allocation</b>	<b>Spectrum Assignment</b>	<b>Licensing Arrangement</b>	<b>Others</b>
				<p>better manage their business.</p> <ul style="list-style-type: none"> <li>▪ Auction involves relatively high business risks, making it very difficult for bidders to evaluate spectrum value.</li> <li>▪ Mobile TV is totally new, and hence it is difficult to set SUF. The use of efficient network can be promoted by an obligation to rent capacity, as Finland and Germany do.</li> </ul>		

	<b>Respondent</b>	<b>Spectrum Availability</b>	<b>Spectrum Allocation</b>	<b>Spectrum Assignment</b>	<b>Licensing Arrangement</b>	<b>Others</b>
16.	PCCW	<ul style="list-style-type: none"> <li>▪ Government should adopt technology neutral and market-led approach.</li> <li>▪ Recommend service neutral approach to spectrum allocation with conventional approach as an alternative (if operational difficulties like interference is a concern).</li> <li>▪ Disagree to pro-mobile TV approach which is inflexible and against Government's technology neutral principle.</li> <li>▪ Consider it inappropriate to use S Band at this stage, which may cause interference between Broadband Wireless Access (BWA) and mobile TV services.</li> <li>▪ DVB-H and MediaFLO are the most appropriate technologies and UHF Band the most appropriate band for launching mobile TV in HK.</li> <li>▪ Government should make as much UHF spectrum available as possible for DTT and mobile TV services.</li> </ul>		<ul style="list-style-type: none"> <li>▪ Auction should be used.</li> <li>▪ SUF should be levied via auction.</li> <li>▪ No need for rollout obligations.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Presently the regulation of mobile TV by COIAO is sufficient.</li> <li>▪ Government should examine whether mobile TV should be regulated by BO to ensure regulatory consistency when BO is next reviewed. It is illogical that the same content on different receiving devices are regulated differently.</li> </ul>	<ul style="list-style-type: none"> <li>▪ The then Secretary for Commerce, Industry and Technology's statement on DTT implementation framework should be updated to reflect the demand for spectrum arising from mobile TV.</li> <li>▪ ATV and TVB should not be permitted to use their SFN multiplexes to provide mobile TV without being subject to the same procedures and requirements as all other interested operators.</li> </ul>

	<b>Respondent</b>	<b>Spectrum Availability</b>	<b>Spectrum Allocation</b>	<b>Spectrum Assignment</b>	<b>Licensing Arrangement</b>	<b>Others</b>
17.	Qualcomm	<ul style="list-style-type: none"> <li>▪ Urge Government to allocate the two spare UHF SFN multiplexes for mobile TV.</li> <li>▪ With respect to cost-effectiveness of network, economies of scale and availability of handsets, L Band may not be as favourable as UHF Band.</li> <li>▪ Agree that S Band for mobile TV cannot be assessed until after WRC-07.</li> <li>▪ Support pro-mobile TV and technology neutral approach to allocate spectrum.</li> </ul>		<ul style="list-style-type: none"> <li>▪ Support auction as a market-led means to assign spectrum.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Government should develop a flexible policy framework suitable for mobile TV.</li> <li>▪ Favour a flexible regulatory regime without particular views.</li> </ul>	<ul style="list-style-type: none"> <li>▪ The existing hilltop sites should be made accessible to new mobile TV operators.</li> <li>▪ Government should further evaluate and clarify requirements of adjacent and co-channel protection.</li> </ul>
18.	RTHK	<ul style="list-style-type: none"> <li>▪ Neutral.</li> </ul>	<ul style="list-style-type: none"> <li>▪ RTHK should be given channel capacity to provide DTT services whereby mobile TV should be integrated with DTT.</li> </ul>		<ul style="list-style-type: none"> <li>▪ Mobile TV should be licensed and regulated under the BO.</li> </ul>	
19.	Revenco and Guangdong Mobile TV Media <sup>4</sup>	<ul style="list-style-type: none"> <li>▪ Recommend to use T-DMB standard on Band III to launch mobile TV.</li> <li>▪ T-DMB enables roaming in Hong Kong, Guangdong, Beijing and Shanghai, etc.</li> </ul>				

<sup>4</sup> Revenco is a company specialized in providing technology solutions and application of new technologies in the fields of telecommunications, transportation, logistics, Internet, electronic payment, media and entertainment. It established its branch in Hong Kong in 1995. Guangdong Mobile TV Media (GTM) is jointly formed by Southern Media Corporation and Revenco (Guangdong) to operate mobile TV. In the submission, GTM claims that it has obtained a mobile TV licence, using T-DMB to provide mobile TV services.

	<b>Respondent</b>	<b>Spectrum Availability</b>	<b>Spectrum Allocation</b>	<b>Spectrum Assignment</b>	<b>Licensing Arrangement</b>	<b>Others</b>
20.	SmarTone	<ul style="list-style-type: none"> <li>▪ It is too premature to decide on spectrum allocation for the moment when mobile TV technologies are at a nascent stage.</li> <li>▪ Interference should be studied with respect to the co-existence of mobile TV, WiMax, 3G services, etc. in the same frequency range.</li> <li>▪ The potential demand for spectrum from other services like wireless broadband services using HSPDA, TD-SCDMA, CDMA2000 and WiMax in the proposed frequency bands should be considered.</li> </ul>		<ul style="list-style-type: none"> <li>▪ Support auction with or without competing commercial demand.</li> <li>▪ The reserve price should be consistent with past auction of similar nature.</li> <li>▪ SUF should apply and be reviewed to ensure a level-playing field among spectrum users.</li> </ul>	<ul style="list-style-type: none"> <li>▪ The current licensing regime for mobile TV on mobile networks should not be changed.</li> <li>▪ Scope of carrier licence for mobile TV should be confined to mobile TV only, i.e., telecom services (e.g., 3G) should not be allowed.</li> </ul>	<ul style="list-style-type: none"> <li>▪ The licensing regime should be reviewed on whether more stringent control should be introduced to avoid abuse of dominance or substantial market power.</li> </ul>
21.	Star Group	<ul style="list-style-type: none"> <li>▪ UHF or L Band should be used for mobile TV.</li> <li>▪ Support pro-mobile, technology-neutral approach.</li> </ul>		<ul style="list-style-type: none"> <li>▪ The Government should act quickly and should allow broadcasters, telcos and other third parties to bid for spectrum.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Support light-touch regulation (e.g., self-regulation).</li> </ul>	<ul style="list-style-type: none"> <li>▪ Access to hilltop sites and facilities should be addressed.</li> </ul>
22.	TVB	<ul style="list-style-type: none"> <li>▪ All frequencies could be made available, contingent upon technical trials.</li> <li>▪ UHF frequencies would be most suitable for mobile TV. In particular, Channel 47 is preferable to Channel 62<sup>5</sup> due to the latter's close proximity to GSM 900 frequency band which may result in interference.</li> <li>▪ Channel 62 could be used to provide DTT services,</li> </ul>		<ul style="list-style-type: none"> <li>▪ Auction is purely assignment by financial strength and may not be in the best public interest.</li> <li>▪ Mobile TV is a content-based service, whose nature</li> </ul>	<ul style="list-style-type: none"> <li>▪ Mobile TV should not be regulated under the existing BO which is too restrictive for media convergence.</li> <li>▪ The existing regulatory regime is</li> </ul>	<ul style="list-style-type: none"> <li>▪ Technical trials and tests of different technologies on different frequency bands should be conducted before policy framework on mobile TV is</li> </ul>

<sup>5</sup> Channel 47 and Channel 62 are the two spare UHF SFN multiplexes.

	<b>Respondent</b>	<b>Spectrum Availability</b>	<b>Spectrum Allocation</b>	<b>Spectrum Assignment</b>	<b>Licensing Arrangement</b>	<b>Others</b>
		<p>such as RTHK and/or public service broadcasting TV channels.</p> <ul style="list-style-type: none"> <li>▪ Conventional approach should be used for spectrum allocation.</li> <li>▪ The two spare SFN multiplexes should not be made available during DTT simulcast until ATV and TVB have successfully implemented their SFN multiplexes, since they may be needed for ATV and TVB to implement dual-frequency networks if SFN technology proved not workable in HK.</li> </ul>		<p>and its associated public expectation warrant a beauty contest method to assign spectrum.</p> <ul style="list-style-type: none"> <li>▪ Beauty contest allows public participation through the Government as arbiter of public interest.</li> <li>▪ SUF should be charged based on a fixed fee structure or a share of revenue.</li> </ul>	<p>more appropriate.</p>	<p>formulated.</p> <ul style="list-style-type: none"> <li>▪ DTT hilltop sites would accommodate mobile TV transmission network, subject to commercial agreements.</li> <li>▪ Cross-border coordination on the use of frequencies is necessary.</li> </ul>
23.	Vlaamse Radio Maatschappij (VRM) bvba <sup>6</sup>	<ul style="list-style-type: none"> <li>▪ Government should make as much spectrum available as possible for digital services of all kinds.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Prefer a conventional approach to spectrum allocation.</li> <li>▪ Doubt the future of DAB based on Eureka 147 standard.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Oppose auction on the grounds of high costs to operators leading to low quality broadcast content.</li> <li>▪ Propose a more content-oriented (i.e., beauty contest) approach.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Interference by the authorities should be minimal or even non-existing to bring about a diversified media landscape and high quality content.</li> <li>▪ Special limitations on access to some content by children should be obligatory.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Express interest in operating one or more digital radio or TV (fixed and mobile) channels in HK.</li> <li>▪ Favour DRM<sup>7</sup> over DAB and suggest examining possibilities of DRM in Hong Kong.</li> </ul>

<sup>6</sup> VRM is active in the radio broadcasting business in Belgium for more than 25 years, transmitting various programmes in FM.

<sup>7</sup> DRM stands for Digital Radio Mondial, is a system that implements digital radio in today's AM frequency bands. DRM is more suitable for large area coverage.

**Proposed Framework for Implementing Mobile TV**

**(a) Spectrum availability:**

The following multiplexes (i.e., a frequency channel for digital transmission) in the relevant bands of frequency spectrum should be released in early 2009 for introduction of mobile TV into Hong Kong:

- (i) Two multiplexes (217.872MHz – 219.408MHz as well as one of the 1.5Mhz multiplexes within 216.160MHz-217.696MHz and 219.584MHz-222.832MHz) in Band III; and
- (ii) One multiplex (678MHz – 686MHz, also known as UHF TV Channel No. 47) in UHF Band.

Subject to further public views in the second consultation in the first quarter of 2008, multiplexes in L Band (1466MHz – 1480MHz) and the relevant portion of S Band (2635MHz – 2660MHz) should be kept in reserve. The release of these portions of frequency spectrum will be subject to review on policy objectives, market situation and technology development.

**(b) Spectrum allocation:**

The spectrum to be released in (a) above should be allocated primarily for development of mobile TV services. At least 50% of transmission capacity should be used to provide mobile TV content, and the remaining capacity can be used to transmit ancillary services (e.g., digital audio broadcasting and datacasting services). To allow flexibility for the successful bidders, the mandatory percentage of transmission capacity dedicated for mobile TV content will be subject to review by the Office of the Telecommunications Authority (OFTA) in five years' time.

**(c) Spectrum assignment:**

The spectrum to be released primarily for mobile TV services in (a) above should be assigned through auction with pre-qualification process. The Spectrum Utilization Fee should be determined by auction. Bidders should propose obligations to roll out mobile TV services taking into

account their deployment plan of the relevant mobile TV transmission technology. Such milestones will be tied with performance bonds at an appropriate amount imposed on successful bidders.

**(d) Licensing arrangements:**

Under the Telecommunications Ordinance (Cap. 106), an operator of the network used to transmit mobile TV via the assigned spectrum is required to obtain a mobile carrier licence (or a unified carrier licence, proposed by the OFTA to replace both fixed and mobile carrier licence in future), while a provider of mobile TV services who rent transmission capacity from a carrier licensee is required to obtain a public non-exclusive telecommunications services (PNETS) licence.

Regarding the regulation of mobile TV programming, the following approaches could be considered:

- (i) the content of mobile TV, either broadcast-type or streaming-type, should be subject to regulation by general laws and not the Broadcasting Ordinance (BO) (Cap. 562)<sup>Note</sup> and self-regulatory codes of practice should be promulgated by the industry to protect public morals and children; or
- (ii) the provision of mobile TV content should be licensed and regulated as a new category of television programme service under the BO, and the licence should be issued by the Broadcasting Authority (BA) and the content should be subject to the codes of practice promulgated by the BA in consultation with the public and the industry.

Digital audio broadcasting services, whether being provided ancillary to mobile TV or standalone, are required to be provided under a sound broadcasting licence to be issued under Part IIIA of the Telecommunications Ordinance and regulated under Part IV of the Broadcasting Authority Ordinance and relevant radio codes of practice, as in the case of analogue broadcasting services.

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<sup>Note</sup> Except for services which are not primarily targeting Hong Kong, where non-domestic television programme service licences under the Broadcasting Ordinance (Cap. 562) are required.

## Mobile TV Development in Various Jurisdictions

### (a) Already Launched Commercially

Jurisdictions	Standard adopted	Spectrum	Operators	Services offered	Launch date	Remarks
China (Mainland)	T-DMB	Band III and L Band	Beijing Jolon Digital Media Broadcasting, Guangdong Mobile Television Media, Shanghai Oriental Pearl Dalian Tiantu Cable Television Network	TV, radio and data services	Nov-2006 (in Beijing.) May-2006 (in Guangzhou and Shanghai) Aug-2007 (in Dalian)	Beijing Jolon plans to invest USD 18 million and achieve subway coverage in the city for the 2008 Olympics.
Finland	DVB-H	UHF Band	SBS Finland and Digita (Mobiili-TV)	TV and radio broadcasts, games and interactive services	Dec-2006	Covered over 25% of people living in Finland in Dec-2006 and 40% by Dec-2007
Germany	T-DMB	L-Band	A consortium of operators	- 5 TV channels - 3 radio channels	Jun-2006 (World Cup) (in Munich)	-
Italy	DVB-H	UHF Band	3 Italia and Reti Radiotelevisive Digitali	9-20 TV channels	May-2006	Claim to be the world's first commercial mobile TV on DVB-H technologies  3 Italia has a total of 770 000 DVB-H customers as of Oct-2007.
	DVB-H	Information not available	Telecom Italia Mobile (TIM) and Mediaset	8 TV channels	Jun-2006	-
	DVB-H	Information not available	Sky Italia and Vodafone	9 TV channels	Dec-2006	-
Japan	S-DMB	S-band (2630 – 2655 MHz)	MBCO (Mobile Broadcasting Corporation) – a company established by Toshiba, SK Telecom, Sharp, Toyota etc)	- 8 video channels, - 40 audio channels, - Some 50 data titles	Oct-2004 (with full national coverage)	Service named as 'MobaHO!'
	ISDB-T	In-band of DTT broadcasting (one out of 13 segments)	NTT DoCoMo, KDDI and local TV broadcasters in Japan	Simulcast of local DTT	Commercial Launch in Apr-2006	Known as 'One-Seg service'

Jurisdictions	Standard adopted	Spectrum	Operators	Services offered	Launch date	Remarks
The Philippines	DVB-H	UHF Band	Smart Communications, Inc. and 360media Corp.	- 10 TV channels	Jul-2007	-
South Korea	T-DMB	- Band III - L-Band	Six service providers in South Korea, i.e. - KBS, - MBC, - SBS, - YTN DMB, - U1 Media, - Hangoon DMB	A total of - - 7 TV channels - 13 radio channels - 8 data channels by the six broadcasters	Dec-2005 (in Seoul and its metropolitan areas)  2007 (in other areas)	Promoted by Samsung and LG
	S-DMB	S-band (2630 – 2655 MHz)	TU-Media Corp. (subsidiary of SK Telecom)	- 11 video channels - 25 audio channels - 3 data channels	May-2005	-
UK	DAB-IP	L-Band (using existing DAB platform)	BT Movio partnered with Virgin Mobile (strategic partner with Microsoft)	- 5 TV channels - 30-50 DAB radio channels (free) - 7 days TV/Radio Guide (free) - Interactivity (red button)	Oct-2006	Service withdrawn in summer 2007.
USA	MediaFLO	UHF Band (at 700MHz)	Verizon Wireless and Qualcomm	- 9 TV channels	Mar-2007	Verizon is currently offering MediaFLO mobile broadcast TV service in 48 cities/areas within the US.  Known as 'VCAST TV'
Vietnam	DVB-H	UHF Band	Nokia, VTC (Vietnam Multimedia Corporation)	-9 TV channels - VOD service - 4 radio services - 1 free-to-air demo channel	Dec-2006	-

(b) Trial Run in Progress

Jurisdictions	Standard adopted	Spectrum	Operators	Services offered	Trial date	Expected Commercial Launch
Australia	DVB-H	UHF Band	Broadcast Australia, Thomson Grass Valley and Irdeto	5 TV channels	May-2007 to Aug-2007 (a new trial in Sydney)	-
China (Mainland)	CMMB	S-Band	China Mobile, China Unicom and CCTV jointly carry out the test.	Information not yet available	mid-2007 (tentative)	2008 (Satellite to be launched in May-2008)
France	DVB-H	UHF Band	TDF and TPS partnered with mobile operators Orange, SFR, Bouygues Telecom	- 14 TV channels - 13 radio services	Sep-2005 – Jun-2006 (in Paris)	Government suggested soft launch in August 2008 and a full rollout envisaged for 2010
			Canal+ partnered with Towercast (operator of broadcast infrastructure) and SFR (mobile operator)	- 13 TV channels - 4 radio stations		
	DVB-SH (Satellite DVB-H)	S-Band	Alcatel leads a project called <i>TVMSL</i> financed by French governmental agency <i>Agence de l'innovation industrielle</i>	A project to create a standard of hybrid terrestrial and satellite mobile TV based on DVB-H technologies, targeting delivering mobile TV service to whole Europe.	Satellite to be launched in 2008	-
Germany	DVB-H	UHF Band	E-Plus, O2, T-Mobile and Vodafone D2	- 14 TV programmes - 6 radio programmes - ESG - SPP (Service Purchase Protection)	Jun-2006 (in Berlin, Hamburg, Hanover and Munich)	Regional media authorities committed to working towards a rapid market introduction of mobile TV.
	DVB-H	UHF Band	T-Systems Media & Broadcast GmbH	Information not available	To start in Hanover in spring 2008 and gradually expand to other Germany cities in 2009	Frequencies for providing nationwide mobile broadcast services were allocated in Oct-2007

Jurisdictions	Standard adopted	Spectrum	Operators	Services offered	Trial date	Expected Commercial Launch
Hong Kong	DVB-H	UHF Band	PCCW and TVB	10-20 linear TV channels / video programming	Sep-2006 to Mar-2007	-
	T-DMB	Band III	RTHK	1 TV and 4 radio channels	Apr to May 2007	
	MediaFLO	UHF Band	PCCW and TVB	10-20 linear TV channels / video programming	May-2007 to Jan-2008	
Singapore	DVB-H	UHF Band	Innoxius Technologies (research & system integration company with focus on wireless applications)	News and others	Jun-2006	Media Development Authority launched a public consultation on mobile broadcasting service on 21 November 2007.
Sweden	MBMS	Existing UMTS WCDMA (3G)/HSDPA (3.5G) cellular network	Ericsson	Information not available	Apr-2006	Second half of 2007
UK	DVB-H	UHF Band	O2 / Arqiva	16 TV channels	Oct-2005 – Mar-2006 (in Oxford)	UHF spectrum required by DVB-H may only be available after analogue switch-off beyond 2012
	MediaFLO	UHF Band (at 700MHz)	BSkyB	11 TV channels	Oct-2006 – Dec-2006 (in Cambridge)	-
USA	DVB-H	L-Band	Modeo and RRD	Package of live 7 video and 8 audio channels and podcast content	2005 (in Pittsburgh) 2006 (in New York City) (Service withdrawn in July 2007)	-
		UHF Band	Hiwire (a division of Aloha Partners) and T-Mobile	Information not yet available	Dec-2006 (in Las Vegas)	-