INFORMATION NOTE

Mobile Television

1. Introduction

1.1 This information note serves to provide reference on mobile television for the deliberation of the Panel on Information Technology and Broadcasting on a consultation paper regarding mobile television published by the Government on 26 January 2007.

2. Definition of mobile television

2.1 Mobile television is a television-like subscribed service over mobile telecommunications networks. In essence, television services can be accessed by viewers "on the move", offering extended hours of television watching. Japan, South Korea and Italy are the forerunners of commercial mobile television services.

2.2 Mobile television services can be delivered over a variety of radio networks[1], each utilizing different delivery systems, including unicast, multicast and broadcast.

The unicast system

2.3 The unicast system sends small video files or streams television programming over a cellular network[2] to a single handset subscriber at a time. The third-generation (3G) technology is an example of the unicast system. Mobile telecommunications operators provide video streaming services to subscribers over their 3G networks. However, 3G is a point-to-point transmission service which cannot support a large number of viewers at a reasonable cost.

[1] A radio network is a network system distributing programming to multiple stations simultaneously, or slightly delayed, for the purpose of extending total coverage beyond the limits of a single broadcast signal.

[2] A cellular network is a radio network made up of a number of radio cells, each served by a fixed transmitter. Cellular networks offer a number of advantages over alternative solutions. These include: (a) increased capacity; (b) reduced power usage; and (c) better coverage. One example of cellular networks is the radio system in taxis.

The multicast system

2.4 The multicast system also utilizes the cellular networks but it provides a one-to-many service in which the same content is being sent to multiple subscribers simultaneously. This system is widely deployed in distance learning, televised company meetings, distribution of stock data and provision of television programming to subscribers over the Internet Protocol (IP)[3] infrastructure. Although the multicast system is able to send content to multiple subscribers, it is costly in terms of bandwidth consumption.

The broadcast system

2.5 The broadcast system employs a separate radio network to deliver television programming. Hence, the same content is received by all subscribers with zero impact to the capacity of the operator's network. As the broadcast system reaches wider audience, it is believed that mobile telephone services will be developed along this system.

3. Impact of mobile television

3.1 According to some market studies[4], the introduction and adoption of mobile television gives way to a more personal and private television experience than that of traditional broadcast television, with implications for viewers, broadcasters, advertisers, mobile phone operators and regulators. Viewers are able to watch television on all occasions, and even create and upload their own television programmes. Broadcasters and advertisers are able to tailor their programming and advertising to the viewers' needs. A handheld device combining television and mobile phone may create a mass demand for it, leading to more business opportunities for mobile phone operators. Regulators need to assign radio frequencies among various competing uses and review relevant regulatory arrangements for the launch of mobile television services.

[3] IP is a data-oriented protocol used for communicating data across a packet-switched network.

[4] See Digital Terrestrial Television Action Group (2005) and Orgad (2006).

4. Standards for mobile televisions

4.1 There are various standards, open and proprietary, for mobile televisions, and currently, there is a lack of global agreement on the standard to be used for mobile television broadcast. Tables 1 and 2 show the places where mobile television services (using open standards) have been commercially launched or are on trial respectively. The open standards include:

(a) Digital Multimedia Broadcast (DMB);

(b) Integrated Services Digital Broadcast-Terrestrial (ISDB-T); and

(c) Digital Video Broadcast-Handheld (DVB-H).

Table 1 – Selected places where mobile television services (using open standards) have been commercially launched

DMB	ISDB-T	DVB-H
(a) China (Beijing in September 2006); (b) Japan (Satellite-DMB (S-DMB) users in October 2004); and (c) Korea (S-DMB users in May 2005 and Terrestrial-DMB (T-DMB) users in Seoul and its metropolitan areas in December 2005).	Japan (April 2006).	(a) Albania (January 2007); (b) Finland (January 2007); (c) Italy (June 2006); (d) the United States (US) (New York city in January 2007); and (e) Vietnam (December 2006). Places expected to launch mobile television services in 2007: (a) France; (b) Germany; (c) South Africa; (d) the Russian Federation (Sverdlovsk Oblast); (e) the US (Las Vegas); and (f) Ukraine.

Sources: See (a) Communications and Technology Branch of the Commerce, Industry and Technology Bureau (2007); (b) WorldDMB (2006); (c) *Digital Video Broadcasting Project* (2007) and (d) *Texas Instruments* (2006b).

Table 2 – Selected places where the trial run of mobile television services (using open standards) has been completed or is still in progress

DMB	DVB-H
Trial run in progress: (a) China (Guangzhou and Shanghai); (b) Germany (Berlin, Cologne, Munich, Stuttgart, Frankfurt and Nuremberg) and some other regions; and (c) the United Kingdom (UK).	Trial run completed: (a) Australia (Sydney); (b) France (Paris); (c) Indonesia (Jakarta); (d) Poland (Warsaw); (e) Portugal (Lisbon); (f) Spain (Barcelona, Madrid, Zaragoza and Gijón); (g) Switzerland (Bern); (h) the Czech Republic (Brno); (i) the Netherlands (Hague); (j) the Russian Federation (Moscow); and (k) the UK (Oxford). Trial run in progress: (a) Austria (Salzburg); (b) Belgium (Ghent, Brussels, Mechelen); (c) Canada (Toronto); (d) China (Hong Kong); (e) Germany (Berlin, Hamburg, Hanover and Munich); (f) India (Dehli); (g) Ireland (Dublin); (h) Malaysia (Kuala Lumpar); (i) Qatar (Doha); (j) Singapore; (k) South Africa (Johannesburg, Soweto, Pretoria and Cape Town); (l) Spain (Seville); (m) Sweden (Gothenburg and Stockholm); (n) Taiwan; (o) the Russian Federation (Kaliningrad); (p) the UK (Cambridge); (q) the US (Pittsburgh); and (r) Ukraine (Kiev).

Sources: See (a) Communications and Technology Branch of the Commerce, Industry and Technology Bureau (2007); (b) WorldDMB (2006); (c) *Digital Video Broadcasting Project* (2007) and (d) *Texas Instruments* (2006b).

Digital multimedia broadcast

4.2 DMB delivers mobile television services using the Eureka-147 Digital Audio Broadcast (DAB) standard with improved adjustments. While T-DMB uses the terrestrial network in Band III and/or Band L, S-DMB uses the satellite network in Band L. At present, mobile television services using DMB are commercially available in Korea[5] and on trial in China, Germany and the UK.

4.3 Both T-DMB and S-DMB have limitations. T-DMB has inferior coverage and is more suitable for static usage than mobile or handheld reception despite its service is free. On the other hand, S-DMB records poorer performance in the indoor or underground environment.

Integrated services digital broadcast-terrestrial

4.4 ISDB-T is developed by Japan as its digital terrestrial television standard, providing some modes suitable for broadcasting for handheld reception. As part of its digital television strategy, the Japanese government has allocated 1/13th of the digital television transmission network for mobile broadcast to portable and handheld devices. Concerns for ISDB-T are low battery power, high receiver cost and low bandwidth.

Digital video broadcast-handheld

4.5 DVB-H is an open standard specified by the Digital Video Broadcasting (DVB) Project[6] and was created specifically for broadcasting television programming to handheld devices. Building upon the portable and mobile capabilities of Digital Video Broadcasting-Terrestrial (DVB-T), the standard adopted for digital television services in Europe, DVB-H overcomes two key limitations of the DVB-T standard. They are:

(a) lowering battery power consumption; and

(b) improving robustness in the very difficult reception environments of indoor and outdoor portable use in devices with built-in antennas.

[5] The World Cup helped mobile television sets become ubiquitous in South Korea. The number of free mobile broadcast users amounted to 1 million as at 15 June 2006.

[6] The DVB Project is a project undertaken by an industry-led consortium of over 260 broadcasters, manufacturers, network operators, software developers, regulatory bodies and other parties across over 35 places committed to designing global standards for the global delivery of digital television and data services.

4.6 DVB-H offers a downstream channel at high data rates. It can be used independently or as an enhancement of mobile telecommunications networks accessible to handheld devices. The time slicing technology[7] is employed for power savings in small handheld devices. Mobile television services using DVB-H have been commercially launched in Europe, the US and Vietnam, while trials have been conducted in various parts of the world.

4.7 Among the open standards in the mobile television market, DVB-H has the highest market acceptance and support. Stakeholders are developing services, devices, hardware and software for the standard. Listed below are reasons for its popularity:

(a) open standard - DVB-H is an open industry standard developed by the DVB Project. An open standard offers advantages over proprietary technologies and networks controlled by a single company;

(b) rapid and cost-effective deployment - DVB-H uses new equipment on existing cellular towers for the Ultra High Frequency (UHF) band. It uses unencumbered and available spectrum without interfering with bandwidths utilized by existing analogue television stations or other television or wireless services;

(c) short channel changing time - DVB-H allows a channel changing time of 1.5 seconds with Multi-Protocol Encapsulation Forward Error Correction (MPE-FEC). MPE-FEC improves the reliability of mobile transmission as packets of data are frequently lost or corrupted during mobile transmission;

(d) ample channels and programming choices - DVB-H provides nine to 18 channels in 6MHz of spectrum, depending on the resolution of the programming. In addition to mobile television programming, DVB-H supports digital radio and audio services and is complementary to clipping services that can be downloaded via the cellular network; and

(e) acceptable quality of pictures - DVB-H supports 15-30 frames per second transmission, enabling consumers to enjoy living room television watching experience in a handheld device.

[7] Time-slicing is a kind of technology where bursts of data are received periodically, allowing the receiver to power off when it is inactive, leading to significant power savings. DVB-H uses time slicing to enhance battery life. It allows a viewing time of at least 3.5 hours.

4.8 Although DVB-H has its competitive edges over other standards, it has its spectrum limitations. Since DVB-H is based on the DVB-T standard, any spectrum assigned to a DVB-H network will reduce the spectrum available for DVB-T networks. As such, regulators are required to decide which operators are given access to the spectrum. Moreover, DVB-H has not been taken into account by the International Telecommunications Union (ITU)[8] in the development of a new frequency plan in 2006, as it is not yet a worldwide standard.

Other technologies

4.9 There are other technologies for mobile television that do not fall within the open standards category. One example is MediaFLO, a proprietary system developed by a private company to deliver broadcast services to handheld devices in North America.

4.10 In China, the State Administration of Radio Film and Television (SARFT) announced on 25 October 2006 that effective from 1 November 2006, China Mobile Multimedia Broadcasting (CMMB) would be the approved industrial standard for mobile multimedia broadcasting standard. One feature of CMMB is the inclusion of the Satellite Terrestrial Interactive Multiservice Infrastructure (STiMi) standard developed by the SARFT Academy of Broadcasting Science. While the development of the STiMi standard began in early 2003, SARFT intends to start trials in 2007, with commercial services expected to begin in 2008, in time for the Olympic Games in Beijing.

5. Situation in Hong Kong

5.1 On 26 January 2007, the Government issued a consultation paper entitled *Consultation on Digital Broadcasting: Mobile Television and Related Issues*. The consultation aims to seek the views of the community in the following four areas:

(a) spectrum availability – whether the frequency spectrum originally reserved for digital terrestrial television (DTT) should be made available for mobile television services and/or DAB;

(b) spectrum allocation – whether the frequencies should be allocated according to the demand for mobile television, services using DTT and/or DAB;

(c) spectrum assignment – whether the available frequencies should be assigned by auction and whether a licence fee should be imposed; and

(d) licensing arrangements – whether the mobile television services should be licensed and regulated under the Broadcasting Ordinance.

[8] ITU is a specialized agency of the United Nations responsible for developing strategies for the avoidance of radio interference and the equitable and efficient use of radio spectrum and satellite orbital resources.

5.2 In fact, some local broadcasters and telecommunications operators are conducting technical tests on DVB-H. As technical standards are key concerns in digital broadcasting, including mobile television, the Government, the broadcasting industry and the telecommunications industry need to decide the standard to be adopted. In addition to the issue on technical standards, according to the Digital Terrestrial Television Action Group (DigiTAG)[9], the following areas need to be addressed in the event of providing mobile television services:

(a) types of services, information or entertainment provided;

(b) management of customer relationship;

(c) marketing of services;

(d) billing mechanism, if any;

(e) other sources of income including licence fees and advertising revenue;

(f) access to the necessary resources such as spectrum and networks;

(g) provision and delivery of programming;

(h) investment capabilities of the parties involved; and

(i) possible synergies within existing business activities.

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5 February 2007
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[9] DigiTAG has over 50 members from broadcasting, network operators, regulatory agencies and manufacturing organizations throughout Europe and beyond. It aims to encourage and facilitate the implementation and introduction of digital terrestrial television services using the standards developed by the DVB Project.

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