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IPTV AND MOBILE TV: NEW REGULATORY CHALLENGES FOR REGULATORS

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1 INTRODUCTION

Today, telecommunications providers face a new competitive landscape. Significant competition from alternative fixed operators, VoIP providers, and mobile operators have decreased their voice revenues and lowered voice average revenue per user (ARPU). Telecommunications providers are looking to recapture some of their lost revenues through bundled services of voice, video and data (multiple play offers). While telecommunications providers have been able to offer voice and data, they have been constrained in their ability to offer video services. This puts them at a disadvantage with cable providers that offer video services and have upgraded their networks to offer broadband Internet access and voice telephony services. However, upgraded Internet Protocol (IP) platforms now offer telecommunication providers the ability to directly offer video services. These services, referred to as IPTV services, allow telecommunication providers the ability to offer a range of video services (including live television channels, video-on-demand (VOD), and various interactive services) through their IP platforms.

For countries struggling with the appropriate means and incentives to foster broadband development, the introduction of video services by fixed telecommunications providers may prove to be a key facilitator for such deployment. Fixed telecommunications providers are upgrading their facilities to obtain more bandwidth capacity in order to offer video services and acquire a new revenue stream. Therefore, these new video offerings are directly affecting the roll-out of new broadband services. As a result, the provision of IPTV services has the potential to not only increase competition in the video marketplace, but also to advance the broadband access goals of many countries.

Mobile television (mobile TV) is also being introduced in a number of countries. Unlike 3G mobile operators that offer video services, mobile TV allows a user to view live television channels. For mobile providers looking for ways to maintain and increase growth, mobile TV is a new avenue to increase their ARPU through content and services.

For both types of services, obtaining content that will attract users to their service is a key element. The market to obtain content, however, is highly competitive. Telecommunications and mobile providers must compete for content with terrestrial broadcasters, cable and satellite operators, and Internet service providers (ISPs). The ability to acquire content rights is likely to impact the success of IPTV and mobile TV business cases, but other factors are important as well, including competition from competing platforms, customer interest and take-up, and regulatory and legal barriers to entry.

The introduction of IPTV and mobile TV will provide substantial benefits to consumers. IP platforms and mobile devices, satellite and cable television, and the transition from analogue television to digital terrestrial television (DTT) will allow consumers access to a broad range of platforms to receive multi-media content. Moreover, they can watch a television programme or movie live or at a time of their own choosing; they can use devices to edit commercials; and they can watch such programming over their television, computer, or their mobile phone.

For regulators, there are a variety of factors to consider in relation to these new services. In the case of IPTV, such factors are potentially broader due to the fact that incumbent telecommunications providers are subject to legacy regulation. Because of this, the regulator must determine the impact of such regulation on providers' ability to offer services and on providers' incentives to incur the significant investments and high risks associated with deploying/upgrading infrastructure to allow for the provision of IPTV services. As such, in the case of IPTV, regulators initially should determine if there are any legal or regulatory restrictions to incumbent telephone providers' ability to provide video services within their markets. If incumbents are not restricted from entering the video market, regulators should consider if the application of existing regulation, specifically issues such as access obligations to dominant providers' network, might skew the incentives for investment in deployment/upgrading of networks to support IPTV services.

Having performed this initial review, regulators might look at how, if at all, IPTV and mobile TV fall within the existing regulatory framework for broadcasting services. As such, they must determine if these services fall within the definition of television broadcasting included in a country's laws or regulations and if so, what type of regulation would be imposed on such providers. Finally, regulators must determine if extending existing broadcasting regulation to these services is the best mechanism to foster their deployment.

This chapter seeks to provide a roadmap of the issues related to IPTV and mobile TV.[1] It discusses the elements of these services, including how such services are defined, their technical aspects, and the particular services that can be provided to consumers. In addition, it addresses the legal frameworks for IPTV and mobile TV. This includes discussion of the regulatory classification of such services, the regulation of content and its potential application on IPTV and mobile TV, the legal issues related to acquiring content, and the licensing issues related to these new services. In addition, the chapter discusses current institutional regulatory structures in the context of an environment that is converging and allows content and telecommunications services to share the same delivery platform. Finally, the chapter discusses some of the ancillary issues related to the deployment of such services, such as standards, quality of service, ownership issues, spectrum, and unbundling.

2 WHAT IS IPTV?

2.1 Definition

The term IPTV can cause some confusion. In narrow terms, IPTV is defined as the provision of video services (e.g., live television channels and near video-on-demand (VOD) or pay-per-view) through an IP platform. However, some define IPTV services to encompass all the possible functionalities associated with an IP platform. For example, some define IPTV services as multimedia services, such as television services, video, audio, text, graphics, and data, which are provided by an operator over a managed IP-based network for delivery to the consumer.[2] This encompasses not only linear video services but other ancillary interactive video and data services, such as Video On Demand (VOD), web browsing, advanced email and messaging services. The interactive services associated with IPTV allow the viewer to determine what and when to watch, and also allow the user to teleshop or order movie tickets using the IPTV service. IPTV providers now commonly include in their commercial packages a personal video recorder (PVR) through a hard disk in the set-top-box (STB) or on the network, allowing 'time-shifted' viewing of TV broadcasts or 'catch-up' viewing if the viewer pauses a live broadcast programme.[3] With the IP-based managed network, the service provider is able to offer a high level of Quality of Service (QoS) and Quality of Experience (QoE), security, interactivity and reliability.

IPTV providers are making content agreements and developing innovative applications in order to compete with cable and satellite television. This includes striking deals for special viewing packages such as sports. High definition (HD) has also been launched by a number of IPTV providers. In Hong Kong, PCCW recently introduced stock trading on its "now" IPTV service. In France, Iliad's "TV Perso Freebox" lets subscribers post their own videos for view by others.

IPTV can be confused with Internet video or Internet TV. However, the services are quite different. Internet video and Internet TV are both offered over the public Internet. Internet video is an unmanaged service that offers the streaming of video through the public Internet. Internet video companies include user-generated video websites like YouTube or Metacafe where users can upload and view others' videos. Today, these services tend to lack a QoS standard and are without any real control over production quality.[4]

Box 1: Services Being Offered by IPTV Providers

- ✓ Television channels
- ✓ Radio stations
- ✓ Pay-per-View live events (e.g., football)
- ✓ Video on Demand (access to movies and other stored content)
- ✓ Personal video recorder (allows recording, storage, and pause ("Live-pause"), fast-forward, rewind and "catch-up TV")
- ✓ Automatic serial recording (e.g. daily news)
- ✓ Recording can be programmed from anywhere via Internet or mobile phone
- ✓ TV Guide (EPG = Electronic Programming Guide)
- ✓ Image within image: keep watching main program, but browse through other channels shown on small window
- ✓ Parent Control: block individual channels or shows
- ✓ Set limit of monthly expenses (for video downloads)
- ✓ Instant box office on TV through partnership (i.e., customers can preview theatrical trailers then pick the seats and purchase tickets from movie theatre by clicking on the buttons on their remote control)
- ✓ Stock trading
- ✓ High Definition TV
- ✓ Personal videos (subscribers can post their videos on the network for view by others)

Source: IPTV – Reinhard Scholl, Speech, ITU Telecommunication Standardization Bureau, *Market, Services, Regulation, Standards*, Presentation at Competitive Platforms for the Delivery of Digital Content, (June 21-22, 2007) and Telecommunications Management Group, Inc. research.

Internet TV companies, like Joost, Babelgum, Zattoo, and Akimbo, tend to operate on peer-to-peer rather than managed networks and typically offer free, ad-based service. However, they offer similar or identical services to IPTV in several key areas. First, like IPTV, Internet TV provides professionally-produced and copyright-protected video. They also tend to use MPEG 4, the same encoding technology used by IPTV providers, for high video quality and offer near-TV quality picture resolution. While IPTV allows the subscribers to more easily switch from television to computer, users are increasingly able to view video on their television sets with Internet TV. For Internet TV providers like Joost that offer VOD, users can rewind and fast forward videos similarly to how IPTV users rewind and fast forward with PVR. However, Internet TV providers that stream live television, such as Zattoo, do not yet have this capability. Although limited in their service areas, both the U.S.-based Joost and European-based Zattoo have negotiated Digital Rights Management (DRM). DRM allows operators to prevent end users from copying or converting copyrighted materials and is considered a necessary component to offering IPTV.

Table 1: Comparison of IPTV, Internet TV, and Internet Video

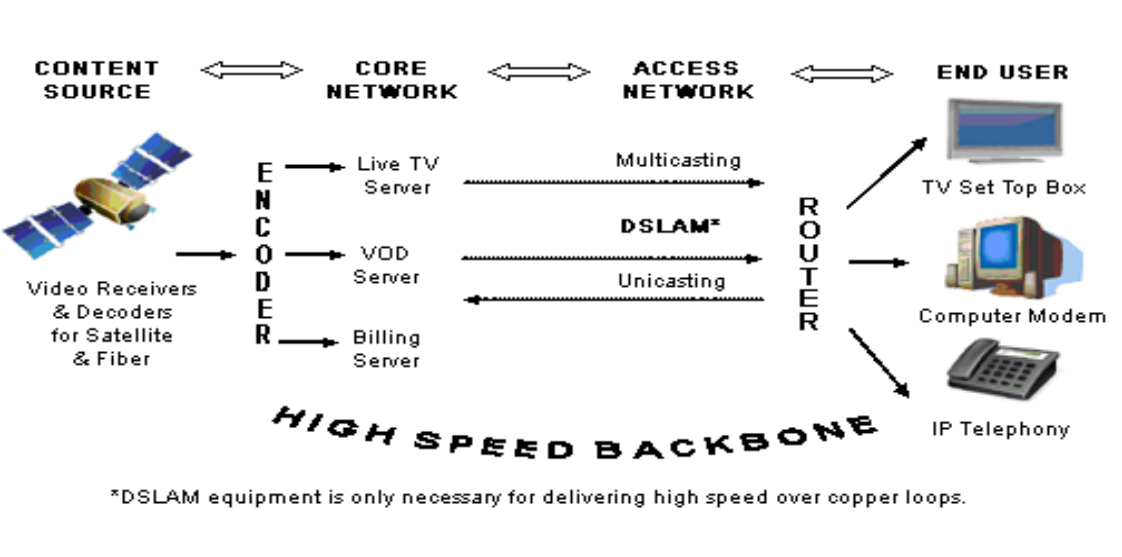
	IPTV	Internet TV	Internet Video
Examples of Operators	U-verse (AT&T) Opzioni TV (Fastweb) Orange TV (France Telecom) Imagenio (Telefonica) Now TV (PCCW)	Joost Zattoo Babelgum Akimbo	Youtube Metacafe
Users	Subscribers only; closed network	Free, ad-based service	Free, ad-based service
Services (Live TV, VOD, Interactive services	Live TV VOD Interactive services	VOD and/or live TV and Internet in multi-task environment	Video clips only
Network	IP-based platform; Managed network	Public Internet; Peer-to-Peer	Public Internet
Video Production	Professional video only	Professional video only	Amateur/user-generated video only
Video Quality	Managed QoS MPEG 2 to MPEG 4, MSVCI	Managed QoS High – MPEG 4	Unmanaged QoS Low, but improving
Receiver device	STB with TV or PC	PC	PC
Resolution	Full TV display	Near full TV display	QCIF/CIF
Copyright	Content is protected through DRM	Content is protected through DRM	No copyright protections
Status of roll-out	Deployed in limited geographic areas in various countries	Trial stages only	Fully accessible

Source: Based on IPTV – Market Regulatory Trends and Policy Option in Europe, Background Material, ITU-T IPTV Global Technical Workshop: Driving The Future Of IPTV, Document: IPTV/01, 1 November 2006, Seoul, 12-13 October 2006, at p. 7 and Telecommunications Management Group, Inc. research

2.2 Technical aspects

The basic elements of an IPTV operation consist of four components: the content source, the core network, the access network, and the end user, as shown in Figure 1 below.[5] The content source is the video provider that owns or is licenced to sell live television programming, VOD, or other downloaded services. Live television is typically received via satellite or through fibre while VOD is stored by the network operator. Content passes through an encoder, or headend, which prepares the content for transmission on the network. The core network encodes the video streams using MPEG-2, although the use of MPEG-4 (H.264 AVC[6], Windows Media VC-1) is on the rise. Once encoded, the content is encapsulated into IP packets, and is then ready for delivery to subscribers.

Figure 1: Operational Diagram of IPTV



Source: Telecommunications Management Group, Inc.

Live television is delivered via multicast, which allows many end users to receive content from one packet through efficient use of the IP network. Channels are essentially IP multicast group addresses that subscribers request to join. Unlike with a cable system or over-the-air television that "tunes" to a channel, the IPTV STB only acts as an IP receiver. The STB changes channels by using the protocol to join a new multicast group. When the local switch office obtains the channel change request, it confirms that the subscriber is authorized to view the content and adds the user to the channel distribution list. Therefore, only signals being watched are sent from the local office, through the Digital Subscriber Line Access Multiplexer (DSLAM) if necessary, and finally to the user.

Rather than a "one-to-many" transmission like multicast, VOD is unicast, or "one-to-one." When an end user requests a VOD, the servers pull pre-compressed video streams and transmit them as IP packets. Typically, the local switch office uses a VOD server to stream from the server to a particular subscriber's location. The stream is generally controlled by Real Time Streaming Protocol (RTSP), which allows the user to play, pause, and stop the programme.

If the video stream is to be delivered over copper loop to the subscriber, the IPTV provider must use DSLAM equipment to deliver IP packets to the subscriber after the content is encoded. DSLAMS are located either along the core network or access network.

At the customer premises, the STB allows subscribers to select the content they want to watch and provides user control over functionality such as rewind, fast forward, and pause over non-live programmes. The two-way functionality of IPTV services not only allows subscribers to choose their services with the press of a button, but also offers interactive capabilities, which allow a user to easily manage their multimedia sessions and personalize their preferences.

2.3 Who provides IPTV services?

The main providers of IPTV services tend to be telecommunications service providers; however, cable operator and satellite operators are also starting to deploy this service. There are two types of telecommunication providers offering IPTV: incumbent operators and newcomers. The former includes operators such as France Telecom, PCCW in Hong Kong, Telefónica in Spain and AT&T

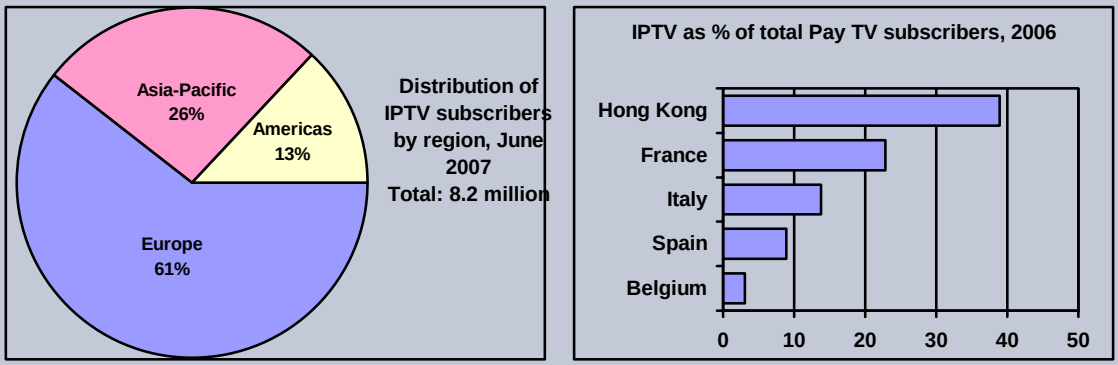
and Verizon in the United States. Incumbents are offering the service over their copper ADSL network or increasingly over fibre access networks. Newcomers include Iliad in France, Fastweb in Italy and Hanaro in Korea. These newcomers have often been successful by offering IPTV as part of a basic ADSL subscription. IPTV service typically offers from 40 up to 300 TV channels, as well as VOD, High Definition (HD), and PVRs. Coverage and deployment vary widely. For instance, AT&T currently only offers their "U-verse" service in select cities in a dozen U.S. states. However some deployments are having an impact. In Hong Kong, PCCW's "now" IPTV service had 560,000 subscribers in June 2007 and accounted for almost 40 percent of all subscription television subscribers. IPTV has also been successful in Italy and France where conventional subscription television penetration is not as developed as in other Western European nations.

Equipment manufacturers are increasingly introducing an element of IP into their STBs.[7] It is estimated that by 2010, of the 30 million IPTV STBs deployed in the world, around half will be hybrid (i.e., IPTV combined with some form of digital cable, terrestrial, or satellite front end). In addition, some established subscription TV operators are combining IPTV technology and services with their existing package of channels to offer enhanced functionality (such as on-demand content).[8] For example, Premiere in Germany is planning to offer a combined satellite and IPTV service in partnership with Deutsche Telekom (DT), allowing access to DT's IPTV offering and to its own satellite subscription service. In Japan, subscription television satellite operator Sky PerfecTV has rolled out an IPTV offering. BT of the UK has launched a combined IPTV/DTT service (BT Vision) that provides traditional broadcast-based channels over DTT alongside additional content over an IP connection.

2.4 Market potential

According to the DSL Forum, there were some 8.2 million IPTV subscribers worldwide in June 2007.[9] This is an increase of 127 percent from a year earlier. Europe leads in deployment, accounting for more than half of the world's IPTV subscribers (see Figure 2). Indeed four of the top five countries by IPTV penetration as a percent of total pay TV subscribers are European (see Figure 2). IPTV has been most successful in Hong Kong where it accounts for around two out of five pay television subscriptions. One study forecasts 14.3 million IPTV subscribers and USD 3.6 billion in revenues in 2007.[10]

Figure 2: Distribution of IPTV subscribers by region and leading IPTV countries by penetration, June 2007



Source: Adapted from DSL Forum and regulator and operator reports.

There are several forecasts for IPTV evolution with the number of subscribers ranging from 41 to 73 million by 2011.[11] However, given that IPTV is at a stage of initial market development these figures should be treated with caution. Some jurisdictions such as France and Hong Kong have been extremely successful with IPTV and if these experiences can be replicated elsewhere, then the figures could be much higher. Also, most major deployments have thus far been limited to developed economies. The potential for IPTV in developing nations could be significant in markets lacking traditional subscription television outlets such as cable or satellite television. However, this needs to be balanced against the high investment costs of installing broadband infrastructure.

IPTV presents an opportunity for traditional telecommunications providers to offer triple play services. In addition, unlike new entrants, most major operators launching IPTV operations have the financial resources available to upgrade their networks, as well as a database of consumers from which to leverage. However, there are bottlenecks that impact IPTV strategy. First, coverage is far from ubiquitous. In order to deliver IPTV, high-speed broadband is required. While many operators have launched broadband, in some markets it is not available nationwide or speeds are too slow to support IPTV (IPTV requires a downstream broadband connection of at least four megabits per second (Mbps)). A second issue is that some telecommunications operators already provide television service through cable and satellite ownership or partnership agreements.

3 WHAT IS MOBILE TV?

3.1 Definition

Mobile television is the wireless transmission and subsequent reception of television content – video and voice – to platforms that are either moving or capable of moving. Mobile TV allows viewers to enjoy personalized, interactive television with content specifically adapted to the mobile medium. These features of mobility and personalized consumption distinguish mobile TV from traditional television services. The services and viewing experience of mobile TV over mobile platforms differ in a variety of ways from traditional television viewing, most notably in the size of the viewing screen.

The technologies used to provide mobile TV services are digital-based and much of the terminology used in mobile TV descriptions is closely tied to corresponding Internet phraseology. For example, the terms unicast and multicast in the context of mobile TV are used to describe the transmission of television content to a single user (subscriber) from a single source at any one time (unicast) and the transmission of the same television content from a single source to multiple users simultaneously (multicast). These definitions correspond quite well with those given for similar Internet-based applications.[12] Unicasting and multicasting are distinct from broadcasting in that broadcast signals can be received by every user on the network simultaneously.

3.2 Technical Aspects

There are currently two main ways of delivering mobile TV. The first is via a two-way cellular network and the second is through a one-way dedicated broadcast network. Each approach has its own advantages and disadvantages. Delivery over an existing cellular network has the advantage of using an established infrastructure that would inherently reduce deployment costs while at the same time providing market access to the current cellular subscribers which could, theoretically at least, lead to enhanced subscribers for mobile TV services. The main disadvantage of using current second and third generation (3G) cellular networks for the delivery of mobile TV is that mobile TV competes with voice and data services for bandwidth, which can decrease the overall quality of the mobile operator's services. The high data rates that mobile TV may demand could severely tax an already capacity-limited cellular system. In addition, it cannot be taken for granted that the mobile handset used for cellular services would be useful for most mobile TV applications without major

redesign. Issues such as screen size, received signal strength, battery power, and processing capability may well drive the mobile TV market to design hand-held receivers that provide a higher quality of voice and video than is available on most current cellular handsets.

Many advanced second-generation mobile service operators and most 3G mobile service providers are providing VOD or streaming video. These services are mainly unicast with limited transmission capacity and are built upon the underlying technologies used in the mobile cellular system itself – GSM, WCDMA, CDMA2000.[13] An example of a technology designed to work on a 3G network is Multimedia Broadcast Multicast Service (MBMS), a multicast distribution system that can operate in a unicast or multicast mode.[14] MBMS has been designed by the 3rd Generation Partnership Project (3GPP) to provide mobile TV services over existing GSM and WCDMA cellular networks. It operates in the 5 MHz WCDMA bandwidth and supports six parallel real-time broadcast streaming services of 128 kbit/s each per 5 MHz radio channel.

Table 2: Video Services over Mobile Networks

	Live Mobile TV Over 3G Network	Live Mobile TV Over Dedicated Network
Examples of Operators	Orange Mobile TV AT&T Wireless (using MobiTV)	V-Cast Mobile TV (Verizon) 3 Italia
Users	Subscribers only; closed network	
Services (Live TV, VOD, Interactive services	Live television VOD, instant messaging	
Network	3rd generation mobile networks	One way dedicated broadcast network
Technology Platform	MBMS	MediaFLO DVB-H/SH DMB
Video Production	Professional video	
Video Quality	Managed QoS MPEG-4	
Receiver device	Requires a standard 3G cellular phone	Requires a new dual-mode handset capable of receiving the broadcast signal and the cellular signal for phone calls and mobile Internet access
Status of roll-out	Relatively wide availability—service is available to any 3G subscriber on a network offering mobile TV	Limited availability in certain countries; trial stages elsewhere
Relative Limitations	3G network may not be able to support mobile TV traffic as the number of 3G voice and data users grow	Cost of building a dedicated network

Source: TMG, Inc. research

Dedicated mobile TV delivery systems, however, can be and are designed to optimize the provision of mobile TV. These delivery systems can be either totally terrestrially based, completely satellite based, or a combination of both. One of the major advantages of a dedicated mobile TV delivery system lies in the relative ease that mobile TV content can be provided to numerous users simultaneously. On the other hand, the disadvantages include the large capital investments in infrastructure that are required and the limited content options that are currently available, although that should abate significantly as the mobile TV market grows.

3.3 Mobile TV Standards for Dedicated Systems

There have been significant advances in the development of standards used to support mobile TV transmissions and mobile multimedia by dedicated delivery systems. These include standards for digital video broadcasting-handheld (DVB-H), digital multimedia broadcasting (DMB), Integrated Services Digital Broadcasting-Terrestrial (ISDB-T), and MediaFLO (see Box 2 below). These standards employ advanced modulation techniques such as orthogonal frequency division multiplexing (OFDM) and are interoperable with mobile telecommunications networks.[15]

DVB-H is the mobile TV standard that has been identified for operation in most of Europe due to its compatibility with GSM and WCDMA mobile standards. T-DMB is being used in Korea, Japan, and Indonesia, and a satellite version of the technology (S-DMB) is operating in Korea. ISDB-T was developed in Japan to provide mobile TV services. MediaFLO technology is being extensively deployed in the United States for mobile TV applications.

In addition to the standards referred to above that form the basis for Recommendation ITU-R BT.1833, there are other mobile TV transmission technologies in various stages of standardization or deployment in various countries around the world. These include DAB-IP mobile TV technology, Advanced-VSB technology, and the China Mobile Multimedia Broadcasting (CMMB) system.

Box 2: Mobile TV Standards

Standards that form the basis for Recommendation ITU-R BT.1833:

- ✓ DVB-H: is based on the DVB-T digital broadcast standard and is optimized for handheld terminals. DVB-H incorporates time-slicing to reduce power consumption and to allow time for a smooth handover from one cell to another. It is designed to operate in bandwidths of 5 MHz, 6 MHz, 7 MHz, and 8 MHz which correspond to the bandwidths used by broadcasting services around the world.
- ✓ Terrestrial Digital Multimedia Broadcasting (T-DMB): is an enhancement of the T-DAB system to provide multimedia services including video, audio, and interactive data services for handheld receivers in a mobile environment. It operates in a channel bandwidth of 1.712 MHz and is completely backward compatible with the T-DAB system for audio services.
- ✓ ISDB-T: There are two distinct systems identified in Recommendation ITU-R BT.1833 for mobile TV: one is based on the ISDB-T-one segment and operates in bandwidths of 1.75 MHz, 2 MHz, or 2.33 MHz, and the other system is a hybrid terrestrial/satellite system Multimedia System "E" based on Digital System E of Recommendations ITU-R BO.1130 for the satellite component and ITU R BS.1547 for the terrestrial component. It operates in a 25 MHz bandwidth. Receivers are typically handheld with a 3.5 inch wide display for video and data broadcasting in addition to high quality audio. The satellite part of the standard provides nation-wide coverage in Japan with terrestrial gap-fillers augmenting areas that are shadowed from the satellite path.
- ✓ Media Forward Link Only (MediaFLO): is an end-to end system that enables broadcasting of video streams, audio-only streams, digital multimedia files, and data-casting to mobile devices, including handheld receivers. The system is designed to optimize coverage, capacity, and power consumption for handheld receivers. It can operate in channel bandwidths of 5 MHz, 6 MHz, 7 MHz, or 8 MHz.

Other mobile TV technologies in various stages of standardization or deployment:

- ✓ DAB-IP mobile TV technology: is a variant of the ETSI DAB standard and was standardized by ETSI in mid-2006. It has a limited amount of channels compared to DVB-H or MediaFLO but as of 2006 was the only standard that could be deployed commercially in the United Kingdom, as the spectrum needed for DVB-H was not available.
- ✓ Advanced-VSB technology: builds on the current North American ATSC television transmission standard to enable mobile receivers to receive television broadcasts. It is backward compatible with current digital television receivers in the United States.

- ✓ The China Mobile Multimedia Broadcasting (CMMB) system: is a satellite/terrestrial wireless broadcast system designed to provide audio, video and data service for handheld receiver. The system employs high-power satellite signals and a complementary terrestrial network. The CMMB system can operate in 2 MHz or 8 MHz channels, uses OFDM modulation, and supports interactive services by cooperating with terrestrial telecom networks.

Sources: Recommendation ITU-R BT.1833, Appendix 1; Recommendation ITU-R BT.1833, Table 1; Appendix 2, Table 1; Recommendation ITU-R BT.1833, Tables 1, 2, 3; Section 4.4; Annex 4; Appendix 2, Table 1; Recommendation ITU-R BT.1833, Tables 1, 2, 3; Section 4.3; Annex 3; Appendix 2, Table 1; Recommendation ITU-R BT.1833, Tables 1, 2, 3; Section 4.1; Annex 2; Appendix 2, Table 1; and Recommendation ITU-R BT.1833, Tables 1, 2, 3; Section 4.5; Annex 5; Appendix 2, Table 1.

3.4 Consumer Issues for Mobile TV

3.4.1 Are new handsets required for end users?

As noted above, there are several types of mobile broadcasting technologies, each with its own set of required hardware and software. Current 3G networks – whether WCDMA or CDMA2000 based – can be modified to deliver mobile TV using technologies such as MBMS described earlier. These technologies have the backing of relevant standards organizations and it would be expected that many 3G handsets would include the capacity to receive and display mobile broadcast-like content.

Mobile TV technologies such as DVB-H, MediaFLO, or DMB, require additional components and software not found in most current 3G handsets. With the addition of each new component, handset design becomes more complicated as vendors attempt to integrate new functionality into form factors that are not only acceptable, but attractive to consumers and operators.

Unless the mobile TV signals are transmitted in the same frequency band that can be received on the mobile handset, reception of broadcast signals on mobile handsets will require an additional receiver/tuner, and perhaps antenna and decoder. Also additional software, battery power, and memory are likely to be necessary.

The most crucial component for receiving mobile TV signals is a platform tuned to the frequencies that are carrying the transmitted signals. Because mobile TV technologies tend to operate in bands not traditionally used for mobile communications (e.g., the 700 MHz band rather than the 800 MHz and 1900 MHz bands in the United States), handset manufacturers must include two receivers: one for the voice and/or data service, and one for the mobile broadcast service. In addition, it is necessary for the two receivers to be separate so as to allow, for example, the interruption of television reception to receive an incoming phone call.[16]

In addition, as handsets become more complex – even without taking mobile TV into account – they have begun to incorporate more and more software applications, which adds additional memory and sometimes power-consuming burdens onto the operation of the handset. Mobile TV will necessitate the inclusion of decoder software, media file players and service or programme guides.[17] While many current handsets include some sort of media player, often for music files or multi-media service (MMS) messages, they will require more robust or additional players to accommodate the demands placed by providing a true mobile TV capability.

Along with the additional receiver and software mentioned above, other handset considerations are antenna-related needs, the receiver's power consumption needs, and sufficient memory to buffer or simply display the received content.

3.4.2 Payment options

Operators can implement a variety of payment options with respect to mobile TV services, each with its own benefits and drawbacks. The plans need not be mutually exclusive; there can be a variety of options for different types of consumers or different types of content. As has been implemented with cable and satellite television systems around the world, pay-per-view pricing enables consumers to pick and choose specific content or programmed material that they would like to view, with à la carte pricing, meaning that they only pay for that content that interests them. This model does not generate a steady revenue stream for operators, but it lowers the barrier to entry for consumers, enabling them to sample content (or, indeed, the concept of mobile broadcasting in general and mobile TV in particular) without requiring a long-term commitment. In addition, pay-per-view is particularly well-suited to one-off broadcasts, such as high-profile sporting events or movies. Mobile TV operators can also offer customers a subscription plan. In a subscription model, operators charge a set price for access to particular content, or more likely, access to a bundle of content streams or channels. Operators can offer a variety of different subscription bundles and prices so as to target different demographic groups.

Table 3: Payment Options for Mobile TV

	Mobile TV Services	Payment Plans
Pay-per-view	2006 FIFA World Cup matches that took place over the course of a month; some operators, such as Germany's T-Mobile, implemented a hybrid pricing plan with a pay-per-view component.	T-Mobile offered live streaming of more than 20 matches to subscribers who paid EUR 7.50 (USD 9.66) per month plus EUR 2 (USD 2.58) per day that they wanted to use the service. T-Mobile's World Cup coverage was available to any subscriber with a 3G handset and 3G coverage. Subscribers to more-inclusive tariff plans had this offering available to them at no extra charge.[18]
	In Qatar, Qtel offers both live and on-demand mobile TV services on a pay-per-view basis.[19]	Access to live streams is priced at QR 3 to QR 15 (USD 0.82 to USD 4.12), depending on the length of time the user wants to view the stream, from one minute to 15 minutes. Qtel also offers delayed access to streams from earlier in the day for reduced prices. On-demand video clips are priced at QR 6 (USD1.65) each. Access to Qtel's mobile TV service requires the subscriber to have access to Qtel's mobile Internet service, which carries its own fee.

Subscription	In the United States, Verizon Wireless has V CAST Mobile TV with three subscription offerings:[20]	Subscription offerings range from USD13-25: Limited package: four content streams provided by three major U.S. broadcasters Basic package: eight content streams provided by seven major U.S. broadcast and cable networks, plus, for an added fee, downloadable video clips from a variety of content providers, as well as unlimited email access. Select package: eight content streams provided by seven major U.S. broadcast and cable networks, plus unlimited downloadable video clips from a variety of content providers, as well as unlimited email access.
Hybrid	Vodafone New Zealand offers consumers a subscriber plan to its Mobile Sky TV service with the option of viewing additional one-off events and programming.[21]	The Mobile Sky TV service subscription is NZD 2.50 (USD 1.93) per week, with international rugby matches available for an additional NZD 3 (USD 2.31). Vodafone New Zealand plans to roll out full-length movies over its Mobile Sky TV service as well.

Sources: The Unwired, "MULTIMEDIA: T-Mobile Germany streams the FIFA World Cup live over UMTS," May 12, 2006, http://www.theunwired.net/?item=multimedia-t-mobile-germany-streams-the-fifa-world-cup-live-over-umts; Qtel Mozaic MOB, http://mobile.mozaic.qa/wnf/t123/0/2203/m/1?og=ct&; Verizon Wireless, http://products.vzw.com/index.aspx?id=mobileTV&lid=//global//features+and+downloads//mobileTV#overview; Vodafone New Zealand, http://www.vodafone.co.nz/personal/vodafone-live/mobile-tv.jsp

4 LEGAL FRAMEWORKS FOR IPTV AND MOBILE TV

4.1 Legal Framework for IPTV and Mobile TV

4.1.1 How are countries classifying IPTV and mobile TV?

The introduction of IPTV and mobile TV services presents regulatory problems closely linked with convergence of the ICT and broadcasting sectors. IPTV and mobile TV provide new platforms and/or devices to distribute digital television content, as well as the ability to provide a variety of multimedia services. With this development, regulators are looking to see whether these services should be considered as broadcasting services, telecommunications services, information service or whether they should be exempt from regulation altogether.

Some regulators have sought to classify these services as a means of creating regulatory certainty. Others have opted to adopt policies to facilitate their deployment but are waiting until market and technologies develop before issuing a regulatory determination. However, for operators of IPTV and mobile TV services, this exercise of regulatory classification is critical. It is necessary for such operators to have a clear set of rules that will create the adequate environment for investment and

deployment of these services. This is particularly important given that such regulatory classifications will have a direct impact on issues such as market entry, licensing, content regulation requirements, ownership requirements, geographic coverage (nationwide, regional or local licence), and other regulatory obligations such as fees.

4.1.1.1 Classification of IPTV services

Countries are taking various approaches in classifying IPTV. These positions range from simply abstaining from issuing an upfront official position, instead focusing on issues deemed relevant to promote competitive entry into the video market; to considering IPTV, and all its related functionalities as a broadcasting service and regulating them accordingly. Some countries are also developing a broad middle ground, where some services offered over IPTV platforms are considered to be broadcasting services as defined under a country's existing regulatory framework while others, such as VOD, are not considered to fall within such category.

In the United States, for example, IPTV has yet to be classified. The FCC initiated a proceeding on IP-enabled services in 2004 pursuant to which it made certain determinations related to IP services, such as VoIP, but it did not issue any determination regarding IPTV services.[22] This fact, however, has not precluded the FCC from addressing certain perceived barriers to the deployment of IPTV services through a series of regulatory decisions. These include issues such as declining to require incumbent local exchange carriers to provide unbundled access to their hybrid or FTTH loops for the provision of broadband services; relaxing the process for issuing cable franchises (licensing process) to facilitate entry into the video market mainly by existing facilities-based local exchange carriers intending to provide IPTV services; and finding that clauses granting cable providers exclusive access for the provision of video services to multiple dwelling units and other real estate developments harm competition and broadband deployment and were accordingly proscribed under the Communications Act of 1934, as amended.[23]

On the other end of the spectrum, some countries have adopted a technology neutral approach towards classifying IPTV. For example, in Canada, the regulatory authority, CRTC, considers IPTV as one of the broadcast distribution technologies available for television programming.[24] Services offered over this platform, including VOD, are deemed to be broadcasting services and providers offering IPTV fall within the category of broadcasting distribution undertakings, and are licenced accordingly.

Another approach is that taken by jurisdictions such as Korea, Singapore and Pakistan where IPTV has not only been specifically classified as a broadcasting service, but new categories of broadcasting licences have been established. In Singapore, for example, broadcasting includes the transmission of any television programming taking the form of either full scheduled channels and/or VOD content to households via a broadband connection using Internet protocol.[25] Korea has enacted a new law that classifies IPTV as an "Internet multimedia broadcasting" service -- defined as a "type of broadcasting whereby various types of content, including real-time broadcasting programmes, are provided to users through television sets by way of Internet protocol that allows interactivity using fixed-line telecommunications facilities."[26]

Some jurisdictions are basing their regulatory classification of IPTV services on the degree of interactivity they allow. On this basis, many countries are regulating the television broadcast component of IPTV and its VOD capabilities differently. For instance, in the EU countries and New Zealand, regulation is differentiated based on whether the content being offered to the user is linear (programming transmitted at a scheduled time) or non-linear (content that is selected by the user and viewed when the viewer wishes). Linear programming is generally subject to broadcasting and content regulation. Non-linear content is not subject to broadcast regulation, such as in New Zealand, but is subject to certain content regulation, as in the EU countries.

4.1.1.2 Classification of Mobile TV

Given that mobile TV has only recently started being deployed, regulators have only begun to consider the possible regulatory classification of these services. Nevertheless, specific trends can be distinguished. Some jurisdictions have opted for a light-handed approach, classifying mobile TV as an information service, while others regulate it, or are proposing to regulate it, as a broadcasting service.

In the United States, mobile TV services (both second generation and 3G, as well as dedicated mobile systems offering live television channels) are classified as information services and are not subject to broadcast rules and regulations.[27]

In Singapore, the broadcasting regulator, MDA, is proposing to classify mobile TV services and cellular mobile TV services (point-to-point video distribution services) as broadcasting services. MDA determined that a technology neutral approach suggests that both types of mobile TV services should be regulated in the same manner, independent of the transmission platform.[28] 3G mobile providers in Singapore strongly oppose this determination and its regulatory implications since it is their position that their current licences allow them to offer such services and they should not be regulated as broadcasters.[29]

Other jurisdictions have found that existing broadcasting regulations are not applicable to mobile TV services.[30] For example, in Hong Kong SAR, the Broadcasting Ordinance is drafted in the context of television reception at a specified premise rather than for an audience with mobility. Given this, Hong Kong SAR is proposing two alternative approaches. The first option provides for a self-regulatory approach, whereby mobile TV would not be classified as a television programming service. Instead, mobile content would be regulated in the same manner as content provided over the Internet (i.e., subject to the Control of Obscene and Indecent Articles Act and the Prevention of Child Pornography Ordinance, but not the Broadcasting Ordinance) and providers would be required to draw up industry codes of practice of voluntary compliance.[31] The second proposed approach calls for amending the Broadcasting Ordinance to include mobile TV services as a new category of service (including those offered over 2.5/3G mobile networks and those offered through broadcasting networks) within its scope.[32]

Other authorities have effectively amended existing broadcasting regulation to include mobile TV within their purview. For instance, in 2006 the Italian regulator, AGCOM, amended the 2001 digital terrestrial television regulations to extend its application to mobile TV services delivered over broadcasting networks (i.e., in the case of Italy's DVB-H networks).[33] As such, AGCOM has classified these mobile TV services as broadcasting services. Similarly, in South Korea amendments were introduced to the broadcasting regulations to include mobile TV services over broadcasting networks within their scope. As such, new "mobile multimedia broadcasting services" (both terrestrial and satellite) were created.[34]

By contrast, regulators in other jurisdictions have chosen to tread more lightly. The Canadian regulator, CRTC, exempted mobile TV service over the public Internet from licensing or other requirements of the Broadcasting Act of 1999 and 2006.[35] The exemption applies to operators that use point-to-point technology to deliver the service, meaning that the operator transmits a separate stream of broadcast video and audio to each end user. The CRTC determined that due to a variety of factors, it was unnecessary and potentially detrimental to the development of mobile broadcasting to impose the more stringent broadcasting conditions upon these operators. These factors include the finding that point-to-point mobile TV will not have a significant impact on traditional broadcasters due to the limitations of the wireless technology employed, the battery life, screen size of the handset, as well as the type and range of programming choices offered by the mobile broadcasters,[36] However, the CRTC has yet to make a determination regarding the regulation of dedicated point-to-multipoint mobile TV systems.

4.1.2 What laws apply to carriage and content?

Traditionally, the regulation of telecommunications networks falls under telecommunications laws and regulations and the regulation of cable networks are covered through broadcasting or cable television legislation. Content regulation, in turn, is typically addressed through specific legislation, codes of conduct developed by the government or in coordination with the sector, or self-regulation. Countries take different approaches regarding which companies are subject to content regulation. In certain instances, content restrictions may only apply to free over-the-air broadcasters. In other instances, the regulations may apply to both free over-the-air broadcasters and subscription television providers. Yet other times, specific content regulations may be developed for different types of operators (e.g., a specific programming code for subscription television operators).

4.1.3 What content issues are usually provided for in content laws?

4.1.3.1 Must carry obligations

A recent survey shows that most OECD countries impose some form of must-carry regulation.[37] Must carry generally involves the obligation of a cable operator (and in certain instances, satellite operators) to rebroadcast the signals of local or public over-the-air television stations. The rationale behind such policies typically centers on ensuring public access to local/regional content and public programming as well as public safety announcements, e.g. in the case of extreme weather conditions.

4.1.3.2 Nationally produced content

It also is common for audiovisual laws and licences to require licensees to include national (or regional) content in their programming, utilize national production resources, and meet cultural diversity goals. Many countries include quotas for national content, such as Malaysia (80 percent), France (prime-time programming must be 40 percent French and 60 percent European), and Brazil (80 percent for non-cable broadcasters). In Canada, national content is a "cornerstone" policy of Canada's Broadcasting Act, and requires the use of Canadian production resources for television and radio programming, air-time quotas for Canadian content, as well as national ownership and control requirements. The requirements apply to cable operators, direct-to-home satellite providers, and multipoint distribution systems.

To encourage local television and film production, some countries also include tax incentives, such as tax credits as high as 25 percent, in their laws and regulations (e.g., Canada, city of New York in the United States, and Ireland).

4.1.3.3 Decency; programming standards

Content laws often include standards related to programming and restrictions regarding language, sex/nudity, violence, and gambling. These rules may apply only to free over-the-air broadcasting, as in the case of United States with regard to obscene speech. In other countries, such as Hong Kong and Singapore, the code of practice regulating content applies to free over-the-air and subscription television.

4.1.3.4 Protection of minors

It is also quite common for countries' audiovisual policies to include rules protecting minors from harmful programming and to have restrictions regarding advertising associated with children's programming. In the EU, as well as in Australia, Japan, Norway, Singapore, India, and Hong Kong, these policies generally apply to free over-the-air broadcasters, cable and satellite providers. With regard to advertising, Norway has a complete ban on advertisements specifically directed at children, and also bans the airing of advertisements immediately before, or immediately after, children's

programmes. Australia bans advertisements that state or imply that a person who buys a product or service for a child is more generous than a person who does not.

4.1.3.5 Fight against racial and religious hatred

Numerous countries, including Australia, Hong Kong, Mauritius, and Singapore, as well the EU countries, have content laws prohibiting racial and religious hatred in television. These laws apply to both free over-the-air and subscription television operators.

4.1.3.6 Role and means of supporting public broadcasting

Public television stations have traditionally been the dominant form of broadcast television in many countries. Their missions typically center on broadcasting throughout a country's territory, providing quality or educational programming, and providing programming with no or fewer commercial influences. These stations may also further specific public policies, such as promoting linguistic policies (e.g., Canada); promoting the country in the international community (e.g., United Kingdom); providing warnings of impending natural disasters (e.g., Japan); promoting religious objectives (e.g., Pakistan); and more recently, rivaling the dominance of U.S. 24-hour news channels, e.g., France (France 24), UK (BBC), Spain (Canal 24 Horas), CCTV News (China) or NHK World (Japan). Public funding may be in the form of subsidies or television taxes, sometimes in combination with advertising revenues.

4.1.3.7 Fair Advertising codes

In many countries, such as the EU countries, Australia, India, and Singapore, free over-the-air television and subscription television broadcasters are typically subject to certain restrictions related to advertising. These restrictions encompass a variety of issues, including the type of advertising that is permitted, the duration of the advertisement, when the advertisement can be shown, and advertising restrictions associated with children's programming. (See discussion below of the new EU Audiovisual Media Service Directive.)

4.1.3.8 Political fairness and programming standards associated with accuracy and impartiality in the reporting of new and current affairs

Free over-the-air and subscription television operators are also often subject to policies requiring accuracy in reporting and a balance in time allotted to political or public figures or groups, as well as a right to reply for individuals, organizations and governments (sometimes mandatory and other times discretionary). In some instances, these policies are developed through industry self-regulation, such as the Australian Commercial Television Industry Code of Practice (applicable to free-to-air television stations) and the Australian Subscription Television & Radio Association's Codes of Practice (applicable to subscription television operators), and the Code of Ethics of the Canadian Broadcast Standards Council (applicable to both types of operators).

4.1.4 Responsibility for complying with content laws

With regard to IPTV and mobile TV, many countries have only recently started to grapple with whether IPTV and mobile TV providers should comply with content regulations. In the EU, for example, the European Commission has recently decided to amend the Television Without Frontiers Directive ("TWF"), last revised in 1997, to address the new scope of audiovisual services. The European Commission approved on 18 December 2007, the Audiovisual Media Service Directive ("AVMS Directive") that will apply to all "audiovisual media services" (i.e., services providing moving images with or without sound). This includes traditional television broadcasts (termed "linear" audiovisual media services) as well as on-demand services (termed "non-linear"). Under the AVMS Directive, both of these services are subject to a basic tier of rules (e.g., rules protecting minors and promoting European works), and traditional television services will be subject to certain additional

obligations. Therefore, IPTV or mobile TV providers will be subject to these basic rules to the extent that they offer television broadcasting and on-demand services. However, such operators will not have to adhere to the content regulations if they are merely retransmitting television or on-demand programming without altering the content.

Box 3: Directive on Audiovisual Media Services

Basic definitions of Directive:

Audiovisual media service (AMS): defined as either television broadcasting (linear) or on-demand audiovisual media (non-linear).

Television broadcasting: AMS provided by a media service provider (MSP) for simultaneous viewing of programmes on the basis of a programme schedule (includes quasi-simultaneous viewing where technical time lag between transmission and reception of broadcast). Examples of such services include analogue and digital television, live streaming, webcasting, and near VOD (pay-per-view).

On-demand audiovisual media: AMS provided by a MSP to be shown at a time chosen by the user at his individual request on the basis of a catalog of programmes selected by MSP. Examples include VOD.

Media service provider: excludes persons who merely transmit programmes for which editorial responsibility lies with third parties.

Summary of Directive:

- ✓ To create a level playing field and avoid distortions of competition, the EU Directive applies a basic tier of rules to all audiovisual services (both linear and non-linear services).
- ✓ These rules impose requirements relating to the protection of minors, encouraging cultural diversity, preventing incitement to hatred, prohibition of surreptitious advertising, product placement and advertising, promotion of European work, and basic consumer protection rules.
- ✓ Television broadcasters are subject to certain additional requirements beyond the basic tier, such as additional restrictions related to advertising.
- ✓ All audiovisual media services, however, will benefit from increased flexibility in the advertising rules (except for strict new rules on product placement).
- ✓ The EU Directive justifies the imposition of lighter regulation for on-demand audiovisual services versus television broadcasting because of the choice and control that the user can exercise with on-demand services and the impact that they have on society.
- ✓ Exclusive rights related to television broadcasting rights for events of high interest to the public are permissible, but they must grant the right to use short extracts, not exceeding 90 seconds, for purposes of general news programmes on fair, reasonable and non-discriminatory terms taking due account of exclusive rights. In addition, each Member State may impose restrictions on exclusivity if it lists the event as being of major importance for society (e.g., Olympics, national football finals)
- ✓ Member States may apply stricter or more detailed rules, as long as these regulations do not contradict the AVMS Directive's general principles.
- ✓ The Directive does not cover non-economic audiovisual services and those services that are not in competition with television broadcast (i.e., private websites, electronic versions of newspapers and magazines, and websites and services that provide and distribute audiovisual content generated by private users for purposes of sharing and exchanging).
- ✓ The new regime will not apply directly to providers until Member States pass enacting legislation, which they are required to do by end 2009.

Source: Directive 2007/65/EC of the European Parliament and of the Council of 11 December 2007 amending Council Directive 89/552/EEC on the coordination of certain provisions laid down by law, regulation or administrative action in Member States concerning the pursuit of television broadcasting activities, Official Journal of the European Union, 18 December 2007, L. 332/27

4.1.4.1 Application of Content Regulation to IPTV Providers

In certain jurisdictions, regulators are determining that IPTV providers should be subject to the same content regulation imposed on subscription television providers. For example, IPTV providers operating in Singapore are subject to the programming code imposed on subscription television providers. In addition, must carry obligations apply to fixed IPTV operators in numerous EU countries, such as Belgium (in the French-speaking community), France, Sweden, and the United Kingdom (although in practice, the parties have negotiated commercial arrangements). The U.S. Federal Communications Commission, however, has yet to rule on what the regulatory status of IPTV will be and whether the must-carry rules will apply to such services.

Like in the EU, the regulator in India, TRAI, has issued recommendations that would not subject telecommunications providers offering IPTV services to content regulation for unaltered content obtained from television broadcasters licenced in India.[38] However, TRAI is recommending that IPTV providers be required to comply with the programme and advertisement code under the Cable Television Network (Regulation) Act 1995 if they obtain "broadcasting content, Internet-related content or VOD including movie related content" (e.g., music-on-demand, games, or locally developed content). In addition, telecommunications service providers offering IPTV services may only show news channels that have been approved by the Ministry of Information and Broadcasting.

4.1.4.2 Application of Content Regulation to Mobile TV

Many countries are applying fixed television broadcast regulations regarding content to mobile TV providers. The EU, for example, is imposing the same restrictions that apply to advertising on television broadcasting services to mobile TV. In Singapore, the MDA (the entity responsible for mobile broadcasting) is conducting a public consultation in which it is proposing that mobile TV service providers, as well as cellular mobile TV providers, be subject to broadcasting regulation, including the MDA's programming codes for free over-the-air content, subscription content, VOD and other kinds of content.[39] Singapore is also proposing that the existing framework for advertising regulation, including those in the voluntary Singapore Code of Advertising Practice and the MDA television advertising and sponsorship codes, apply to mobile TV services.

In Australia, a new regulation for content service providers restricting access to minors to certain content applies to mobile premium services, including mobile portal and premium rate SMS/MMS services.[40] This new regulation removes content-related provisions regarding mobile phones from the Telecommunications Service Provider (Mobile Premium Services) Determination of 2005 and applies the new Restricted Access System Declaration, enacted in accordance with the new Schedule 7 of the Broadcasting Service Act 1992, to mobile premium services such as mobile TV.

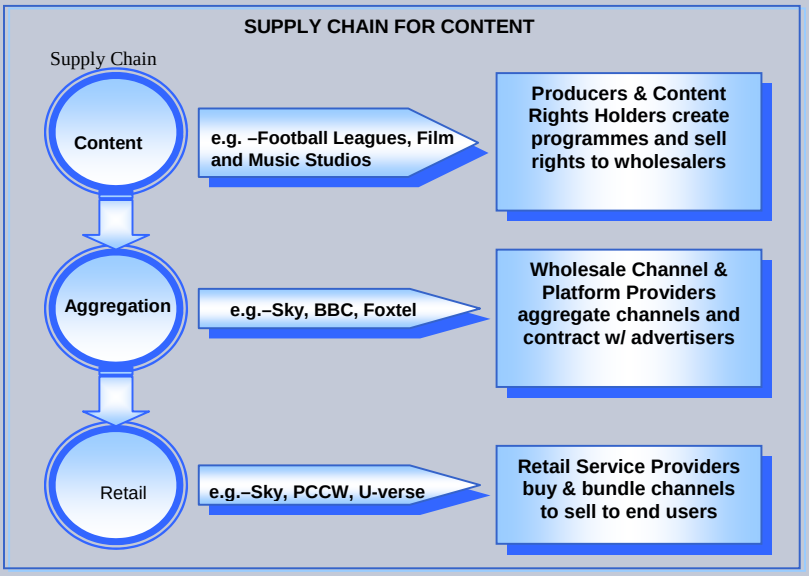
4.1.5 Legal issues related to acquiring content

IPTV service and mobile TV providers need to offer desirable content if they want to attract viewers. Locating and contracting with each individual content provider, ensuring that the provider has the necessary rights to distribute the material and then managing those relationships can be a time-consuming and difficult task. IPTV and mobile TV providers may also find themselves in a difficult negotiating position as movie studios and other content providers want the largest audiences for maximum exposure, guarantees of a secure distribution chain that safeguards their intellectual property rights, as well as guarantees of high-quality transmission. Start-ups may find it difficult to compete with the more established media entities that deliver programming over traditional media (broadcast, cable, and satellite) with more resources, experience, and viewers.

A new breed of business — the content aggregator — has sprung up to fill the gap between retail providers (e.g., IPTV and mobile TV providers) and the content providers. Content aggregators act

as middlemen which obtain the rights to content and then facilitate the distribution of the content through their clients. Additionally, they typically offer security enhancements and due diligence services, i.e., ensuring that the content provider has legitimate rights to distribute the content. IPTV and mobile TV providers get one-stop-shopping for content as well as assistance in negotiating licence agreements and understanding the contours of their distribution rights. Content providers get wider exposure for their material via outlets that may have otherwise gone untapped.

Figure 3: Supply Chain for Content



Source: Telecommunications Management Group, Inc.

4.1.5.1 Vertical integration between content programmers and video distributors

Vertical integration gives the entity controlling both the content or programming rights and the distribution platform the ability to discriminate in favor of its affiliated video distributor (e.g., cable or satellite) to the detriment of competitors in the downstream market (see Figure 3). Although there may be economic efficiencies that benefit consumers, such discrimination may also lessen competition and diversity in the distribution of video programming, ultimately harming consumers. In India, for example, due to concerns about having control over content production and distribution, services, and platforms across different sectors, a proposed bill, the Broadcasting Services Regulation Act of 2007, would impose a 20 percent cross holding restriction between any "content broadcasting service provider" and any "broadcasting network service provider."

In the United States, exclusive contracts for satellite cable programming or satellite broadcast programming between vertically integrated programming vendors and cable operators are prohibited. These “Programme Access Rules” were introduced to address the concern that potential competitors to incumbent cable operators, particularly satellite television providers, would be unable to gain access to the programming offered by vertically integrated cable operators.

In countries such as Australia, Spain, and the United Kingdom, regulators have also imposed restrictions on exclusive content agreements between vertically integrated video programmers and distributors. These restrictions, however, have been adopted on a case-by-case basis in the context of mergers and other transactions. In Singapore, for example, the lack of vertical integration between video programmers and cable distributors was a determining factor for Ministry of Information, Communications and the Arts (MICA) to allow StarHub Cable Vision’s exclusive carriage agreements.

4.1.5.2 Exclusivity agreements over "premium content"

Generally, exclusivity agreements between content programmers and subscription television distributors are permitted in many countries. In fact, the grant of exclusive broadcasting rights is an established commercial practice in many jurisdictions. Rights to football matches, for example, has proved to be particularly contentious as football leagues have traditionally sold exclusive rights to one channel in a geographic area. Out of the nine countries surveyed in a recent ITU report, IPTV operators in only two countries (Belgium and the Netherlands) had secured exclusive distribution rights, and these were secured by established operators.[41]

In certain instances, exclusive agreements have raised competition concerns from regulatory authorities. Some jurisdictions have found that (i) vertical integration and/or (ii) exclusive control over "premium" or "must have" content could be used as a strategic tool to exclude or raise a competitor's costs in the subscription television distribution market. What type of content is considered "premium content" or "must have" content depends, of course, on a country-specific assessment. The FCC, for instance, considers "must have" content as "programming for which there are no readily available substitutes and, without access to which, competitive Yet some groups want the government to require cable television and direct-broadcast satellite multichannel video-programme distributors (MVPDs) would be limited in their ability to compete in the video distribution market."[42]

4.1.5.3 Restrictions of exclusivity over specific content

Although the benefits of entering into exclusive content distribution agreements are generally accepted, in certain jurisdictions the regulatory framework restricts exclusive broadcasting of certain events or content, particularly over subscription television networks. At the European Community level, for example, under the Audiovisual Media Services Directive certain events deemed by a Member State as "being of major importance for society" must be transmitted over free over-the-air stations. The list of events of major importance in most EU Member States mainly includes sporting events, ranging from the Olympic Games to relevant national and international tennis, football, rugby, and cycling competitions, among others.

5 LICENSING ISSUES

Traditionally, licences have been granted on the basis of the service to be offered or the network that was being used. However, governments are shifting away from this approach due to the impact of convergence and are adopting more flexible licensing regimes. In a number of jurisdictions, regulators have introduced technology neutral licences with broader service categories or have introduced a unified and technology neutral licence, whereby the licensee can offer a range of services through one licence. Some jurisdictions have eliminated the need for licensing and only require a notification or registration before, or shortly after, commencing to provide services (e.g., Japan and EU), unless scarce resource such as numbers or spectrum are involved. In more limited instances, the government has eliminated any filing requirements with the regulator entirely on the basis that the services fall outside of the regulator's authority.

However, the introduction of services like IPTV and mobile TV, particularly given its broadcasting component, has prompted many regulators to review their licensing framework and consider how to licence a provider that may offer a variety of traditional and non-traditional video services. Should these services be licenced as broadcasting services, telecommunications services or information services? Is a new type of licence or licence category required for IPTV and mobile TV providers? Should IPTV and mobile TV providers be subject to different licences depending on the services that they offer subscribers? Should separate licences be required for content and carriage?

5.1 Licensing of IPTV Providers

Regulators are taking different approaches regarding licensing requirements imposed on IPTV providers. In a number of instances, the licensing requirement is based on the service being offered rather than on the particular platform through which the service is being offered, i.e., a technology neutral approach. Therefore, to the extent that an IPTV provider is offering live television, it is subject to the same licensing requirements imposed on television broadcasters. In Europe, a technology neutral approach is followed whereby any television service channel provided over any platform (e.g., cable, satellite Internet, ASDL, mobile network) is considered a broadcasting service. For example, in France, an operator providing IPTV services must submit a declaration to the Conseil Superieur de l'Audiovisuel (CSA), although small operators with annual programming budgets of less than EUR 150,000 do not have to submit a declaration.[43] Similarly, Canada requires any television service, including VOD, provided over a managed IP network to have a Broadcast Distribution Undertakings licence. However, in Europe, VOD is not considered a television service due to its two-way interactivity.

Table 4: Pakistan: IPTV Channel Distribution Service Licence

Issuing Authority	Pakistan Electronic Media Regulatory Authority
Primary Requirements	Must hold Fixed Local Loop Licence from PTA for region to be served
	Company Incorporated in Pakistan
	Majority of shares cannot be owned or controlled by foreign nationals or whose management control is vested in foreign nationals
Coverage	Per Zone: Two Categories A and B (Category A – 4 zones including Karachi and Islamabad; Category B – 10 zones)
Fee Structure	Application Processing Fee: Rs 20,000 (approx. US$ 320) Category A licences: Rs 1,000,000 (approx. US$ 16,000) per zone Category B licences: Rs 500,000 (approx. US$ 8000) per zone
Security Deposit	10 percent of licence fee (refundable after 1 year after satisfactory operation)
Licensing Term	5 years
Annual Renewal Fee	30 percent of the licence fee plus 5 percent of the annual gross revenues

Source: Pakistan Electronic Media Regulatory Authority, Guidelines for Submission of Statement of Qualifications for IPTV Channel Distribution Service Licence

In countries such as Korea, Pakistan, and Singapore, the broadcasting authority has developed new licences for the provision of IPTV services. Under Korea's new Internet Multimedia Broadcasting Business Act, IPTV providers require an Internet multimedia broadcasting licence from the Minister of Information and Communications. In Pakistan, IPTV providers must not only obtain an IPTV Channel Distribution Service Licence from the Electronic Media Regulatory Authority to provide service, but must also hold a Fixed Local Loop Licence for the same areas in which they seek to provide IPTV (See Table 4).

In 2007, Singapore's MDA developed a technology neutral licence framework to facilitate the introduction of new media services like IPTV. All media service operators seeking to offer any IPTV services or any form of subscription television services, in or from Singapore, require a licence from MDA. The MDA defines IPTV as the transmission of television programming taking the form of either full scheduled channels and/or video-on-demand content to households via a broadband connection using Internet protocol. Using the IPTV network, service providers can also offer rich interactivity and services such as television commerce, VoIP, video conferencing, and gaming (seeTable 5). Under

this new framework, however, ownership restrictions under the Broadcasting Act would apply to nationwide licensees with over 100,000 subscribers but not to niche licensees with fewer than 100,000 subscribers. The disadvantage of this two-tier distinction is that as licensees grow their subscriber base they may find themselves in a difficult situation if they have foreign ownership since the Broadcasting Act prohibits a foreign entity holding more than a 49 percent interest. The MDA is proposing a similar two-tier approach for mobile TV providers that would also face this ownership constraint.

Table 5: Singapore: Two-Tier Licensing Framework for Broadcasting IPTV Services

	Niche Subscription TV Licence	Nationwide Subscription TV Licence
Number of subscribers	100,000 subscribers	Unlimited number of subscribers
Licence term	5 years	10 years
Licence fee	2.5% of total revenue; minimum annual licence fee of $5,000 will be applicable during duration of licence. New service licensees may enjoy a concessionary rate of 0.5% of total revenue or $5,000, whichever is the higher amount during first three years of licence term	2.5% of total revenue; minimum annual licence fee of $50,000 per annum will be applicable throughout. New service licensees may enjoy a concessionary rate of 0.5% of total revenue or $50,000, whichever is the higher amount during first three years of licence term.
Performance bond	$50,000, in the form of either banker's guarantee or cash.	$200,000, in the form of either banker's guarantee or cash.
Ownership	No ownership conditions	Subject to ownership restrictions set forth in Part X of Broadcasting Act
Must carry	Not applicable	Must carry obligations for enabling access to local free-to-air channels are applicable
Advertising revenue	No cap on advertising revenue	Advertising revenue not to exceed 25 percent of total revenue
Advertising time limit	14 minutes per hour advertising time limit applies for channels with scheduled programming (not applicable for VOD content and interactive advertising services.	
Content guidelines	Subscription TV programme code applies if scheduled programmes are offered. VOD programme code applies if on-demand programmes are offered.	

Source: http://www.mda.gov.sg/wms.www/devnpolicies.aspx?sid=88#3

Hong Kong has not established a special category of licence for IPTV providers. Instead, it regulates IPTV providers in the same manner as a subscription television provider, requiring them to obtain a domestic subscription television programme licence. However, as in Pakistan, such licences can only be obtained if the operator already holds a fixed licence.

India's regulator, TRAI, is recommending that IPTV telecommunications providers be regulated under the terms of their telecommunications licence and that cable operators be regulated under the terms of the Cable Television Network (Regulation) Act, 1995. TRAI has indicated IPTV services provided by telecommunications operators are not the same as a cable service, based on the technical aspects of the services and the manner in which the channels are delivered to the user (e.g., cable channels are pushed to the user whereas IPTV channels are pulled by the user). From a licensing perspective, TRAI is recommending that telecommunications service providers holding a Unified Access Services Licence or Cellular Mobile Telephony Service (CMTS) Licence be allowed to provide IPTV services without any other registration under their licence.[44] ISPs with a net worth of

more than a billion Rupees (approximately US$ 25 million) can also provide IPTV services after obtaining permission from the regulator. Similarly, cable television operators can provide IPTV services through their current authorization.

5.2 Licensing of Mobile TV

With regard to mobile TV, the licensing approaches are very similar to IPTV services. In a number of jurisdictions, the government makes a distinction between content and carriage. In Singapore, for example, the MDA is proposing that mobile TV be subject to the existing licensing structure for fixed digital broadcasting, which involves obtaining both a multiplex licence and a broadcasting service licence issued by the MDA under the Broadcasting Act, as well as a Facilities-Based Operator licence issued by the Information Development Authority (IDA) under the Telecommunications Act.[45] However, in the United States, a licensee operating one of the C block (710-716/740-746 MHz) or D block (716-722 MHz) licences in the UHF band can provide "flexible fixed, mobile, and broadcast uses, including mobile and other digital new broadcast operations, fixed and mobile wireless commercial services (including FDD- and TDD-based services)…[that] could also include two-way interactive, cellular, and mobile TV broadcasting services."[46]

In January 2008, Hong Kong issued a consultation on mobile TV whereby it proposes to licence such services as a new category of television programme service under the Broadcasting Ordinance or to regulate mobile TV by general laws (as currently is the case) but to require the industry to implement a code of practice for self-regulation.[47] Currently, mobile TV providers offering streaming-type mobile TV services already available on 2.5 GHz and 3 GHz mobile networks are not subject to broadcasting regulation and can offer services if they hold a mobile carrier licence.

Table 6: Hong Kong: Regulation of Mobile TV, IPTV, and Internet TV

	Mobile TV	IPTV Services	Internet TV
Carriage Licences	Mobile licence or unified carrier licence (proposed by OFTA to replace both fixed and mobile carrier licence in future)	Carrier licence required for conveyance of IPTV services	No licence required
Content Licences	Not currently applicable to mobile TV on 2.5 and 3 GHz	Broadcasting licence required: IPTV service over fixed network is categorised as domestic pay TV programme service	Exempted from the licensing requirement under the Broadcasting Ordinance

Source: Consultation on Digital Broadcasting: Mobile Television and Related Issues, UCAC Paper No. 3/2007, 26 April 2007, at p. 12, available at http://www.ofta.gov.hk/en/ad-comm/ucac/paper/uc2007p3.pdf

In January 2008, the regulator in India, TRAI, issued recommendations related to mobile TV. Since cellular licensees in India are already allowed to deliver video content over their networks, the recommendations primarily address mobile TV licensing for dedicated broadcast networks.[48] TRAI proposes to award mobile broadcast licences in the 582-806 MHz band for Digital Terrestrial Television (DTT) and in the 2520-2670 MHz band for satellite transmission through a tender process. TRAI further recommends that mobile TV operators should not be responsible for following content codes if they simply retransmit channels without altering content.

6 REGULATORY AUTHORITIES RESPONSIBLE FOR IPTV AND MOBILE TV

Today, 148 countries have separate regulatory authorities. Among these, a number of jurisdictions have converged regulators, such as in the Australia, Finland, Iraq, Italy, Japan, Kenya, Mali, Malaysia, South Africa, Singapore, Uganda, United States, and United Kingdom.[49] In the past seven years, close to 30 countries have established converged regulators. The rationale for this shift is that a converged regulator is better suited to respond to an environment where distinctions based on service and network are becoming blurred. A converged regulator can allow providers and users with one government entity to look to for all matters involving the communications sector.

Despite this trend, most OECD countries still have separate regulators for broadcasting and for telecommunications.[50] In addition, content regulation is typically addressed by a separate ministry or government authority (e.g., India and Saudi Arabia) or by the broadcasting authority (e.g., Botswana, Chile, and Colombia). In India, there are two entities responsible for content regulation. The Ministry of Information and Broadcasting monitors content related to broadcasting and film, and the Ministry of Information Technology regulates content related to the Internet.[51]

As noted in Table 7, many countries still have multiple government authorities responsible for the functions of broadcasting licensing, telecommunications licensing, spectrum allocation, and content regulation.

Table 7: Regulatory Entities Involved in Telecommunications and Broadcasting

Country	Telecoms Carriage	Telecoms Spectrum	Broadcasting Carriage	Broadcasting Spectrum	Content
Argentina	National Communications Commission (CNC); Communications Secretariat (SECOM)	CNC	Federal Broadcasting Committee (COMFER)	CNC	COMFER
Botswana	Ministry of Communications, Science and Technology (MoCST); Botswana Telecommunications Authority (BTA)	BTA	National Broadcasting Board (NBB)	NBB	NBB; BTA
Colombia	Ministry of Communications (MoC); Telecommunications Regulatory Commission (CRT)	MoC	National Television Commission (CNTV)	CNTV	CNTV
Chile	Telecommunications Secretariat (SUBTEL) within Ministry of Transport and Telecommunications	SUBTEL	National Television Council (CNTV)	SUBTEL	CNTV
Egypt	National Telecommunication Regulatory Authority (NTRA); Ministry of Communications and Information Technology (MCIT)	NTRA	Egyptian Radio and Television Union [ERTU]	ERTU	Ministry of Interior *(Internet security);* ERTU *(Broadcasting)*
France	Regulatory Authority for Electronic Communications and Postal Service (ARCEP)	National Spectrum Agency (ANFR)	Higher Council for Radio and Television (CSA)	ANFR; CSA	ARCEP; CSA

Hong Kong (SAR)	Office of the Telecommunications Authority (OFTA)	OFTA	Broadcasting Authority (BA) and OFTA	BA; OFTA	BA
India	Telecommunications Regulatory Authority of India (TRAI); Department of Telecommunications (DoT)*(for licensing)*	DoT	TRAI /Ministry of Information and Broadcasting (MI&B) *(for licensing)*	DoT	Ministry of Information Technology (MIT) *(Internet;* MI&B *(Broadcasting)*
Jordan	Ministry of Information and Communications Technology (MoICT); Telecommunications Regulatory Commission (TRC)	TRC	Audiovisual Commission (AVC)	AVC in coordination with TRC	AVC
Mexico	Communications and Transportation Secretariat (SCT) and Federal Telecommunications Commission (COFETEL)	SCT	SCT; Secretariat of Public Education (SEP)	SCT	SEP; General Directorate for Radio, Television and Cinematography (RTC) within Executive Secretariat (Secretaría de Gobernación)
Pakistan	Ministry of Information Technology – IT and Telecom Division (MoIT) and Pakistan Telecommunications Authority (PTA)	PTA	Pakistan Electronic Media Regulatory Authority (PEMRA)	PTA	PEMRA
Singapore	Infocomm Development Authority (IDA)	IDA	iDA; Media Development Authority (MDA)	IDA	MDA
Uganda	Uganda Communications Commission (UCC)	UCC	Uganda Broadcasting Council (UBC)	UBC; UCC	UBC
United Kingdom	Office of Communications (Ofcom)	Ofcom	Ofcom; Department for Culture, Media, and Sport	Ofcom	Ofcom
United States	Federal Communications Commission [FCC]/ Public Utility Companies (PUCs)	FCC	FCC; local government for cable TV franchises	FCC	FCC, Federal Trade Commission (FTC), and Department of Justice (DoJ)

Source: Based upon Telecommunications Management Group, Inc. research and Telecommunication Regulatory Institutional Structures and Responsibilities, OECD Paper, DSTI/ICCP/TISP(2005)6/Final, at p. 31, 32.

Operators seeking to offer converged services are required to follow the processes of more than one regulator and multiple regulations, often resulting in duplication and delay in rolling out their services. In addition, given that IPTV services and mobile TV services encompass television services as well as other video services, jurisdictional disputes have arisen between the broadcasting and

telecommunications authorities, with each authority asserting jurisdiction and reaching different conclusions about how the services should be regulated. In Korea, for example, the Korean Broadcasting Commission was of the opinion that converged service providers should be regarded as a broadcasting company whereas the Minister of Information and Communication argued that it should be regulated as a value-added service. Similar debates have arisen in Colombia between the National Television Commission (CNTV) and the Ministry of Communications regarding which entity has authority over IPTV services and how they should be regulated. The result of this is that telecommunications operators seeking to offer such services have been unable to obtain the necessary authorization, while other telecommunications operators that hold cable television licences have been able to begin the deployment of IPTV services.

In China, the Ministry of Information Industry (MII) and the State Administration of Radio, Film and Television (SARFT) share the responsibilities related to broadcast licensing. This has resulted in confusion regarding which agency regulates converging services like IPTV.[52] SARFT has interpreted a joint provision restriction contained in a 1999 law as barring telecommunications operators from offering video services and has twice used its licensing authority to block telecommunications operators from providing IPTV over their networks. Since telecommunications operators are prohibited from controlling the IPTV infrastructure, they must enter into joint arrangements with broadcasters. For example, China Telecom, the country's leading telecommunications operator, partnered with Shanghai Media Group, which is one of four broadcasters that was granted an IPTV licence. Currently, this partnership is the only network to have begun commercial IPTV deployment.[53]

As governments look at how to facilitate the development of new services such as IPTV and mobile TV, they should consider whether their institutional frameworks are best suited for expediting the roll-out of new services or whether such frameworks need to be modified. Korea, for example, had four government authorities responsible for regulating the communications sector: the Telecommunications Commission, the Ministry of Information and Communication, the Broadcasting Commission, and the Ministry of Culture and Tourism, each with their jurisdiction and regulation. This was delaying the roll-out of IPTV services. In December 2007, Korea enacted a new law eliminating the Ministry of Information and Communications (MIC) and transferring its functions to the Ministry of Commerce, Industry and Energy, the Ministry of Culture and Tourism, and the Ministry of Government Administration and Home Affairs.[54] In addition, a unified commission will be created that encompasses the merger of the Korean Broadcasting Commission with the Telecommunications and Broadcasting Policy Office of the now-defunct MIC, and will supervise broadcasting and communications.

7 OTHER LEGAL AND REGULATORY ISSUES

7.1 Standards

Governments need to consider which mobile TV and IPTV standards should be authorized in their country, or whether they will leave the choice of standards up to the providers. A number of different standards are available for IPTV, such as Microsoft or DVB based standards. These standards are not interoperable and can create difficulties for consumers that want to change service providers, as this may require changing hardware and getting used to new user interfaces. The challenge for the industry and regulators is to create open standards as well as facilitate interoperability between different standards. With the development of multi-platform STBs, the industry can contribute to the creation of more choices and better utilization of resources. Regulations should encourage this development.

In addition, regulators need to consider whether the laws on equipment to be used for provision of television services impose barriers to the roll-out of IPTV or mobile TV. For example, in India, concerns have been raised about whether the use of IPTV STBs by cable operators would violate the Cable Television Networks (Regulation) Act, 1995, which does not allow the use of equipment in the cable network that does not conform to the Indian Standard. Since an Indian Standard for IPTV STB does not exist, TRAI has indicated that there is no violation of the Act; however, it is recommending that the Bureau of Indian Standards (BIS) be tasked with expediting the development of a standard for IPTV STB specifications.

7.2 Quality of Service Issues

Quality of service is likely to be an issue considered by regulators. With services provided over the Internet, quality of service is a "`best effort' medium." However, with IPTV and mobile TV, a provider has the ability to offer customer quality of service since it offers its service through a privately managed network. In addition, given the importance of better picture quality with IPTV and mobile TV, it is in the interest of the operator to provide high quality service; otherwise the consumer will go elsewhere. In Singapore, the MDA is determining whether it should impose quality of service requirements on mobile TV and has proposed not to mandate picture quality or performance indicators for customer service. The reason being that it expects that imposing picture quality requirements will limit the mobile TV providers' flexibility to determine the optimal mix of formats, and that performance indicators for customer service are not necessary given the competitive environment. However, the MDA is proposing to impose minimum network coverage requirements to ensure that mobile TV services are offered nationwide in Singapore and to ensure that outdoor coverage meets a 95 percent threshold, although the MDA is not proposing any indoor coverage levels.[55]

7.3 Ownership Issues

A number of countries have ownership restrictions that may impede the development of IPTV and mobile TV services. Some countries, for example, have joint-provisioning restrictions that bar a telecommunications provider from operating a cable subscription services. For example, Argentina's law forbids a telecommunications provider from offering of any type of broadcasting services over any platform, whether or not it is subscription-based. In Brazil, incumbent telecommunications providers are prohibited from providing cable broadcasting services in areas where they offer telecommunications services. However, they are permitted to provide VOD after obtaining a direct-to-home licence and may also offer satellite television.

In addition, countries may have cross-ownership restrictions that prevent a telecommunications provider from owning a cable provider and vice versa. Unlike joint provision restrictions, cross-ownership restrictions do not necessarily restrict the affected firm from entering a specific market, provided its entry strategy does not involve the acquisition of an existing market participant. In the context of public switched telecommunications networks and cable television services, such limitations generally are directed at safeguarding the independence of competing service providers with the end goal of fostering facilities-based competition. In India, for example, broadcasters and cable operators may only own up to 20 percent in satellite television companies. In January 2007, TRAI issued recommendations to the Ministry of Information and Broadcasting proposing to also extend this 20% cap to mobile TV providers.

In response to convergence, however, a number of jurisdictions are pursuing legislation to eliminate or modify these restrictions. For example, in Mexico, a Convergence Agreement was introduced that eliminated the joint provision restrictions barring incumbent Telefonos de Mexico from directly or indirectly providing television services under its concession contract. Pursuant to the Convergence Agreement, the Mexican Government relaxed this limitation allowing entry by the incumbent

telecommunications provider into the cable television services market, subject to a set of conditions including the adoption of clear interconnection rules and number portability processes. However, due to competition concerns related to joint ownership in Mexico, the Communications and Transport Secretariat and the Federal Competition Commission have established a presumption that joint ownership would stifle inter-modal competition in the newly opened convergent communications sector in Mexico. Only where this presumption is rebutted by an interested party, and evidence of efficiencies derived from cross-ownership are duly presented, may the Competition Commission grant a waiver of the cross-ownership restrictions.[56]

The Brazilian Congress is currently working on a comprehensive law that would eliminate the joint provisioning restriction.[57] However, in other jurisdictions, cable operators have mounted strong efforts to counteract any attempt to change such restrictions. For example, in an attempt to prevent telecommunications providers from offering IPTV, the Argentine Cable Television Association filed an appeal with the Federal Administrative Court (affirmed by the Supreme Court), which upheld the constitutionality of the law barring telecommunication companies from the broadcasting services market.[58]

Traditionally, there has been a greater sensitivity regarding broadcasting services and foreign ownership. As a result, while foreign ownership restrictions have been eliminated in many countries for telecommunications companies, they still remain in place for traditional broadcasting companies. For example, in India, the foreign ownership cap for telecommunications providers is 74 percent and 49 percent for cable operators.[59] Similarly, Korea has different foreign ownership restrictions for the broadcasting and telecommunications sector.[60]

7.4 Spectrum

The major issue facing the deployment of any mobile TV system is access to the spectrum needed to support the services. The availability and cost of spectrum will dictate in large measure the technology deployment options available to the operator. For example, if a potential operator wishes to deploy a satellite-based mobile TV system, then there must be an allocation for satellite broadcasting in the desired service area. If there is no spectrum available for a dedicated terrestrial mobile TV network, then the mobile operator must provide mobile TV service in the bands that are already being used for more traditional mobile services. This will limit the mobile provider's options and may have a possible impact on the quality of service available to the consumer. As countries move to identifying spectrum for dedicated mobile TV networks, considerations have to be given to compatibility between new and existing services. The choice of the technology to be used to provide mobile TV services should be left to the operator as long as it operates in a manner consistent with national and international frequency allocations.[61]

7.5 Unbundling

Unbundling of the local loop allows for new entrants to access the fixed infrastructure of incumbents and provide advanced services, including IPTV and ancillary interactive services, through these networks. Access to incumbent's local loops expands new entrants' potential market and may increase competition on IPTV services.[62]

Unbundling of the local loop has been required in a number of countries. All OECD countries, with the exception of Mexico, require some form of unbundling, and many developing countries, such as Colombia, Peru, or South Africa, have introduced or are introducing mandated local loop unbundling in their regulatory frameworks.[63]

In many countries where IPTV has a high penetration, such as France, Italy and Spain, unbundling of the local loop has been a key factor for new entrants to develop competing offers and increase IPTV

penetration. In Japan, the main broadband competitor, Yahoo! BB, offers an IPTV service based offer on unbundled infrastructure that competes with the incumbent's IPTV fiber-based offer.

As incumbents are releasing plans to upgrade their networks and build NGN fiber-based networks, regulators are considering whether unbundling rules need to be modified in order to avoid disruption of alternative operators broadband and IPTV services over unbundled loops. For instance, European countries, such as the United Kingdom, have conducted consultations to adapt their existing unbundling rules to the new fiber-network architecture. Among the issues being considered in these consultations are the feasibility of unbundling the last mile of fibre network architecture, and the introduction of access obligations to new elements of the local loop, such as street cabinet access, ducts and the fibre itself.[64]

8 CONCLUSIONS

The deployment of IPTV and mobile TV changes traditional perceptions and challenges legal regulation. However, both services offer enormous opportunities to provide consumers with new platforms to receive multi-media content, enhance competition, and increase broadband deployment.

However, as noted in the checklist (see Box 4), governments need to look at their regulatory frameworks and institutional structures, and determine how best to facilitate the deployment of these services. Recognizing this, a number of countries have initiated consultations to address the regulatory issues related to these services. In addition, governments are considering the need of maintaining legislative or regulatory restrictions that prevent a telecommunications provider from operating video services in a multi-platform multi-service environment since this may result in limiting

Box 4: Checklist for Regulators Introducing IPTV and Mobile TV

For regulators, there are a variety of factors to consider in relation to these new services. In the case of IPTV, such factors are potentially broader due to the fact that incumbent telecommunications providers are subject to legacy regulation. Because of this, regulators need to consider the following questions:

- ✓ What is the impact of legacy regulation on providers' ability to offer services and on providers' incentives to incur the significant investments and high risks associated with deploying/upgrading infrastructure to allow for the provision of IPTV services?
- ✓ In the case of IPTV, are there any legal or regulatory restrictions to incumbent telephone providers' ability to provide video services within their markets (joint provision restrictions or cross-ownership restrictions)?
- ✓ If incumbents are not restricted from entering the video market, does the application of existing regulation, specifically issues such as access obligations to dominant providers' network, skew the incentives for investment in deployment/upgrading of networks to support IPTV services?

Having performed this initial review, regulators might look at how, if at all, IPTV and mobile TV fall within the existing regulatory framework for broadcasting services.

- ✓ Do the services offered by the IPTV or mobile provider fall within the definition of television broadcasting included in a country's laws or regulations? If so, what type of regulation would be imposed on such providers?
- ✓ Does a mobile TV provider require multiple licences under the existing legal framework (telecommunications, broadcasting, and content)?
- ✓ Does your regulatory framework provide for a technology neutral approach for granting licences?
- ✓ How many regulatory entities claim jurisdiction over IPTV and mobile TV services? If not, can one entity be given the authority to regulate IPTV? Or mobile TV?
- ✓ Should laws and regulations relating to content be applicable to IPTV and mobile TV services?
- ✓ Are there legal restrictions that impede investment in IPTV and mobile TV services (e.g., foreign ownership restrictions)?
- ✓ Is extending existing broadcasting regulation to these services the best mechanism to foster their deployment?

Source: Telecommunications Management Group, Inc.

choices and benefits for consumers. In addition, governments are looking at the manner in which these services should be regulated, including the appropriate licensing requirements and regulatory obligations. In some countries, regulators are opting to treat the offering of television programming as broadcasting and regulating IPTV and mobile TV providers in the same manner as traditional broadcasters. However, other countries may, for policy reasons, choose to subject these new services to lighter regulation for a certain period of time until the market develops.

For regulators, there is no right or wrong approach. However, what is important is to provide operators of such services with regulatory certainty regarding the manner in which they will be regulated and try to eliminate impediments due to jurisdictional debates between government agencies or onerous regulatory hurdles and cumbersome licensing requirements that may delay the deployment of such services.

GLOSSARY OF TERMS

Mobile TV: Wireless transmission and reception of video and voice television content to platforms that are either moving or capable of moving. The transmission can be over a dedicated broadcast network or a cellular network.

MVPDs: *Multichannel video-program distributors.* An MVPD may be a cable operator or satellite TV operator that sells multiple channels of video programming.

PVR: *Personal Video Recorder*. A device that records video in a digital format and stores the video on a disk drive or other medium. The term *DVR* (Digital Video Recorder) is also used.

Internet TV: A system that distributes professional television content over the Internet. While IPTV typically transmits on discrete service provider networks, Internet TV is usually over peer-to-peer networks.

Internet Video: An unmanaged video service that offers user-generated streaming video over the Internet.

Headend: Equipment or facility that receives, stores, and processes television signals for distribution to a local region. The headend may control interactive features, manage VOD, and insert advertisements.

MPEG: *Moving Pictures Experts Group*. An ISO/ITU universal standard that compresses digital video for digital TV, DVDs and PVRs. MPEG-2 is used for digital TV STBs and DVDs. MPEG-4 offers better compression technology to deliver multimedia for fixed and mobile video.

STB: *Set-top box*. A device connected to a television that receives and decodes digital television broadcasts and interfaces with the Internet through the user's television.

DTV: *Digital television*. A system for broadcasting and receiving video and sound through digital signals rather than through traditional analog signals.

Unicast: A transmission between a single sender and a single receiver over a network. See also *Multicast* and *Broadcast*.

Multicast: A transmission from a single sender to multiple, specific receivers on a network. See also *Unicast* and *Broadcast*.

Broadcast: A transmission from a single sender to all connected devices. See also *Unicast* and *Multicast*.

RTSP: *Real Time Streaming Protocol*. A protocol that enables users to remotely control streaming video from a server, which allows users to play, pause, and stop the video.

MBMS: *Multimedia Broadcast Multicast Service*. A broadcasting service developed by the 3rd Generation Partnership Project (3GPP) that provides mobile TV over 3G cellular networks.

Technology-Neutral: A general term referring to rules that allow operators to adopt any technology standard for a particular service.

Multiplex: The transmission of more than one digital channel within a single frequency.

DTH: *Digital-to-Home*. A satellite television system that allows end users to receive signals directly from geostationary satellites. The term *DBS* (Direct Broadcast Satellite) is also used.

CIF/QCIF: *Common Intermediate Format/Quarter Common Intermediate Format*. An international standard size for low-resolution image and video display formats. CIF dimensions are 352 x 288 pixels and QCIF are 176 x 144 pixels.

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1 This paper will focus on IPTV and mobile TV, not digital terrestrial television, advertising, user-generated content and m-banking.

2 *See* ITU-T IPTV Focus Group definition.

3 ITU IPTV Global Technical Workshop, *Driving The Future Of IPTV* 13 (2006), available at www.itu.int/osg/spu/stn/ digitalcontent/4.9.pdf.

4 Mark Rooney, *Pace Micro Technology: IPTV White Paper* 3 (2006), available at www.iptv-news.com/content/view/758/61/.

5 Wei Li, Hong Liu, and Yiyan Wu, Communications Research Centre Canada, *IEEE: Introduction to IPTV*, available at www.ieee.org/ organizations/society/bt/iptv1.pdf.

6 H.264 generally provides a 40 percent saving in bandwidth over MPEG-2 encoded content, allowing IPTV providers to offer high definition (HD) television to the home.

7 Rooney, s*upra* note 4, at 4.

8 Off. of Comms. (Ofcom), *The International Communications Market 2006* 99 (2006), available at www.ofcom.org.uk/ research/cm/icmr06/icmr.pdf.

9 Press Release, DSL Forum, IPTV Deployments More Than Double in a Year as Broadband Continues to Achieve Strong (Oct. 8, 2007) www.dslforum.org/dslnews/pdfs/pr_bwfeurope100807.pdf.

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15 ITU-R BT.1833, *supra* note 14; Int'l Telecomm. Union (ITU), ITU-R Report BT.2049-1: *Broadcasting of Multimedia and Data Applications for Mobile Reception* (2005) provide further detailed information on these standards.

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18 Arne Hess, The Unwired, *MULTIMEDIA: T-Mobile Germany Streams the FIFA World Cup Live Over UMTS*, May 12, 2006, available at www.theunwired.net/?item=multimedia-t-mobile-germany-streams-the-fifa-world-cup-live-over-umts.

19 Qtel Mozaic MOB, http://mobile.mozaic.qa/wnf/t123/0/2203/m/1?og=ct& (last visited Feb. 20, 2007).

20 Verizon Wireless, V-Cast Mobile TV, http://products.vzw.com/index.aspx?id=mobileTV&lid=//global//features+and+downloads// mobileTV#overview (last visited Feb. 20, 2007).

21 Vodafone New Zealand, www.vodafone.co.nz/personal/vodafone-live/mobile-tv.jsp (last visited Feb. 20, 2007).

[22] *In the Matter of IP-Enabled Services,* 19 FCC Rcd 4863, 4878 (2004).

[23] *In the Matter of Review of the Section 251 Unbundling Obligations of Incumbent Local Exchange Carriers; Implementation of the Local Competition Provisions of the Telecommunications Act of 1996; Deployment of Wireline Services Offering Advanced Telecommunications Capability*, 18 FCC Rcd 16978, 17103-04, 17149, ¶¶ 200, 288 (2003). These rules were upheld by the D.C. Circuit Court of Appeals on Mar. 2, 2004, in *United States Telecom Ass'n v. FCC*, 359 F.3d 554, 564-76 (2004) ("USTA II"); *In the Matter of Implementation of Section 621(a)(1) of the Cable Communications Policy Act of 1984 as amended by the Cable Television Consumer Protection and Competition Act of 1992,* 20 FCC Rcd 18581 (2006); *In the Matter of Exclusive Service Contracts for Provision of Video Services in Multiple Dwelling Units and Other Real Estate Developments*, 22 FCC Rcd 20235 (2007).

[24] Can. Radio-television and Telecomms. Comm'n (CRTC), *The Future Environment Facing the Canadian Broadcasting System: A Report Prepared Pursuant to Section 15 of the Broadcasting Act* (2006), available at www.crtc.gc.ca/eng/publications/ reports/broadcast/rep061214.htm?Print=True. ("There are four broadcast distribution technologies available for television programming: conventional over-the-air (OTA) transmission, cable distribution, DTH satellite distribution and Internet Protocol Television (IPTV)").

[25] *See* Media Dev. Auth. (MDA), *Licence Framework for Broadcasting IPTV Services*, available at www.mda.gov.sg/wms.www/ devnpolicies.aspx?sid=88.

[26] Internet Multimedia Broadcasting Business Act (Korea), approved by National Assembly in 2007, and to be implemented in April 2008.

[27] *Nat'l Cable & Telecomms. Ass'n v. Brand X Internet Servs*., 545 U.S. 967 (2005).

Cable & Sat. Broad. Ass'n of Asis (CASBAA), *MDA Public Consultation on the Policy and Regulatory Framework for Mobile Broadcasting Services in Singapore* (2007), available at www.mda.gov.sg/wms.file/mobj/mobj.1180.Casbaa.pdf.

[29] *See* Singapore Telecom Mobile PTE LTD, *Submission to the Media Development Authority of Singapore, Policy & Regulatory Framework for Mobile Broadcasting Services in Singapore* (2008), available at www.mda.gov.sg/wms.file/mobj/mobj.1196.SingTel.pdf. *See also*, StarHub Mobile PTE LTD, *Response to MDA Consultation Paper, Policy and Regulatory Framework for Mobile Broadcasting Services in Singapore* (2008) available at www.mda.gov.sg/wms.file/mobj/mobj.1200.StarHub.pdf.

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[31] Hong Kong Second Mobile TV Consultation, at ¶¶ 6.6, 6.7.

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[34] Enforcement Decree of the Broadcasting Act, art. 1-2(3) (2007) (Korea), available at www.kbc.go.kr/english/file/sponsor.pdf.

[35] Can. Radio-television and Telecomms. Comm'n (CRTC), Canada Broadcasting Public Notice CRTC 2007-13, Feb. 7, 2007, available at www.crtc.gc.ca/archive/ENG/Notices/2007/pb2007-13.htm.

[36] *Id*. at ¶ 42. The CRTC further noted that it would initiate a further proceeding to examine whether mobile TV services not delivered and accessed over the Internet would be exempt from the broadcasting conditions. It found that, at the time, much remained unknown about the potential impact of the broadcast-based or point-to-multipoint mobile technologies, particularly if they could become a substitute for conventional television. *Id*. at ¶ 27.

[37] OECD *Communications Outlook 2007* (2007), available at http://213.253.134.43/oecd/pdfs/ browseit/9307021E.PDF.

[38] Telecomm. Reg. Auth. of India (TRAI), *Recommendations on Provision of IPTV Services*, at 25-26 (Nov. 28 2007).

[39] Media Dev. Auth. (MDA), *Public Consultation on Policy and Regulatory Framework for Mobile Broadcasting Services in Singapore*, at 18 (Nov. 21, 2007), available at: www.mda.gov.sg/wms.file/mobj/mobj.1167.Mobile%20TV%20Consultation.pdf.

[40] Ausli. Comms. & Media Auth. (ACMA), *Restricted Access System Declaration 2007*, (Dec. 20, 2007). This new rule for restricting access to age restricted content becomes effective on Jan. 20 2008.

[41] ITU IPTV Global Technical Workshop, *Driving The Future Of IPTV*, p. 9 and Table 7.2 in Annex II (2006), available at www.itu.int/osg/spu/stn/ digitalcontent/4.9.pdf.

[42] Hong Kong Second Mobile TV Consultation, *supra* note 32.

[43] OECD, *IPTV: Market Developments and Regulatory Treatment*, DSTI/ICCP/CISP(2006)5/FINAL, at 24 (Dec. 17, 2007), available at www.oecd.org/dataoecd/11/23/39869088.pdf.

[44] Telecomm. Reg. Auth. of India (TRAI), *IPTV Services*, *supra* note 40, at 18-20.

[45] Med. Dev. Auth. (MDA), *Mobile Broadcasting Services*, *supra* note 41, at 8.

[46] FCC, *FCC Auction 49: Lower 700 MHz Band Fact Sheet*, available at: http://wireless.fcc.gov/auctions/default.htm?job=auction_factsheet&id=49.

[47] Hong Kong Second Mobile TV Consultation, *supra* note 32.

[48] TRAI, India, *Recommendations on Issues Relating to Mobile Television Service*, (Jan. 23, 2008).

[49] ITU Telecommunications Regulatory Database (2007).

[50] OECD, *Policy Considerations for Audio-Visual Content Distribution in a Multiplatform Environment*, DSTI/ICCP/TISP(2006)3/FINAL, Jan. 12, 2007.

[51] TRAI, *IPTV Services*, *supra* note 40, at 20.

[52] MII coordinates the deployment of the public telecommunications network, the television and radio broadcasting networks. However, the State Administration of Radio, Film, and Television (SARFT) regulates broadcast content transmitted via radio, TV, satellite, cable, and the Internet and has authority to award or revoke licences to produce, distribute, and broadcast films, TV, and radio programs.

[53] China Telecom provides the equipment and broadband network while the broadcaster holds the IPTV licence and contributes video content.

[54] *Farewell to the Ministry of Information and Communication*, Telecom Korea News Service, Jan. 16, 2008.

[55] *See* Media Dev. Auth. (MDA), *Mobile Broadcasting Services*, *supra* note 41, at 6.

[56] *See* Fed. Competition Comm'n, OF. No. PRES-10-096-2005-117, Opinion Twelve (Oct. 31, 2005); Fed. Competition Comm'n, OF. No. PRES-10-096-2006-102, Opinion Eleven (Jul. 7, 2006); Commns. and Transport Secretariat, Convergence Agreement, Second Accord (Oct. 3, 2006).

[57] The draft law nº 29 establishes that the concessionaires operating at the switched fixed line services would be allowed to offer cable TV; except in localities where a cable TV provider launched its operations less than one year before the issuance of the new law (draft 29). In those localities, the concessionaires would need to wait one year after the issuance of the law in order to acquire a cable TV licence.

[58] *Cooperativa Telefonica de Libertador General San Martin before the Supreme Court of the Nation* (interpreting article 45 of Broadcasting Act 22.285, as amended by Law 26.053 of Sept. 14, 2005), available at www.atvc.org.ar/?pagina=legales_articulo_45.

[59] TRAI, India, *IPTV Services*, *supra* note 40, at 28.

[60] Foreign equity cap for broadcasters and backbone telecommunications service providers is capped at 49 percent. However, the method of calculating foreign equity different under the Telecommunications Business Act (calculation is based only on stocks with a voting right) and the Broadcasting Act (calculation is based on all stocks). Int'l Telecomms. Union (ITU), *IPTV Case Study of Korean Digital Convergence*, Study Group 1, ITU-D/E/57-E, at 10 (Nov. 4, 2007).

[61] For example, in the ongoing Public Consultation on *Policy and Regulatory Framework for Mobile Broadcasting Services in Singapore*, the Media Development Authority (MDA) has proposed not to mandate a single standard for mobile television service in Singapore as the MDA found it premature for a small market like Singapore to set a "particular standard when there is no obvious global champion," as well as no need for the MDA to depart from its policy of technology neutrality. *Supra* note 40, at 6.

[62] *See* Org. for Econ. Coop. and Dev. (OECD), *IPTV*, *supra* note 44, at 15.

[63] For OECD countries, *see* Org. for Econ. Coop. and Dev. (OECD), *supra* note 39, at 53-59.

[64] *See* Off. of Comms. (Ofcom), *Regulatory Challenges Posed by Next Generation Access Networks* (Nov. 23, 2006), available at www.ofcom.org.uk/research/telecoms/reports/nga/nga.pdf.