

Response of Dish TV India Ltd.
To
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On
Issues Relating to Mobile Television Service

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**1. Whether the technology for mobile television service should be regulated
Whether it should be left to the service provider?**

Response:

Mobile Television service is just like any other broadcast and content distribution platforms available in the country today such as Cable TV service, DTH service etc and hence needs to be regulated in the same manner. Amongst other things, the technology to be deployed for implementing Mobile TV should certainly be standards based to permit inter operability in the consumers' interest by way of regulations and should not be left to the service alone.

There are various reasons for this:

- (i) It has to be ensured that the technology deployed is highly spectrum efficient. It goes without saying that, RF spectrum is a scarce commodity and every effort is required to be made to optimize its usage.

- (ii) Regulation is also necessary to ensure that it does not lead to a scenario, wherein number of competing technologies get deployed in the country without appreciating the life, longevity and technological relevance of the same, particularly when some of these proposed technologies are most likely to become technically obsolete in a short period of time. A situation like this is neither in the interest of service providers nor in the interest of consumers.

The technology for the Mobile TV service should be based on open international standards which will benefit both the service providers & consumers as well as hand set manufacturers. This will lead to economies of scale and ensure the availability of cheaper handsets. The adoption of international standards based technology will also ensure interoperability of receiving devices.

It is our view that the technology for mobile television service should be regulated and it should not be left to the service providers.

2. If the technology is to be regulated, then please indicate which technology should be chosen and why. Please give reasons in support of your answer.

Response:

Before answering this question, it is first necessary to define clearly the term “Mobile TV Service”. Let us first consider TV over mobile cellular networks Initial offerings for mobile TV over cellular networks have been worked by converting TV signals into data packets, which are then transported over a 2.5G or 3G network. As mobile TV is basically a video application, content is usually delivered in one of the following three ways:

- Downloaded, usually for future consumption at a designated time (push and store)
- Streamed, usually pre-recorded or re-packaged and then streamed
- Live-stream.

Receiving TV signals without the need for a built-in TV antenna, however, raises the question as to whether cellular mobile TV can be called a genuine television service, as TV signals are not sent directly to the phone. In our view, a true TV service should be based on handsets with built-in TV antennas / front-ends capable of providing a live transmission. It is expected that most of the cellular based mobile TV will be either downloaded or streamed, as live-stream is not broadcast efficient over such networks.

Because of the reasons mentioned in the preceding paragraph ,it is our contention that the term ‘mobile TV’ should refer only to a broadcast network delivering live transmissions to portable/mobile hand held receiving devices which are equipped with appropriate receiving components such as antenna, tuner, front ends etc.

There are currently three different mobile broadcast technology groups jostling for market position and regional acceptance:

- DVB-H (Digital Video Broadcasting - Handheld)
- DMB (Digital Media Broadcasting, satellite and terrestrial)
- ISDB (Integrated Services Digital Broadcasting).

DVB-H:

It has been developed by the DVB Organization using OFDM. DVB-H represents the combination of broadcast and Internet technologies. It uses IP data casting (IPDC) to transmit TV content in a multicast topology over the DVB-T broadcast path. DVB-H is purely for mobile broadcast, offering a one-to-many alternative rather than the point-to-point topology of 2.5G or 3G cellular networks, with minimal battery consumption and a more penetrative signal to maintain contact on the move and within buildings.

The DVB-H network is similar in most respects to DVB-T, but the topology of the DVB-H network is closer to a cellular network topology (for example, more sites, less output power per transmitter). To convert to a DVB-H transmitter system, a multiprotocol encapsulator must be added to a DVB-T transmitter system.

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DMB:

Digital Mobile Broadcast uses DAB technology to deliver TV, video, CD quality audio and data. DMB is a system that was designed in South Korea and is based on the Eureka 147 DAB system over VHF band III. The significant differences between DMB and DAB are:

- DMB allows use of the BSAC (bit-sliced arithmetic coding) codec, which provides efficiency equivalent to AAC
- DMB adds MPEG 4 video capability to the European DAB system
- DMB adds an outer-layer of Reed-Solomon forward error correction (FEC) coding to improve signal robustness.

An advantage of using DMB is that current DAB transmitters can still be used, with only the multiplexing hardware and software needing to be changed. DMB also has a frequency planning advantage for local multiplexes compared with DVB-H due to the narrower 1.7 MHz channels.

There are two DMB systems for the broadcast of TV content to mobile devices:

- Terrestrial DMB (T-DMB)
- Satellite DMB (S-DMB).

S-DMB is a new concept in multimedia mobile broadcasting service that converges satellite telecommunications and broadcasting. The S-DMB terrestrial base stations, usually built on existing cellular network sites and based on the Eureka 147 DAB protocol, are used to fill in coverage gaps.

TDMB uses Eureka 147 DAB technology to deliver TV, video, audio and data to mobile or in car devices.

ISDB:

Integrated Services Digital Broadcasting (ISDB) is the Japanese digital television (DTV) and DAB format, which was created to allow radio and television stations in Japan to convert to digital. It is the ISDB-T standard that has been adopted as the basis for mobile TV trials using a prototype receiver that consists of a plug-in module attached to the bottom of handsets.

ISDB-T is also a modified version of the European Eureka-147 DAB standard designed to account for multipath reception, which can create *ghosting* in analogue systems, and featuring greater resilience to signal fading than DVB-T to take account of the demands of mobile propagation

Having thus seen the main features of the competing technologies, the crucial issue is to decide as to which is the best for use in this country. The DMB technology was suggested

as a modification of the existing DAB networks. In some countries the installed DAB networks proved to be commercial failures and converting them to DMB networks seemed to be a reasonable thing to do. It is also worth mentioning here that although DVB-H appears to be gaining increasing interest in Europe, it is notable that DAB, despite having been deployed on a large scale for digital radio services in the region, appears not to be a preferred choice as a potential platform for mobile digital TV broadcasting.

As regards ISDB, its latest extension known as OSB (One Segment Broadcasting) is the proposed solution for mobile TV broadcasting in Japan which has not found any takers around the world primarily because of limited data capacity available for mobile service.

There is also a technology mostly deployed in the US called Media FLO. However being a proprietary technology it is not suitable for adoption and need not be considered.

An objective analysis of the different networks should be based on the following factors:

- Ability to provide a one-to-many broadcast topology
- Network and device costs
- Reception quality
- Regulation
- Spectrum allocation and efficiency
- Power management.

In the light of the above, let us compare DVB-H and T-DMB the terrestrial version of DMB

1.Receiver performance:

- DVB-H has power consumption advantage over T-DMB (60% lower power).
- DVB-H has 3–6dB C/N performance advantage over T-DMB.

- DVB-H has less probability for flat fading.

2. Network cost:

- With lower network investment, DVB-H offers 3-4 times more capacity.
- Existing DVB-T networks are better starting point for DVB-H than existing DAB networks for T-DMB.

3. Spectrum Issues:

- Getting spectrum for T-DMB is more difficult than getting spectrum for DVB-H
- DVB-H spectrum efficiency is scalable(same as DAB or 3 times more)

4. Terminal availability:

- T-DMB and DVB-H terminal availability is at similar level and many more vendors are developing DVB –H terminals than T-DMB.

5. Networks elements availability:

- DVB-H network elements are readily available .

Initially Mobile TV services will be made available in urban areas. For this DVB-H based terrestrial SFNs provide the optimal solution. Further considering the fact that future digital terrestrial transmission in India would be based on the DVB-T standard and the fact that both DVB-T and DVB-H can co-exist on the same channel sharing the available bandwidth, DVB-H provides the perfect solution for mobile TV. In future if nation wide coverage is required, this objective could also be easily realized by adopting the DVB-SH standard currently under development.

Taking into consideration all the above mentioned factors it is our view that for Mobile TV services in India, DVB-H is the best solution.

It is also pertinent to bring out here that Interoperability is another key factor in the consumer interest, Regulator cannot overlook that, the need is to regulate the technology and strict compliance of this

The below placed article give the position in the European Union, which is Hub of all the technological advances and the trials in the Mobile TV

From European Union Website :
<http://europa.eu/rapid/pressReleasesAction.do?reference=IP/07/1118&format=HTML&aged=0&language=EN&guiLanguage=en>

Brussels, 18 July 2007

Reference: IP/07/1118

Commission opens Europe's Single Market for Mobile TV services

Today, the Commission has adopted a strategy favouring the take-up of mobile TV across the 27 EU Member States. The Commission urges Member States and industry to facilitate and accelerate the deployment of mobile TV across Europe and to encourage the use of DVB-H as the single European standard for mobile TV.

"Mobile broadcasting is a tremendous opportunity for Europe to maintain and expand its leadership in mobile technology and audiovisual services," said Viviane Reding, EU Commissioner for the Information Society and Media. "Europe is today at a crossroads. We can either take the lead globally – as we did for mobile telephony based on the GSM standard developed by the European industry – or allow other regions take the lion's share of the promising mobile TV market. 'Wait-and-see' is not an option. The time has come for Europe's industry and governments to switch on to mobile TV."

Until now, the introduction and take-up of mobile TV in the EU has been slow while Europe's competitors have progressed significantly. Unless Europe takes concrete action

immediately, it risks losing its competitive edge. For example, the mobile TV penetration rate of South Korea, Asia's most developed mobile TV market, is close to 10%. Yet penetration in Italy, the EU's most advanced market, is still less than 1%.

The Commission is strongly committed to the success of mobile TV (see [IP/07/340](#)) which could be a market of up to €20 billion by 2011, reaching some 500 million customers worldwide. The Commission sees today's Communication on Strengthening the Internal Market for Mobile TV as crucial to create jobs and business opportunities for content creators, service providers and hardware manufacturers, and to bring new value-added services to citizens.

Three key success factors have been identified by the Commission for mobile TV take-up:

- ***Standards/interoperability:** The Commission will promote consensus around a common standard, to reduce market fragmentation caused by multiple technical options for mobile TV transmission. The universal success of the GSM standard – which had been strongly supported by the Commission and Member States at the end of the 1980s – proves the benefit of a common standard. Currently, DVB-H (Digital Video Broadcasting for Handhelds) technology is the strongest contender for future mobile TV, with successful commercial launches and trials in 18 European countries, and increasingly worldwide. The Commission will therefore in the weeks to come prepare the inclusion of DVB-H in the EU's official list of standards (published in the EU's Official Journal) and will thereby legally encourage its use in all 27 Member States. It will look closely at market developments over the next months and come with proposals in 2008 including, if necessary and appropriate, mandating the use of DVB-H.*
- ***Spectrum:** Today's Communication outlines the need of an EU strategy for the "digital dividend", the premium spectrum that will be freed up by the switch-off from traditional analogue to digital TV broadcasting. The Commission calls upon Member States to make spectrum available for*

mobile broadcasting as quickly as possible, including in the UHF band (470-862 MHz) as it becomes available. This is considered the most suitable spectrum for mobile multimedia services due to its technical characteristics. The Commission has also initiated the opening to mobile TV services of another frequency band, the so-called L-band (1452-1492 MHz) as a fallback solution.

- ***A favourable regulatory environment:** National approaches to regulating mobile TV vary considerably at the moment. This generates regulatory uncertainty across the EU. The Commission considers that mobile TV is a nascent service and as such should benefit from "light touch" regulation. It will organise an exchange of best practice and provide guidance for a coherent framework for mobile TV authorisation regimes.*

2008 is considered by the Commission as a crucial year for mobile TV take-up in the EU due to important sports events, such as the European Football Championship and the Summer Olympic Games, which will provide a unique opportunity for raising consumers' awareness and for the adoption of new services.

Background:

In March 2006 the Commission encouraged setting up a European Mobile Broadcasting Council (EMBC) to promote mobile TV in Europe. It gathered players from the telecommunications, hardware manufacturers and the software, broadcasting and content industries. However, EMBC failed to agree on industry led-solutions. This is why the Commission has now decided to intervene, and to actively support the take-up of mobile TV in Europe.

Open and interoperable DVB-H terminals (phones and other devices)

DVB-H handsets and other devices should be completely open for content/services from any DVB-H distributor. This principle should apply both to free-to-air services as well as pay-TV services.

For pay-TV services, this implies that it must not be possible to block the subscriber from adding a security device from any DVB-H distributor to the terminal. The types of security devices presently relevant are SIMs and Micro SD cards for DVB-H phones, and for other devices.

The DVB-H phones are multi-purpose devices, and most of the users would prefer it to be available for phone calls and SMS messages as well. These basic services are controlled by the mobile operator's SIM. A mobile operator wanting to deploy DVB-H pay-TV should be able to use the same SIM for such services. However, to enable choice to the consumer, the best option would be if the DVB-H phone contains a second slot, whether a SIM or micro SD card slot, in such an event it shall be possible to plug a second SIM or a micro SD card through which it would be possible to grant access to DVB-H services in such second slot".

Interoperability: The DVB-H phone must either support a loader and an API allowing the Micro SD card to upload and get executed a driver that subsequently drives Micro SD card, or support another public way to mount a Micro SD card to the terminal. The APIs or the public specification must be at a level making the same functions available and giving the same level of service for the Micro SD card as for the first SIM.

It may also be noted that software based security devices are not robust enough for high-end pay-TV, and they are therefore not an alternative to second SIM or micro SD card.

European Experiences

Finland

Finland's arrangement for DVB-H is, to divide the licensing in two: Network License and Programming License. The Network License is held by a network operator called Digita. Digita under the Network license is obliged to:

- Sell capacity to all Programming licensees under fair, equal and reasonable terms,
- Not function as a service operator
- Not allow any single Programming licensee to purchase more than 1/3 of the network's capacity.
- Ensure a minimum coverage. Coverage beyond the minimum is a commercial matter between Digita and the Programming licensees.

The Programming License are granted to broadcasters and pay-TV distributors. Others can apply for a Programming license from the authority. A Programming license implies the right to promote the services to consumers.

Germany

Germany's model for DVB-H is similar to the Finnish, i.e. divided into a network and a programming license. However, in Germany, the authority initially select one player to get the programming license for the first DVB-H multiplex. This player, which may be a MNO (Mobile Network Operator) consortium or broadcasters (this is not determined yet), will negotiate with broadcasters, etc. with respect to content distribution. Subsequently, as spectrum is freed up, there may be more DVB-H programming licenses issued.

Receiving mobile TV on devices other than mobile phones

DVB-H is broadcasting to all types of receivers featuring a small screen or the ability to show a small image in a window of a bigger screen. So, DVB-H is to be received not only on mobile phones, but also on handheld TVs, car TV, GPS terminals, game devices, laptop PCs, etc.

In Korea where DMB is run by broadcasters/terrestrial broadcast operators, the consumption of the services on non-mobile phone terminals represents between 30 and 40% of overall consumption.

In the other market that have been functioning for a while, Italy, where the DVB-H is run by mobile operators, consumption till now is via mobile phones only thereby not exploiting the full potential of mobile TV. This is mainly due to the fact that the mobile operators want to focus all consumption around the mobile phone and the SIM, and are not interested in multifold TV consumption which otherwise is more flexible for the consumer.

To turn it round: why should a consumer wanting to watch TV while on the move, has to buy a mobile phone?

Mobile TV is a broadcast service – not a telecom service

Defining video broadcasting to be the one way transmission of video from an operator to many concurrent users, and telecommunication to be the two way communication between users (and not the operator), then mobile TV is clearly a broadcast service and not a telecommunication service.

DVB-H are broadcast techniques using broadcast networks. The difference is, DVB-H are targeted small screens/handhelds, and apply specific techniques compared to other broadcast formats for robustness while in speed (cars etc.) and for minimum power dissipation for longer battery.

Mobile TV is a term which gives wrong impression as it gets people to think about TV received on a mobile phone and thereby TV to be delivered by the mobile operator. According to the above definition TV 'on mobile' would be a more appropriate term.

3. What will be the frequency requirement for different broadcast technological standards for terrestrial and satellite mobile television transmission in India?

Response:

DVB-H is designed to work in the following frequency bands:

1. VHF Band 3 (170-230 MHz)
2. UHF Bands 4 & 5.(470 – 862MHz)
3. L Band (1452-1492 MHz)

We have to first consider the question that out of these bands , which is the best band for DVB-H operation?

The level of transmitter power required has a large effect on the cost of the transmitter network .Transmitter powers are highly dependent on both the frequency and bandwidth of the transmitted signal – the lower the frequency and narrower the bandwidth, lower the required transmitter power. Further radio waves also propagate over longer distances at lower frequencies. However there are also other equally important factors which need to be taken into consideration before deciding on the optimum band for DVB-H transmission.

DVB-H can be transmitted alongside terrestrial digital TV channels in a DVB-T multiplex.. However DVB-T multiplexes usually use high data capacity transmission modes and are planned for rooftop Ariel reception whereas DVB-H must cater for ground level,high speed mobile reception Consequently DVB-T multiplexes are found not to be suitably configured for carrying DVB-H services ,**instead it is envisaged that**

DVB-H services will typically run on purpose built multiplexes for DVB-H services only.

Next comes the important question: What is the optimum bandwidth for DVB-H transmission?. Like DVB-T, DVB-H can also use 6,7 or 8 MHz channels. but in addition to this DVB-H can also use a 5 MHz channel which brings down the required transmitter power.

Also there is the question of optimum FFT length. In addition to the 2K and 8K modes originally specified for DVB-T, DVB-H has an optional 4K mode. The 'mode' affects both mobility and SFN (Single Frequency Network) design. For a given mode, there is an upper limit on the speed of moving vehicles, beyond which mobile reception is not possible. This upper limit comes down as one moves from the 2K mode to the 8K mode. Further for a given mode, there is an upper limit on the spacing between adjacent transmitters in a SFN network. For the 8K mode this is 4 times than that for the 2K mode. In other words, for a given number of transmitters, maximum possible SFN size in 8K mode is 4 times compared to the 2K mode. The optional 4K mode of DVB-H increases mobility by a factor of two when compared to the 8K mode, and doubles the maximum SFN size when compared to the 2K mode. **In view of all these reasons, for DVB-H, 5 MHz channels with the 4K mode seems to be the optimal solution..**

Worldwide, VHF Band 3 and UHF Bands 4 and 5 were hitherto deployed for analog television broadcasting using 6,7 or 8 MHz channels. Currently a number of countries have launched digital terrestrial television broadcasting using the DVB-T standard. This simulcasting of digital and analog services will continue for a period leading to an eventual switch off of all analog services. Given this scenario, it will be difficult to introduce exclusive DVB-H transmission using 5MHz channels, in these bands., particularly during the simulcast period. **However it is possible to use these bands for transmission of DVB-T multiplexes carrying both DVB-T/DVB-H components.**

The designers of the DVB-H system have stated their preference for spectrum in the broadcast Band IV between 470MHz and 582MHz. This is prime spectrum real estate for any wireless radio services, close to the optimal, as it is low enough in frequency to offer long distance propagation characteristics and high enough to avoid the worst effects of man-made noise interference. For those designing a receiver product which includes mobile telephone capabilities, this frequency range minimizes potential interference at the receiver between the DVB-H reception and the GSM/UMTS transmissions.

In UHF Band V, spectrum beyond 806 MHz has been exclusively assigned for cellular mobile services. **Of the remaining 27 channels, currently no assignment has been made for analog TV transmission in India and is thus available.**

An alternative to the UHF band is the L Band.(1.5GHz) even though the cost of a transmitter network for the L Band would be much more expensive than at UHF.

However L Band has some significant advantages also. To begin with, the antenna size available in a handheld receiver ideally suits a higher frequency use. Further, frequency planning for introducing exclusive DVB-H transmissions in 5MHz channels in L Band will be a considerably easier process as the planners need not have to deal with interference to and from both analog and digital terrestrial transmitters.

Let us now consider satellite transmission of mobile TV. Currently the system proposed for this is the S-DMB system. **However the table given below clearly shows that terrestrial transmission based on DVB-H is a far superior alternative for mobile television delivery.**

S-DMB Vs DVB –H

<p>1.<u>STANDARD USED</u></p> <p>S-DMB uses a standard similar to System</p>	<p>DVB-H is an international standard and has</p>
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<p>E. System E is a standard for Digital Satellite-terrestrial hybrid radio broadcast to fixed/portable and mobile users. It uses a network of in-band on-channel terrestrial repeaters to overcome satellite signal outages in the coverage area. However this standard was not meant for delivery to mobile phones.</p>	<p>been adopted by ETSI for delivery of IP data cast services to mobile handheld devices. It is an extension to the DVB-T standard and makes use of another standard called DVB-MPE (Multi Protocol Encapsulation) to carry IP packets over MPEG-2 transport packets.</p>
<p><u>2. FREQUENCY BAND OF OPERATION</u></p> <p>S-DMB uses a 25 MHz band in 2630-2655 MHz (S Band) range</p>	<p>DVB-H uses 7/8 MHz channels in the VHF/UHF bands currently used for analog TV transmission.</p>
<p><u>3 TRANSMITTED CHANNELS</u></p> <p>Uses CDMA technique to transmit 30 channels (out of a theoretically possible 60). Each channel can carry a bit rate 236 Kbps to 413 Kbps depending upon the inner code rate selected</p>	<p>A DVB-T transmitter emits a multiplex of TV channels. The total data capacity depends upon the selected transmission parameters-max bit rate is 24Mbps. However when optimized for mobile reception it can be about 15 Mbps. A part or full of this capacity can be used for DVB-H transmission. In other words for e.g. 3/4th of this capacity can be used for DVB-T services and 1/4th (approx 3.75Mbps) can be used for carriage of DVB-H service. This is enough to carry 6 video streams or 15 stereo audio signal</p> <p>Thus BW capacity of DVB-H is much higher</p>
<p><u>4. IN BAND Vs OUT OF BAND</u></p>	

<p><u>DELIVERY</u></p> <p>S-DMB uses “in band” delivery using W-CDMA modems. This means signal is compatible with CDMA based handsets hence handsets can be less expensive.</p> <p>However this has the disadvantage of rather low data transfer capacity restricting the use to only “push and store” services. This in turn necessitates the use of high capacity storage devices in the handset</p>	<p>DVB- H uses “Out of band” delivery over a dedicated channel-means higher capacity but more expensive handset with dedicated built in DVB-T modem.</p> <p>Advantage- Delivery of live content is possible.</p> <p>DVB-H uses a technique called “time slicing” for power saving. Data is transmitted in (greater than real time) bursts and receiver is switched off in between bursts saving power</p>
<p>5. <u>COVERAGE</u></p> <p>S-DMB- This is the great advantage of satellite transmission –country wide coverage possible. However it also brings with it disadvantage-difficulties in putting in local content.</p>	<p>DVB-H – Local content insertion is possible-Nationwide coverage possible. Both MFN and SFN possible. Reception possible with one antenna. Handover with a single front-end.</p> <p>DVB-H offers greater flexibility in network planning:-</p> <ul style="list-style-type: none"> • 5 MHz channels for non-broadcasting bands. • 2K mode –Lesser distance between SFN transmitters • 8K Mode- Maximum separation between SFN transmitters. Doppler tolerance worse than 2K

	DVB-H also provides non broadcast 4K mode as a compromise.
<p><u>6. TERRESTRIAL REPEATERS</u></p> <p>SDMB – Uses two types of repeaters to overcome signal outages</p> <ol style="list-style-type: none"> 1. Direct amplifying repeaters Receives S-band signal for satellite amplifier (with small gain to avoid oscillation due to input/output coupling) and retransmits, Range : 500m 2. Frequency conversion repeaters receives satellite transmission in 11 GHz , converts to S Band, amplifies and transmits, Range:3km 	<p>DVB-H: Limited number of terrestrial repeaters used as gap fillers.</p>

**For national coverage using satellite transmission a new system has been proposed:
DVB-SH:**

DVB-H in UHF is acceptable for city coverage with numerous repeaters. However, it becomes uneconomical for nationwide coverage, as it would require a very large number of transmitters and repeaters.

DVB-H in S-band using a hybrid solution offers city coverage with repeaters and nation wide coverage with satellite, The system provides universal coverage by combining a satellite component (SC) and a complementary ground component (CGC).The CGC is an

OFDM modulated signal in terrestrial (VHF/UHF/L) where as SC can be generated either by a simple up conversion of CGC to S band or by TDM modulating the satellite carrier as in DVB-S2.

4. Which route would be preferable for mobile TV transmission – dedicated terrestrial transmission route or the satellite route? Should the mobile TV operator be free to decide the appropriate route for transmission?

Response:

It is submitted that large number of factors, both technical and non technical have to be carefully considered before arriving at an answer to this question. To begin with, as has already been mentioned earlier, while DVH-H in UHF is acceptable for city coverage with numerous repeaters, it becomes uneconomical for nation wide coverage as it would require a large number of transmitters and repeaters. In spite of this, taking this terrestrial route and gradually building a nation wide network seems to be a better approach Among other things, one great advantage of this approach is that all the needed investment need not have to be made in one go.

Further, it is expected that, in the initial stages, Mobile TV will find ready acceptance only in urban areas. Currently, a lot of research is being carried out around the world, to determine the type of content which will find acceptance with the mobile audience. In spite of this there is still a lot of uncertainty in this. Added to this is the further complication of an intervening simulcast period, the duration of which is not known at this point of time. What this means is that frequency planning for this service has to be done separately for the simulcast period and the post analog era.

Considering all these factors, it is our view that, the terrestrial route appears to be the better approach. In any case, the final decision should be left to the operator.

5. How should the spectrum requirements for analogue/ Digital/ Mobile TV terrestrial broadcasting be accommodated in the frequency bands of operation? Should mobile TV be earmarked some limited assignment in these broadcasting bands, leaving the rest for analog and digital terrestrial transmission?

Response:

As has already been mentioned ,it is necessary to carry out frequency planning separately for the simulcast era and the post analog era.

Currently the majority of DD TV transmitters operate in the VHF Band. The remaining transmitters operate in the UHF Bands.

In this scenario, for introducing digital transmission the following approach can be taken.

In case the existing analog transmitter is operating in the VHF band , a channel in the UHF bands can be chosen for the digital transmission and vice versa. Alternately if the same band is to be used for analog as well as digital transmission, the upper and lower adjacent channels can be used for this purpose. For example if an analog transmitter is operating in channel number say, 9 then digital transmitter can operate either in channel 8 or channel10.This is possible because a digital transmitter could be operated at a much lower power level as compared to the existing analog transmitter while maintaining the same coverage area as that of the analog. Because of this there will not be interference from digital to analog. Also because of the much higher immunity of digital transmission against interference, there will be no interference from analog into digital.

In the digital era each transmitter will be emitting a ‘multiplex’ of four to six TV programs. The actual number of TV channels in a multiplex depend upon the choice of transmission parameters. **This means that there will be approximately a five fold increase in transmission capacity. Part of this increased capacity could very well be used for transmission of DVB-H signals.**

As an example consider this. For a DVB-T transmitter the chosen parameters for fixed reception could be just over 25 Mbit/s. This could be used for transmitting say 5 SDTV channels. Alternately if we chose the transmission parameters for robust mobile reception, this could give us a total bit rate of about 15 Mbits. If we now decide to use one fourth of this capacity(3.75 Mbit/s) for carrying DVB-H signals, it will be possible to deliver 6 video streams or 15 stereo audio signals to mobile devices.

In the digital era further increase in the spectrum utilization efficiency can be achieved by using well designed single frequency networks as opposed to multi frequency networks, for coverage of a given area.

6. In the case of terrestrial transmission route, how many channels of 8 MHz should be blocked for mobile TV services for initial and future demand of the services as there are nearly 270 TV channels permitted under down linking guidelines by Ministry of Information and broadcasting?

Response:

The table below shows the data rates for audio and video for various applications.

Type of DVB Receiver	H.264/AVC-Level	Video Resolution	Maximum bit rate	Typical Application
A	1	QCIF (180*144)	128 kbit/s	UMTS telephone
B	1.2	CIF (360*288)	384 kbit/s	UMTS telephone,PDA
C	2	CIF (360*288)	2 Mbit/s	Pocket receiver

As could be seen from this table the number of channels which could be carried in a DVB-H signal depends upon the application and could be anything from 10 to 55.It is this scalability which is the main feature of this technology.

Further it could also be seen from the table that the DVB-H signals could be delivered not only to mobile phones but also to PDAs as well as pocket receivers. Considering all these factors maximum possible allocation should be made for Mobile TV

7. Whether Digital Terrestrial Transmission should be given priority for the spectrum assignment over mobile TV, particularly in view of the fact that the Mobile TV all over the world is essentially at a trial stage.

Response:

Today the penetration of DTH and CATV is increasing at such a fast pace that in the near future digital terrestrial broadcasting will cease to be a platform for delivery of television to the home. In the future digital terrestrial broadcasting will be increasingly deployed to deliver TV to people on the move. Today mobile TV may be at a trial stage around the world, but this is going to change within a very short time.

Mobile phone ownership and usage are still growing dramatically on global basis. There are now around 2 billion paying customers. And increasingly, consumers are using their mobile phones for multimedia – not just for communication, but also for entertainment (with streamed video, music and games), and for news and other information services. Mobile TV is easy to understand and has obvious uses, so already there is genuine consumer interest. Studies conducted around the world indicate that a good number of users are highly interested in acquiring the service and prepared to pay a realistic charges for the same. Because there is no theoretical limit to the number of people who can receive content broadcast within a coverage area, digital broadcasting is a highly cost-effective way to reach a large audience. When combined with IP (Internet Protocol) Datacasting, digital broadcasting enables mobile phone users to receive a wide selection of top quality TV services over a DVB-H Network

The selection of DVB-H as the Mobile TV standard, among other things provide us the flexibility for spectrum assignment. This flexibility comes from the fact that both DVB-T and DVB-H signals can coexist on the same DVB-T channel .This means that as Mobile TV becomes more popular in the future, the full available capacity can be assigned for DVB-H carriage.

8. Whether the frequency allocation for the mobile TV should be made based on the Single Frequency network (SFN) topology for the entire service area or it should follow Multi Frequency Network (MFN) approach.

Response:

Single Frequency Network (SFN)

An efficient network for DVB-H reception can be built by using several transmitters on the same frequency. A large area of up to 60 kilometers can be covered without needing high transmitter towers. The identical signals are transmitted from several sites and the system behavior is similar to that of a distributed transmitter. The DVB-H main transmitters must be accurately synchronized, most easily with time signals received from GPS satellites. Repeaters can be used to improve coverage on critical areas where indoor or car reception performance has been found to be insufficient. This kind of network structure is sometimes known as a Dense SFN network.

Nation-wide coverage

When nationwide coverage is required, over distances of hundreds of kilometers, several radio frequency channels will be needed. Users of different channels in neighboring areas gives the possibility also to run local content in each area. This may be important with DVB-H where local content is expected to have an important role.

An alternative is to use an hybrid system such as DVB-SH which uses a satellite component for providing national coverage.

9. Whether frequency spectrum should be assigned through a market led approach – auctions and roll out obligation or should there be a utilization fee?

Response:

Dish TV India would like to suggest allocation of spectrum to all interested broadcasters with a roll out obligation of a maximum 1 year in the area in which it seeks licensing. At present we do not advocate grant of any spectrum to any telecom operator who have been granted spectrum. Dish TV would like to suggest that revenue share on the basis of AGR should be the mode of charging for spectrum, the Mobile TV operator should be subject to a minimum specified fee per year.

As this will be a new initiative for content delivery platforms and sufficient UHF slots are available, thus Dish TV does not foresee any need to auction the spectrum. It has been observed that auctioning normally leads to hoarding of the spectra by non-serious players. This should be avoided.

10. What should be the eligibility conditions for grant of license for mobile television services?

Response:

As the licensed DTH operators have the requisite experience for content aggregation, operations of infrastructure, the encryption technologies, middleware, SMS & CRM systems and thus are most eligible for granting of DVB-H license. The applicant company should be an Indian company duly registered under the provisions of The Indian Companies Act, 1956 with Indian management & control. The CEO and the key Executives should be Indian citizens & persons resident in India. The conditions of eligibility are similar for both mobile TV and terrestrial TV services.

In addition to the FDI guidelines, as creation of content for mobile TV is a specialized business only those broadcasters who have experience in running channels belonging to all genres and languages over past 10 years should be considered as eligible licensees.

Hence only serious contenders with requisite due experience both in content generation & content aggregation as evidenced by broadcasting channels in the Indian markets and also experience in running a Pay TV service through encryption and SMS/CRM centers should be considered.

The following is the suggested as the basic minimum eligibility criteria:

Applicant Company to be an Indian Company registered under the Indian Company's Act, 1956.

(i) The applicant company must have Indian Management Control with majority representatives on the board as well as the Chief Executive of the company being a resident Indian.

(ii) A minimum of 3 years experience in running channels of all genres including news, business, sports, general entertainment, lifestyle, music and kids channels. The channels should include regional language channels.

(iii) An experience of a minimum of three years of operating an encrypted Pay TV service in India with Subscriber management System (SMS), Customer care centre and a countrywide distribution system

(iv) Demonstrated capability and past experience in running of an EPG and Carousal based service providing magazines and games to users in a Pay TV environment.

(v) Demonstrated capability and past experience of marketing of pay TV services in India and a countrywide network of distributors/ dealers for customer support and billing/ collection.

(vi) Past experience and demonstrated capability of acquiring content, negotiating content rights and enter into long term agreements for content aggregation and distribution.

11. Whether net worth requirements should be laid down for participation in licensing process for mobile television services? If yes, what should be the net worth requirements for participation in licensing process for mobile television services?

Response:

Dish TV India suggests a minimum networth of Rs 200-250 crores for a company being eligible to bid for a Terrestrial or a mobile TV license for Nationwide services.. This is owing to the fact that rolling out terrestrial services including Mobile TV requires large expenditure and capability to sustain operational losses for a couple of years as a minimum.

12. What should be the limit for FDI and portfolio investment for mobile television service providers?

Response:

As a first step, the eligibility for terrestrial services should require the same terms and conditions as are applicable for a DTH licensee as the terrestrial transmission services which can be received direct to the home or on personal mobile devices have the same sensitivity as the DTH services.

The provisions relating to the Content delivery and media have been appropriately brought under the FDI guidelines with the understanding that the operation of media, news, content generation and delivery services is a sensitive issue and foreign investors

wishing to operate in this field need to adhere to guidelines which have been laid down for this purpose.

The FDI regulations have been prescribed by the Parliament and TRAI has no mandate to dilute any provisions which have been enacted by the Parliament by permitting services which deliver content including news and current affairs, in a manner which is identical to DTH/ Cable TV. Thus the same FDI limit should be applicable to Mobile TV as is applicable to DTH platform.

13. What should be the tenure of license for the mobile television service providers?

Response:

The tenure of license for Terrestrial and mobile TV services should be 10 years, extendable by an additional 10 years.

14. What should be the license fee to be imposed on the mobile television service providers?

Response:

The license fees should be 4% of the Adjusted Gross Revenue (AGR) from mobile TV services or terrestrial transmission services. There should be no entertainment tax or service tax on such services.

15. Whether in view of the high capital investment and risk associated with the establishment of mobile television service, a revenue share system would be more appropriate?

Response:

Dish TV India's view that the revenue sharing system as is in Vogue for VSAT, is the only system which will work. Hence we suggest the licensing of Terrestrial TV services (including Mobile TV) based on the revenue share model as is applicable to for VSAT services, as mentioned hereinabove.

16. Whether any Bank Guarantee should be specified for licensing of the mobile television service providers. If yes, then what should be the amount of such bank guarantee? The basis for arriving at the amount should also be indicated.

Response:

A licensee, who is granted a terrestrial license and is permitted to use spectrum on a revenue share basis needs to be able to put resources and commence network operations in a timely manner. This is because by virtue of having taken the license it would be using scarce resources using which others might have commenced similar services.

Hence we propose that a bank guarantee of Rs 10 crores valid for a year should be prescribed.

17. Whether the licenses for mobile television service should be given on national/ regional/ city basis.

Response:

Dish TV India recommends grant of licenses either on a city/state/national basis as is being done in ISP services.