



सत्यमेव जयते

Telecom Regulatory Authority of India

**Consultation Paper  
on  
Technical Interoperability of DTH Set top Boxes**

New Delhi: August 20, 2010

Mahanagar Doorsanchar Bhawan

Jawahar Lal Nehru Marg

New Delhi- 110 002

## Preface

DTH services in India have registered a very impressive growth since its inception in the year 2003. Today, besides Doordarshan, there are six private DTH service providers with a subscriber base of over 21 million subscribers.

DTH service providers currently follow different standards in terms of transmission, compression and encryption technologies. Resultantly, a separate Set Top Box (STB) is required for each service provider. Technical interoperability enables subscriber to receive signals from any DTH service provider using same STB. In the year 2008, TRAI had recommended that technical interoperability be part of the license conditions. However, in view of the increased number of DTH operators and standards, M/o I&B has recently requested the Authority to reconsider the issue of technical interoperability.

In line with established practice, this consultation paper has attempted to bring out various issues involved in technical interoperability. All stakeholders are requested to benefit the Authority with their valuable comments by 7<sup>th</sup> September 2010. Counter comments, if any, on the comments received may be sent by 12<sup>th</sup> September 2010. The full text of the consultation paper is available on TRAI website – [www.trai.gov.in](http://www.trai.gov.in).

**(Dr. J. S. Sarma)**  
Chairman, TRAI

## Table of contents

Introduction.....	3
Chapter I. Set Top Box -Architecture and Standards.....	6
Chapter II. Technical Interoperability issues .....	13
Chapter III. Summary of Issues for Consultation .....	23

## Annexures

Annexure I . Reference from The Ministry of Information and Broadcasting.....	24
---	----

## Introduction

- (i). In 2001, the Government of India, withdrew the prohibition on the reception and distribution of television signal in Ku band. The first Direct -to-Home (DTH) license was awarded by the Ministry of Information and Broadcasting in 2003. Telecom Regulatory Authority of India has been entrusted with the regulation of broadcasting services since January 9, 2004.
- (ii). In 2006, Ministry of Information and Broadcasting sought recommendations of TRAI on various issues related to a DTH license. One of the issues included technical interoperability in case of set top boxes with recording facility, namely personal video recorder (PVR) or Digital video recorder (DVR).
- (iii). After due consultation process, including a meeting with the two existing DTH operators, the Authority furnished its recommendations to the Ministry on August 25, 2006. On the issue of technical interoperability, it was recommended that there should not be any amendment in Clauses 7.1 and 7.2 of the DTH License Agreement which mandate technical interoperability for DTH set top boxes. It was further recommended the DTH Service Providers should also be encouraged to provide basic or advanced set top boxes to consumers under rental schemes, but there should be no dilution in the technical interoperability conditions.
- (iv). The regulatory issues relating to DTH set top box were taken up again in another Consultation Paper dated March 2, 2007. Apart from other issues, the views of the stakeholders were ascertained on adequacy of technical interoperability of set top box as an effective exit option for the subscribers. Consequently, the Authority notified the Direct to Home Broadcasting Services (Standards of Quality of Service and Redressal of Grievances) Regulations, 2007 (8 of 2007). The said regulations make it obligatory on the part of DTH operators to provide set

top boxes to subscribers on outright purchase basis or on hire purchase basis or rental basis. This is commonly termed as commercial interoperability in the given context. These Regulations came into effect from December 1, 2007 onwards.

- (v). The Ministry, in September 2007, while referring to TRAI recommendations dated August 25, 2006 again sought the recommendations on the issue of interoperability of set top box. There was an indication that there would be two more DTH operators who wished to adopt MPEG-4 compression format. After considering the observations mentioned in the Ministry's reference dated September 28, 2007, TRAI furnished its recommendations to the Ministry on January 30, 2008. The Authority, in this regard, recommended retention of existing technical interoperability conditions and updating of standards for set top boxes. These views were reiterated in March 2009 in response to the Ministry's reference dated February 2, 2009.
- (vi). In the meanwhile, the issue of interoperability of DTH Set Top Box was part of one of the petitions before Hon'ble TDSAT. Another petition on the same ground is sub-judice. These petitions have been filed on the behalf of different consumer groups.
- (vii). Since the start of DTH operations in India, the subscriber base has grown manifold. At present, there are six DTH operators apart from Doordarshan DD Direct Plus service. These DTH operators have adopted different technological standards for their network operations. The Ministry of Information and Broadcasting vide Reference No. 8/5/2006-BP&L-Vol.II dated May 11, 2010 has requested TRAI to reconsider the recommendations dated January 30, 2008 and furnish the recommendations after taking into consideration the views of the Government as contained in the reference. The reference from MIB is at Annexure- I.

(viii). This consultation paper seeks the comments of the stakeholders on the related issues. This paper, after presenting details of set top box, its architecture and standards in chapter I, deals with the views recently expressed by the Ministry and resulting analysis in chapter II. Chapter III presents the summary of issues on which stakeholders are requested to offer their comments and counter-comments.

## Chapter I. Set Top Box-Architecture and Standards

- 1.1 Since the start of DTH operations in India from 2003 onwards, DTH services have registered impressive growth. The number of DTH subscribers across India is reported to be over 21 million as on March 2010. The growth in terms of number of subscribers continues to be significant and is expected to be of the order of 21%<sup>§</sup> on CAGR basis for the period 2009-2014. Thus, DTH services assume the status of one of the preferred distribution platform for TV channels along with the cable TV distribution services.
- 1.2 As DTH an addressable system, the private DTH operators, a unique identity or ID is allotted to each of the enrolled subscriber. Physically this unique ID is part of a viewing card (VC) that gets inserted into the generic set top box before activation of services. This ID continues till the subscriber continues to receive TV channels through the given DTH operator. The Set Top Box (STB), viewing card, mini dish and other accessories are presently made available to the subscriber by the DTH operators. There is an exception in the case of Doordarshan DTH services called as DD Direct plus for which subscribers buy the dish, the set top box and other accessories from the open market.
- 1.3 DTH operations involve compression, encryption and transmission of large number of channels using high power satellites. The programmes are received directly at home. With the advent of satellite TV, STB has become an essential component of reception equipment. The transmission of television signals is digital whereas most of the television sets being used at home are still analog. So, a STB, after demodulating, decrypting and decompressing the bit stream, converts the digital signal to analog signal so as to enable a viewer to watch content on television. Moreover, it provides a host of services to enhance

---

<sup>§</sup> As per Media Partners Asia report – “ Asia-Pacific Pay TV and Broadband Markets 2010”

television viewing experience. For example - Electronic Program Guide (EPG) gives program schedule or listing for all the channels. This is one application where subscriber can mark programs for reminders/recording, or set up their favourite channel list or block channels from being watched by children.

- 1.4 Since there are six private DTH operators that offer Pay TV services directly to subscribers on all India basis, a subscriber is able to choose the service provider after evaluating prices, quality and range of services. The choice to choose a service provider may be one of the reasons for the substantial growth of DTH services in the recent years. With the increase in the subscriber base, DTH operators have been increasing the number of TV channels and value added services on their respective networks. It also leads to a situation where subscribers may like to switch-over from his DTH operator to another operator for better quality of service, availability of value added services or better pricing offers.

#### **Technical and Commercial Interoperability**

- 1.5 In the perspective of subscribers, provision of switch-over from one operator to another at a minimum exit load becomes an important aspect of DTH services. In this context, the subscriber who already possesses the mini dish, set top box and accessories, commonly called as Customer Premises Equipment (CPE), may like to have an option of retaining the same CPE and take services from a different DTH operator. This is known as technical interoperability\*\* whereby the same CPE can be used for availing services of any other DTH operator after enrolment. Alternatively, he may like to surrender the available CPE to the existing service provider and get back money as per pre-defined agreement and then take the appropriate CPE from another DTH service provider. This type of interoperability is called as commercial interoperability.

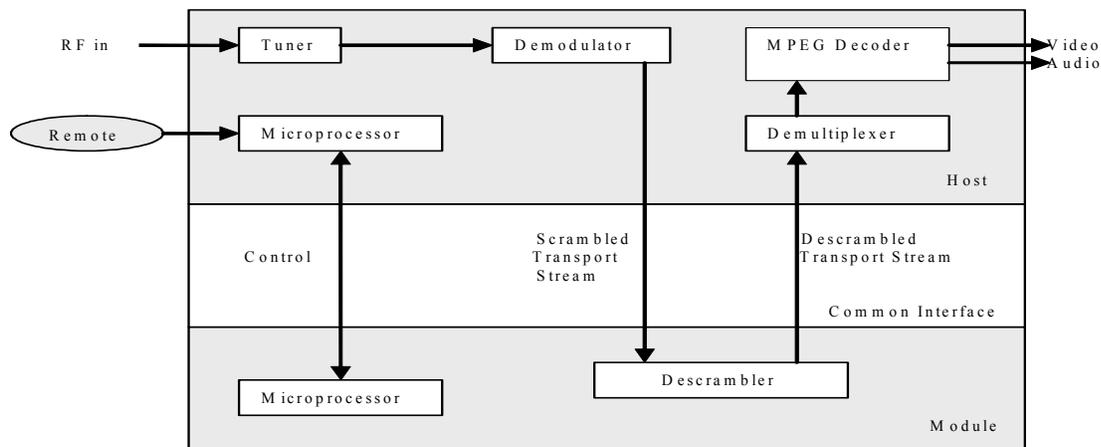
---

\*\* A CPE is said to be interoperable amongst a set of networks if it can receive services from any of these networks.

1.6 If the set top box is based on Open Architecture and technically interoperable, the cost of switch-over from one service provider to another for a subscriber may be minimal. A Set Top Box is a collection of a number of small functional blocks or modules, with each module performing well defined function. A module can be composed of only hardware or only software or combination of the two. Architecture can be considered to be 'Open' if the functionality of each and every module in that architecture is available in the public domain in the form of published international standards or de-facto industry standards.

**Basic Architecture of a Set Top Box**

1.7 For any DTH STB to be interoperable, there are number of factors. At the functional level, STB is required to receive the RF signal from satellite, demodulate, descramble and decompress the video & audio stream available through the mini dish. In view of availability of different transmission, compression and encryption standards, DTH operators may choose a combination of standards. This in a way leads to possibility of different DTH networks with different set top boxes. The basic block diagram indicating the functional description of a set top box is given below:



**Figure : Functional Block Diagram of a Set Top Box**

- 1.8 The RF input signal from the antenna is connected to the tuner of the STB. The tuner and demodulator relate to transmission system<sup>††</sup> adopted for satellite based transmission. Here, the signal gets converted from RF signal to a baseband data stream for further processing. The most prevailing standards are namely DVB-S and DVB-S2. DVB, Digital Video Broadcasting, refers to an international standardization body. DVB-S, developed in 1993, is used by most of the satellite broadcasters around the world for DTH TV services. The second generation standards, DVB-S2 in this series have been developed in 2003. DVB-S2 is reported to achieve a saving of 30% satellite bandwidth as compared to DVB-S. There are other attributes of DVB-S2 that make it more flexible to operate on variety of satellites and offer range of services, notably the interactive services.
- 1.9 The next component after demodulator is descrambler. In a scenario where TV content is priced and is made available for viewing to subscribers on subscription basis the role of efficient and reliable encryption/Conditional Access (CA ) system is important. In this component, the bit stream is decrypted on the basis of keys made available by the Conditional Access system. It protects unauthorized viewing of the TV content. There are a number of CA service providers in the world that provide conditional access solutions on the basis of proprietary technology or algorithm.
- 1.10 The digital video/audio signals are compressed before transmission. This helps in saving the satellite transponder bandwidth. The signals are de-compressed at the receiver end. There are different video/audio compression standards that have been widely adopted by satellite TV operators. The block indicated as 'MPEG decoder'<sup>©</sup> decompresses the decrypted compressed video/audio data stream in addition to converting the digital stream into a analog signal fit for

---

<sup>††</sup> The role of a transmission system is to ensure efficient and reliable transfer of data stream over the RF channel. In case of DTH, the RF channel comprises of radio link between earth station of a DTH operator to the satellite and from the satellite to the mini dish at the subscriber premises.

<sup>©</sup> MPEG – Moving Picture Experts Group

viewing on analog TV set. Such decoder may be compatible to MPEG-2 or MPEG-4 standards.

- 1.11 MPEG-2 is a global standard that specifies the syntax and semantics of a video/audio bit stream. However, MPEG-2 does not define how the decoder and encoder should be implemented. The designers are free to develop the best encoding and decoding methods while complying to MPEG-2 standards. MPEG-4 refers to next generation of standard after MPEG-2. MPEG-4 is reported to have some advantages over MPEG-2 in the context of Digital TV. These are satellite bandwidth savings of the order of 50% as compared to MPEG-2 and support for wide range of TV services including interactive multimedia and compatibility with Internet Protocol (IP).
- 1.12 Apart from these hardware features that may differentiate set top boxes on the basis of standards adopted, there are some software features that could also make STBs different. The DTH set top box in order to support various services also requires an element of software that resides on the hardware of the STB. Such software is termed as 'middleware' and support services such as Electronic Program Guide (EPG) unique to each DTH operator.

### **DTH License Conditions and BIS Standards**

- 1.13 The relevant conditions as per DTH license agreement are as under:

*" Clause 7 (Technical Standards and Other Obligations) :*

*Clause 7.1 and 7.2 of DTH license conditions:*

*7.1 The Open Architecture (non-proprietary) Set Top box, which will ensure technical compatibility and effective interoperability among different DTH service*

*providers, shall have such specifications as laid down by the Government from time to time.*

*7.2 The Licensee shall ensure subscribers' interests through a Conditional Access System (CAS), which is compatible with an Open Architecture (non-proprietary) Set Top Box."*

- 1.14 Bureau of Indian Standards (BIS), on behalf of the Government, issued the standards for DTH STBs in 2003 under code IS 15377:2003. The specification only defines two aspects, two logical interfaces to be included on the same physical interface. The first interface is MPEG-2 transport stream. The link and physical layers are defined in this specification and the higher layers are defined in the MPEG-2 specifications. The second interface, the command interface, carries commands between the receiver and the module that performs a specialized task such as decryption. Other standards mentioned above such as DVB-S2, MPEG-4 have not been included in the BIS endorsed standards.
- 1.15 The specification does not define the operation or functionality of a conditional access (CA) system application on the module. While it has standardized the scrambling algorithm, algorithms used for control messages and Control Words i.e. Entitlement Control Messages(ECM)/Entitlement Management Message(EMM) encryption are not standardized. It is possible that hardware of STB may be so designed that the decryption of coded bit stream is done by an in-built component in the STB. Any STB with embedded functionality of decryption cannot be termed as based on Open Architecture. Further, an STB will not be interoperable across different networks which use different encryption or Conditional Access (CA) systems. Alternatively, the STB may have a Common Interface (CI) wherein a separate detachable unit, commonly known as

Conditional Access Module (CAM), is used for decryption of the bit stream. In this case, the STB contains only those elements that are needed to receive unencrypted broadcast feed. Plug-in CAM modules contain the CA system. This CAM module is inserted into the main STB frame and gets connected with main assembly through CI.

## Chapter II. Technical Interoperability Issues

- 2.1 As the DTH services market has grown in India since 2003, the number of operators has become seven who serve over 21 million subscribers at present. The technical standards of their networks are as tabulated below:

Sr.No.	DTH Operator (year of starting operations)	Transmission standard	Compression standard	Conditional Access Services (encryption)
1	Dish TV (2003)	DVB-S	MPEG-2	Conax
2	Doordarshan (DD Direct Plus) (2004)	DVB-S	MPEG-2	No encryption is done.
3	Tata Sky (2006)	DVB-S	MPEG-2	NDS
4	Sun Direct TV (2007)	DVB-S	MPEG-4	Irdeto
5	Reliance BIG TV (2007)	DVB-S	MPEG-4	Nagravision
6	Bharti Telemedia (Airtel Digital TV) (2008)	DVB-S2	MPEG-4	NDS
7	Bharat Business Channel (Videocon d2h) (2008)	DVB-S2	MPEG-4	Irdeto

The DTH operators also take up development of proprietary software for STB in order to support various applications such as Electronic Programmable Guide (EPG).

2.2 As on date, DTH operators provide different kinds of STBs to their subscribers. These include STBs with Common Interface (CI) or customized ones as sourced from different manufacturers or vendors. Interoperability norms are meant to allow third party manufactures to independently sell STBs like in the case of GSM mobile phones. This in turn invites competition among STB manufactures and help in lowering the cost of STBs.

2.3 TRAI has dealt with the subject of interoperability of DTH STBs in earlier instances. In the first instance, there were only two DTH operators during 2006 who adopted identical transmission (DVB-S) and compression standards (MPEG-2) with different encryption technologies. At that time, the Ministry of Information and Broadcasting sought recommendations of TRAI on the subject of exception from technical interoperability in cases of new generation DTH set top box such as Personal Video Recorder (PVR) having advanced features such as recording. TRAI, after taking into account that set top box having advanced features is not expected to be fully interoperable, recommended the following on August 25, 2006:

- There should not be any amendment in Clauses 7.1 and 7.2 of the DTH license conditions;
- The license conditions should be amended to provide for casting an obligation on the service provider to inform and educate the consumers about the limited technical interoperability of the set top boxes with Personal Video recorders/ Digital Video recorders;

- The DTH service provider should be encouraged to provide basic or advanced set top boxes to consumer under rental schemes, but there should not be dilution in the technical interoperability conditions as that exist today.

2.4 TRAI also recognised that the subscriber is often required to make an upfront payment to acquire a set top box. In case a particular subscriber finds that the service is not upto the desired level there should be some mechanism by which he can exit from the service. This can be done in two ways namely (a) through technical interoperability; or (b) through commercial interoperability. Since commercial interoperability was not available as one of the DTH license conditions, the Authority issued regulations for Commercial interoperability covering Customer Premises Equipment (CPE) including set top box as well. The relevant regulation which came into effect since December 1, 2007 is given below.

2.5 Regulation 4 of the Direct to Home Broadcasting Services (Standards of Quality of Service and Redressal of Grievances) Regulations, 2007 (8 of 2007) dated August 31, 2007 states that:

*“ 4. Option to provide Direct to Home Customer Premises Equipment on outright purchase or hire purchase or rent:....(2) Every direct to home operator shall give all the three options, namely (a) on outright purchase basis, (b) on hire purchase basis, and (c) on rental basis, as referred to in sub-regulation (1), for making available the direct to home Customer Premises equipment to the persons making the request for the same under that sub-regulation.”*

2.6 The objective of making provision for commercial interoperability for Set top box through Quality of Service Regulations is to provide an easier exit route for the existing DTH subscriber to subscribe services of another DTH operator or any other available distribution platform. For a customer, it means that depending upon his assessment, he may choose to purchase STB or take it on hire-purchase basis or on rental basis. Besides, the scope of commercial interoperability is

relatively wider as compared to that of technical interoperability since it allows a DTH subscriber to switch-over to other distribution platforms with minimal exit load.

2.7 Shortly after the notification of the TRAI Regulations dated August 31, 2007, the Ministry of Information and Broadcasting vide its reference dated September 28, 2007 sought the recommendations of TRAI on interoperability issue. In the reference, the Ministry had observed that the new DTH operators desire to adopt MPEG-4 video compression format for their services as this format saves around 25% transmission bandwidth as compared to MPEG-2 compression format. The Ministry also referred to the observations made in the meeting which was held in the Ministry with the representatives of BECIL, Prasar Bharati and Bureau of India Standards. These observations suggested that the DTH license guidelines be modified to incorporate the commercial interoperability of set top boxes for the following reasons:-

“... ”

- the interoperability between set top boxes between two DTH operators is practically not feasible to the level of completeness.
- the imposition of this clause of interoperability increases the cost of set top boxes which consumer has to bear;
- the strict adherence to BIS specifications of set top boxes inhibits the advent and advancement of technology and the resulting benefit to the consumer. ...”

2.8 In response to the Ministry's reference, TRAI issued recommendations dated January 30, 2008 which have been referred now in the recent reference from the Ministry. The relevant recommendations are as follows:

## “Technical Interoperability

- (i) There is no need for doing away with the existing technical interoperability conditions.
- (ii) The issue of revision of BIS standards for DTH set top boxes should be taken up by the Government with the Bureau of Indian Standards so that the standards laid down by BIS for DTH Set Top Boxes are updated for advanced technologies.
- (iii) Revision of standards should be prospective and should apply to DTH subscribers who are enrolled after six months from the date of such revision. Such revision should not compulsorily require the DTH operators to upgrade the STBs of existing subscribers to conform to revised standards, though they would be free to do so, on their own.
- (iv) Clause 7.1 of the DTH license conditions should be amended to read as under:-

“7.1 The Open Architecture (non-proprietary) Set Top Box, should be such as to ensure technical compatibility and effective interoperability among different DTH service providers. The DTH Set Top Boxes supplied to the subscribers shall have such specifications as laid down or as revised by the Government from time to time. However, in cases of revision of specifications such revisions will be applicable prospectively to new subscribers, and the licensee will have a transition period of six months from the date of such revision to ensure full compliance with the revised specifications for the new subscribers.” ...”

2.9 It is pertinent to mention that at the time of making the above recommendations, there were four DTH operators who operated their networks on the same transmission technology i.e. DVB-S but adopted different video compression standards i.e. MPEG-2 and MPEG-4 along with separate conditional access technology in each case. While issuing the recommendations dated January 30, 2008, the Authority identified that there were some problems in the implementation of technical interoperability of DTH STBs. One of the reasons stated is related to limited availability and high cost of CAMs. On the issue of choosing between MPEG-2 or MPEG-4, it was observed that since MPEG-4

based STBs can be used even with MPEG-2 based transmission on account of backward compatibility, the operators who use MPEG-2 based transmission should distribute MPEG-4 based STBs to new subscribers.

### **Views of Government**

2.10 The MIB has given following views on the TRAI's recommendations on technical interoperability dated 30.01.2008:

(i) The present BIS specifications for STBs provide for MPEG-2 (DVB-S) standards. The interoperability is provided through a CI slot. The idea is that by inserting a CAM module provided by the DTH operator whose services are to be received, the STB will be in a position to receive the services of the concerned DTH operator. CAM module is optional in BIS specifications as on date. The ground situation as per information available is that since the cost of the CAM modules is as good as the STB itself, no DTH operator is providing CAM modules. Thus interoperability even within the operators using the same technology and standards i.e. MPEG-2 (DVB-S) is not manifest.

(ii) Different technologies and standards (MPEG-2, MPEG-4/ DVB-S, DVB-S2) are now available for signal transmission and compression and some others are being tried and developed. Such new technologies/ standards provide efficient use of available spectrum and transponder space. A technology neutral policy enables the use/ adoption of different technologies and standards for the benefit of the operators as well as the subscribers.

(iii) Mandating a particular technology/standard today raises a number of issues while migrating to a new standard. Issues like who should bear the cost burden of switching over to the new technology crops up. It begins to be argued that since government has mandated the new standard, therefore the government should subsidise the cost of switching over. Issues of

interoperability of equipment with existing customers based on old standards with those operators using new technology/standards crop up and become difficult to address everytime a new standard gets developed. On the contrary if the operator is given the freedom to choose a technology, business compulsions themselves will require him to migrate to a better technology and he will himself develop strategies to retain his customer base.

(iv) If a STB is to be interoperable across various technologies and standards, then the STB will have to conform to all such technologies. Such stacking of technologies may increase the size and cost of the STB. Moreover such a stipulation will benefit only a small percentage of subscribers who wish to switch from one DTH operator to another, but the disadvantage of higher cost and size would have to be borne by each and every subscriber. This defeats the very purpose of providing technical operability requirement.

(v) Some DTH operators have even started offering STBs free of cost. Provisioning of technical interoperability requirement across all DTH service providers will increase the cost of STB and free STB schemes may have to be reconsidered by the operators. The ultimate loser will be the subscriber.

(vi) TRAI has also mandated commercial interoperability which gives the subscriber an option to take the STB on rent or hire purchase basis giving him enough flexibility to be able to switchover from one operator to another at least cost.

(vii) Technical interoperability was relevant from the view of subscriber earlier since the cost of STB was high. With the cost of the STB coming down, technical interoperability may lose its relevance in the years to come. It is also being argued that there is enough competition in the market to provide the consumer with wide choices and reasonable prices.

(viii) Even the requirement of technical interoperability within the DTH service providers will not provide the option to migrate from a DTH service provider to the cable operator or IPTV service provider for which a different STB/CPE will be required. Commercial interoperability in that context is a better option.

(ix) Limited technical interoperability within the same technology and standards is also difficult to achieve for the following reasons:

a. There are two components in STB (1) Hardware (2) Software, which includes Conditional Access System (CAS). Due to selection of different CAS by DTH operators there is no STB of open architecture. As such presence of CAS makes all STBs proprietary in nature. This goes against the requirement of technical interoperability.

b. All new technologies are usually backwardly compatible and not upwardly compatible. MPEG-2 and MPEG-4 are separate compression standards. Hence their decoding chips do not decode each other. However new MPEG-4 STBs are able to decode MPEG-2 signals if MPEG-2 decoder chip and associated software is placed on it along with MPEG-4 decoding chip the motherboard.

c. Similarly DVB-S2 STBs can decode DVB-S signals if DVB-S chip and associated software is placed on it along with DVB-S2 chip on the motherboard.

d. Due to the presence of proprietary CAS there is no possibility for limited technical interoperability of STB among various DTH operators.

2.11 The factors influencing the interoperability of STBs have been discussed in chapter I. These factors, as adopted by different DTH operators, have led to different combinations presently used in various networks. The DTH license

agreement does not prescribe any technological standard to be adopted for DTH platform.

- 2.12 Coming to the issue of interoperability, there are different views. One view regarding technical interoperability of STB is that open architecture based STBs would lead to lower per unit cost due to economy of scales and competition amongst manufactures. Besides, it facilitates the subscriber migration from one operator to another operator. This view further maintains that single chipsets that supports multiple transmission and compression technologies are becoming available and STBs would be commercially available that can function with different standards. In such a scenario it is important that compatible CAMs should be available to subscribers at affordable cost. Also, another related issue is that there would be cost involved in migration of the existing DTH platforms.
- 2.13 There are some alternate views against the need to mandate the particular technical standard for making systems interoperable. There is a view that adopting a single technical standard would not allow the operators to choose a better technology whenever available. Also, that the cost of STB is gradually decreasing and the competition is keeping the entry cost low for a subscriber. Mandating a particular technology for making STBs interoperable may lead to higher cost for the STB. Alternatively, if the STB is designed to support multiple technical standards then also the cost of the STB may be higher.

In view of above, the issues for consultation are as follows:

- 2.14 Is it possible to have an Open Architecture based Set Top Box (STB) for DTH services that could ensure technical interoperability i.e. technical compatibility and effective interoperability among different DTH operators who have adopted same or different standards?**

- 2.15** If yes, how can the interoperability be implemented and what would be the implications to the stakeholders?
- 2.16** Is there a need to mandate any particular standard so that the objectives of technical interoperability can be achieved? If so, which standard?
- 2.17** If technical interoperability for STB is not possible, is there any other mechanism to safeguard the interests of the subscribers.
- 2.18** Any other relevant issue that you may like to mention or comment upon.

## Chapter III. Summary of Issues for Consultation

- 3.1 Is it possible to have an Open Architecture based Set Top Box (STB) for DTH services that could ensure technical interoperability i.e. technical compatibility and effective interoperability among different DTH operators who have adopted same or different standards?**
- 3.2 If yes, how can the interoperability be implemented and what would be the implications to the stakeholders?**
- 3.3 Is there a need to mandate any particular standard so that the objectives of technical interoperability can be achieved? If so, which standard?**
- 3.4 If technical interoperability for STB is not possible, is there any other mechanism to safeguard the interests of the subscribers.**
- 3.5 Any other relevant issue that you may like to mention or comment upon.**

## Annexure I

रघु मेनन  
सचिव  
**RAGHU MENON**  
SECRETARY  
Tel. : 011-23382139  
Fax. : 011-23383115



भारत सरकार  
सूचना और प्रसारण मंत्रालय  
नई दिल्ली-110115  
GOVERNMENT OF INDIA  
MINISTRY OF INFORMATION & BROADCASTING  
NEW DELHI-110115

D.O.No.8/5/2006-BP&L-Vol.II

11<sup>th</sup> May, 2010

*Dear Shri Sarma,*

Please refer to your d.o. letter No.4-76/2007-B&CS dated 30<sup>th</sup> January, 2008 forwarding therewith recommendations of Telecom Regulatory Authority of India under Section 11(1)(a) of TRAI Act, 1997 on interoperability and other issues relating to DTH.

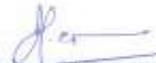
2. In the Ministry's reference No.8/5/2006-BP&L dated 2.2.2009 vide which a number of issues were forwarded to TRAI for recommendations, it was indicated that though the TRAI recommendations dated 30.1.2008 are under consideration, however, 'the Ministry is of the broad view that the specification of STB should be so designed so as to ensure effective interoperability both intra and inter DTH operators using both MPEG-2 and MPEG-4 technologies'.

3. The matter has since been reconsidered and the views of the Ministry are being enclosed for reconsideration by TRAI for the reasons mentioned therein.

4. It is requested that as per the provisions of Section 11 of TRAI Act, the Authority after considering this reference may kindly furnish their recommendations to enable the Government take a final decision in the matter.

*With regards,*

Yours sincerely,

  
(Raghu Menon)

13.2.10  
**Shri J.S. Sarma**  
Chairman,  
Telecom Regulatory Authority of India  
Mahanagar Doorsanchar Bhawan,  
Jawaharlal Nehru Marg (Old Minto Road)  
New Delhi.

Encl : As above

**Government's views on TRAI's recommendations on Technical Interoperability dated 30.1.2008**

**10.5.2010**

Recommendation	Summary of recommendation	Views of the Government
5.1	<b>Technical Interoperability</b>	
(i)	There is no need for doing away with the existing technical interoperability conditions.	<p>Before a decision is taken on this recommendation, the following factors/issues will need to be taken into account:-</p> <ul style="list-style-type: none"> <li>(i) The present BIS specifications for STBs provide for MPEG-2 (DVB-S) standards. The interoperability is provided through a CI slot. The idea is that by inserting a CAM module provided by the DTH operator whose services are required to be received, the STB will be in a position to receive the services of the concerned DTH operator. CAM module is optional in BIS specifications as on date. The ground situation as per available information is that since the cost of CAM modules is as good as the STB itself, no DTH operator is providing CAM modules. Thus interoperability even within the operators using the same technology and standards i.e. MPEG-2 (DVB-S) is not manifest.</li> <li>(ii) Different technologies and standards (MPEG-2, MPEG-4/DVB-S, DVB-S2) are now available for signal transmission and compression and some others are being</li> </ul>

		<p>tried and developed. Such new technologies/standards provide efficient use of available spectrum and transponder space. A technology neutral policy enables the use/adoption of different technologies and standards for the benefit of the operators as well as the subscribers.</p> <p>(iii) Mandating a particular technology/standard today raises a number of issues while migrating to a new standard . Issues like who should bear the cost burden of switching over to the new technology crop up. It begins to be argued that since government has mandated the new standard therefore government should subsidise the cost of switching over. Issues of interoperability of equipment with existing customers based on old standards with those operators using new technology/standards crop up and become difficult to address every time a new standard gets developed. On the contrary if the operator is given the freedom to choose a technology, business compulsions themselves will require him to migrate to a better technology and he will himself develop strategies to retain his customer base.</p> <p>(iv) If a STB is to be interoperable across various DTH technologies and standards, then the STB will have to be built to conform to all</p>
--	--	---

		<p>such technologies. Such stacking of technologies may increase the size and cost of the STB. Moreover, such a stipulation will benefit only a small percentage of subscribers who wish to switch from one DTH operator to another, but the disadvantages of higher cost and size would have to be borne by each and every subscriber. This defeats the very purpose of providing technical interoperability requirement.</p> <p>(v) Some DTH operators have even started offering STBs free of cost. Provisioning of technical interoperability requirement across all DTH service providers will increase the cost of STB and free STB schemes may have to be reconsidered by the operators. The ultimate loser will be the subscriber.</p> <p>(vi) TRAI has also mandated commercial interoperability which gives the subscriber an option to take the STB on rent or hire purchase basis giving him enough flexibility to be able to switchover from one operator to another at least cost.</p> <p>(vii) Technical interoperability was relevant from the point of view of subscriber earlier since the cost of STB was high. With the cost of the STB coming down, technical interoperability may lose its relevance in the years to come. It is also being argued that there is enough competition in the</p>
--	--	--

		<p>market to provide the consumer with wide choice and reasonable prices.</p> <p>(viii) Even the requirement of Technical interoperability within DTH service providers will not provide the option to migrate from a DTH service provider to the cable operator or IPTV service provider for which a different STB/CPE will be required. Commercial interoperability in that context is a better option.</p> <p>(ix) Limited technical interoperability within the same technology and standards is also difficult to achieve for the following reasons:-</p> <ol style="list-style-type: none"> <li>a. There are two components in STB (1) Hardware (2) Software, which includes Conditional Access System (CAS). Due to selection of different CAS by DTH operators there is no STB of open architecture. As such presence of CAS makes all STBs proprietary in nature. This goes against the requirement of technical interoperability.</li> <li>b. All new technologies are usually backwardly compatible and not upwardly compatible. MPEG-2 and MPEG-4 are separate compression standards. Hence their decoding chips do not decode each other. However new MPEG-4 STBs are able to decode MPEG-2 signals if MPEG-2 decoder chip and associated software is placed on it</li> </ol>
--	--	--

		<p>along with MPEG-4 decoding chip on the mother board.</p> <p>c. Similarly DVB-S2 STBs can decode DVB-S signals if DVB-S chip and associated software is placed on it along with DVB-S2 chip on the mother board.</p> <p>d. Due to the presence of proprietary CAS there is no possibility for limited technical interoperability of STB among various DTH operators.</p> <p><b>TRAI is requested to take into account above factors while furnishing its recommendations on, whether requirement of technical compatibility and effective interoperability among different DTH service providers needs to be continued with as it is, or in a modified form, or should be dispensed with.</b></p>
(ii)	The issue of revision of BIS standards for DTH set top boxes should be taken up by the Government with the Bureau of Indian Standards so that the standards laid down by BIS for DTH Set Top Boxes are updated for advanced technologies.	The recommendation is acceptable since BIS standards are only available for MPEG-2/DVB-S STBs. In case a technology neutral approach is preferred by TRAI then as and when an acceptable technology and standard becomes available BIS can be requested to lay down specifications of STBs for the same, allowing different technologies and standards to coexist.
(iii)	Revision of standards should be prospective and should apply to DTH subscribers who are	TRAI may like to take into account the following : (i) Various DTH service providers have

	<p>enrolled after six months from the date of such revision. Such revision should not compulsorily require the DTH operators to upgrade the STBs of existing subscribers to conform to revised standards, though they would be free to do so on their own.</p>	<p>indicated that the six months time period is too short for the development, manufacturing and procurement of a STB after the new standards become available.</p> <p>(ii) It has been argued by DTH operators that it will not be proper to force the existing DTH operators (say using MPEG-2 compression format) to start providing STBs capable of receiving signals of a different technology (MPEG-4 in the present case) even though the operator decides not to migrate to the use of such different technology. This will not only mean additional cost to the subscribers but will also place a huge financial burden on the DTH Operator, without the consequential benefits of the technology to either of them.</p> <p>(iii) It has been demanded that the cost of migration should be borne by the Government.</p> <p>(iv) It has been contended that the recommendations have been given without going through a consultation process on the issues.</p> <p>(v) If there are better technologies available and in use by competing DTH operators, sheer business compulsions will force the DTH operator to migrate and come out with appropriate schemes for replacement of STBs or for adapting the STB to be able to receive the signals, for its existing</p>
--	--	---

		subscribers
(iv)	<p>Clause 7.1 of the DTH license conditions should be amended to read as under:- “7.1 The Open Architecture (non-proprietary) Set Top Box, should be such as to ensure technical compatibility and effective interoperability among different DTH service providers. The DTH Set Top Boxes supplied to the subscribers shall have such specifications as laid down or as revised by the Government from time to time. However, in cases of revision of specifications such revisions will be applicable prospectively to new subscribers, and the licensee will have a transition period of six months from the date of such revision to ensure full compliance with the revised specifications for the new subscribers.”</p>	<p>The formulation may require a relook if TRAI takes into account the issues raised in remarks of the Ministry indicated in 5.1 (i) to (iii) above.</p>
5.2	<b>Supply of signals to cable operators in KU Band</b>	
(i)	<p>There should be no dilution of condition relating to provision of signals directly to subscribers, as laid down in the DTH guidelines, namely “Direct-to-Home (DTH) Broadcasting Service, refers to distribution of multi channel TV programmes in Ku Band by using a satellite system by providing TV signals <i>direct to subscribers’ premises without passing through an intermediary such as cable</i></p>	<p>Acceptable.</p>

	<i>operator."</i> . Therefore, under no circumstance should the DTH operator provide signals to any MSO/ cable operator.	
(ii)	There should not be any transmission band restriction for DTH operators, which can offer their services directly to subscribers either in Ku Band or C Band.	The reception of signals in C-Band will require large size dishes for reception of signals which will need more space and will not be feasible to be placed on Multi Storeyed buildings already short of space. It will also mean more cost to the subscriber. Hence the most suitable band for DTH services is the Ku band only.