

**Response of Dish TV India Ltd to Consultation Paper on STB Interoperability
Consultation paper No 11/2010**

Response to Consultation Paper on STB Interoperability
Consultation paper No 11/2010

Dish TV is pleased to present its response on the issue of STB Interoperability for DTH operators in India.

Dish TV would like to mention here that it is a matter of record that TRAI vide its recommendations dated 30th Jan 2008 had furnished its recommendations on the issue of technical interoperability 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.

Dish TV will like to mention here that our earlier responses to TRAI on the consultation papers issued by the authority and our earlier submissions vide our letters may please be considered as an integral part of this response.

Authority in the consultation paper has mentioned that :

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 & notified standards.

Subsequent to this, BIS vide its circular ref LITD 07/T-149 dated 16th March 2009 had circulated the draft standards for the MPEG4 Digital Set Top Boxes for the Direct to Home Services. Copy of the same are annexed at Annexure III.

These drafts standards were made in by sectional committee of the BIS LITD 07 which has representation from the wide section of the stakeholders which include BIS, DTH Operators, Consumer Groups, Manufacturers, Doordarshan, Defence etc.

It is important to mention here that the draft standards were made by the special working group committee constituted by the sectional committee whose composition was as under

Doordarshan : Convenor

Members : BIS,

Dish TV

Bharti Airtel Digital

Tata Sky

Reliance Big Tv

Sun Direct

Videocon

CEAMA (Representing Manufacturers)

Voice (Consumer Organisation)

In the draft standards all the stake holders agreed to the basic fact the Interoperability is a licence condition and thus should be maintained and agreed to formulate the standards accordingly.

It is also a matter of record that all the operators in their affidavit filed in the Hon'ble TDSAT in the Petition No 60 (C) of 2010 (Tamilnadu Progressive Consumer Centre (TPCC) v/s Ministry of Information and Broadcasting and others) have admitted that they are Technically interoperable and are following the BIS notified standards/norms for the same.

Thus this consultation paper was in fact not required as there is already a consensus among the operators that they are working for the interoperability and in case they have a different view point in response to this consultation paper then the same is directly contrary to their respective affidavits filed in Hon'ble TDSAT.

The correct sequence of the events is vital to properly appreciate the matter.

(i) The MIB wrote to the BIS vide its letter no 8/5/2006-BP&L Vol I dated 01.10.2008 to look into the standards to ensure effective inter and intra interoperability between the DTH operators using both the MPEG2 and MPEG 4 technologies ,

(ii) This letter was sent to BIS on 01.10.2008 by which time the service providers had started the services in MPEG4 and DVB S2 which clearly is in contravention to the licensing guidelines . MIB in this very letter instructed BIS that "Finalized Draft specifications as above should be referred back to the Ministry before finally notifying them" , the addition of this line itself raises queries as BIS is the sole authority for making & notifying standards.

(iii) Subsequently the Sectional Committee on recommendation of the working committee finalized a draft standard for MPEG 4 Digital Set Top boxes, in March 2009. The draft was put in for wide circulation in March 2009.

As per the BIS process the standards are notified after six months of the wide circulation of the draft standards. In this case 18 months have elapsed and MIB is yet to take any decision/action on it, The fact that the MIB in their letter to BIS asked to refer back the finalized draft before notifying leads to the inevitable apprehension and in fact conclusion that MIB never wanted the drafts to be notified.

MIB by allowing BIS to notify the standards would have formalized the process of the operators who have adopted the MPEG4 encoding format and DVB S 2 transmission standards to provide more channels per transponders as they did not have enough of the Satellite Capacity to compete in the market place.

Dish TV is surprised to see the comments of the MIB sent for reference to the TRAI on 11th May 2010 and perceive it as an deliberate attempt to derail the standardization process and the process of interoperability. This is anti consumer and is aimed at helping a certain section of the industry to continue providing services without adhering and complying with the licensing conditions and also depriving the consumers of the benefits of the interoperability..

It is a stated position that Dish TV has been a supporter of interoperability and is the only operator who has been certified by BECIL for providing the interoperable Set Top Boxes and has also demonstrated that its services run on CAM which is an established fact as it has provided CAM for enablement and availment of the services.

We thank TRAI to allow Dish TV to bring focus to the topic of interoperability as it is gaining momentum world wide , and the normally often quoted international experience in such case is worth studying It is a fact that growing ecosystem world wide is supporting the CAM's.

As demonstrated by us in our response below, the DTH ecosystem in India is now very large with 7 operators having over 30 million customers and large investments have gone into STBs provided by DTH operators but paid for by customers. It is also inevitable that there will be mergers and consolidations in coming years and providing proprietary STBs will leave customers with unusable assets. These costs can also not be absorbed by the operators as even for an operator at the lower end with say 2 million

customers, the costs of STBs deployed in field is Rs 6 Billion at Rs 3000 per decoder. Commercial interoperability is thus only a myth and cannot be supported by the size of the market. Interoperability has always been a key point even in the advanced markets of EU and USA. In EU the regulators have mandated the provision of 2 or more CAM slots to enable customers to use services from multiple providers. In USA, the cable markets have always followed a common industry standard (Cable Card). FCC had floated a consultation paper in 1Q 2010 on how the STBs could be made interoperable. The proponents of Open STBs against proprietary ones include Google.

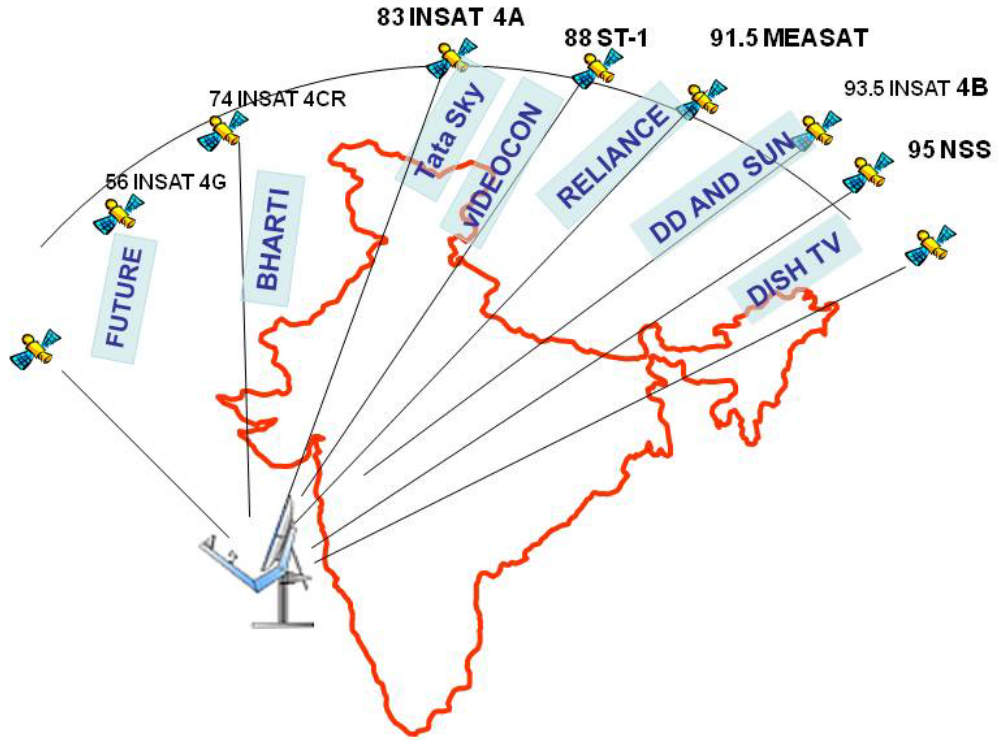
As demonstrated by us in our response, any move towards proprietary decoders will be a retrograde step which will lead to severe problems for customers in particular and industry in general. A DVB-CI (DVB-Common Interface) is an essential part of DVB Specifications and the same has been adapted by the BIS under IS 15377:2003 as far back as in 2003. Any efforts at permitting one or more operators to short-charge the customers by avoiding provision of standard interfaces which are an integral part of standards is undesirable.

2. An overview of DTH operators in India

At the outset, we would like to review the position of DTH operators in India which are likely to be directly affected by the specifications on STBs and issues such as interoperability. The TRAI has presented this position in Section 2.1 of the consultation paper, but it has fallen short of specifying whether CAMs are easily and commonly available for the same.

In terms of location, the operators are placed as follows:

DTH Operators- India



The following table represents the DTH operators in India:

Sr.No. DTH Operator (year of Start)	Transmission standard	Compression Standard	CAS	CAM Availability
1 Dish TV (2003)	DVB-S	MPEG-2	Conax	Yes
2 Doordarshan (DD Direct Plus)(2004)	DVB-S	MPEG-2	Free	Any CAM
3 Tata Sky (2006)	DVB-S	MPEG-2	NDS	NO
4 Sun Direct TV (2007)	DVB-S	MPEG-4	Irdeto	Yes
5 Reliance BIG TV (2007)	DVB-S	MPEG-4	Nagravision	Yes
6 Bharti Airtel(2008)	DVB-S2	MPEG-4	NDS	NO
7 Videocon D2H(2008)	DVB-S2	MPEG-4	Irdeto	Yes

2.1 Considerations for Interoperability and Continuity of Service

(a) Customers can view multiple satellites using a Single Dish

It may be seen from the positioning of DTH operators in India that no less than 4 operators are clustered around the 93.5E location on which SUN and DD-Direct operate. These operators also have common visibility of other satellites. This implies that using a common antenna, a customer without making any change in the rooftop antennas etc. can potentially receive services from more than one satellite provided that the set top box is interoperable.

Even customers at other locations such as 88.5E or 83E can view one or more satellites with dual LNBS which are available inexpensively in the market.

(b) Channel Viewership depends on interoperable set top boxes

However while customers have access to 3-4 satellites or more with the same dish or dual LNBS, they can view the channels on other DTH systems if they have an interoperable set top box with a CI slot and CAMs for other system. This is desirable as not all channels are available on all DTH systems. As an example certain Cricket matches were available on only one DTH system and further not all DTH systems carry the same set of channels in SD or HD format.

While TRAI is making regulations to permit viewing of channels on A-la-Carte basis, the same cannot be effectively used on multiple systems if the boxes are proprietary. In fact the proprietary STBs bind a customer to a particular DTH system irretrievably. The suggestion that he should use commercial interoperability i.e. return the decoder is impractical as no customer will do so for watching just one or two additional channels on another DTH system.

(c) Interoperable decoders protect customers in case of DTH operator mergers/ Consolidations

As briefly outlined above, Indian market has many DTH operators, some with 8 Million or more customers while others are at just a million or even less. In this scenario, mergers or consolidations are quite likely. The use of a proprietary decoder places the customers affected by such potential consolidation at a disadvantage as they may be forced to buy new decoders, if after a notice period, their existing CAS is phased out. Commercial interoperability is impractical as no DTH operator can take the burden of replacing multimillion decoders. This has not happened in any market and is unlikely to happen in India.

The best option in this case is for the new DTH operator to provide CAMs which are now inexpensive with prices which can range as low as \$3-5 with the given volumes.

(d) Interoperable decoders protect the customers in case of satellite failures

In June 2010, the Insat 4B satellite had lost 50% of the capacity resulting in 4 out of 6 transponders of a DTH operator going blank. In this particular case the DTH operator could salvage the situation to an

extent as it happened to be operating on the same satellite as DD-Direct which had 60 active on air channels. Further it could get some respite from the proximity of a satellite at 91.5E(Measat3). During the entire incident, TRAI was a silent spectator despite being the regulator in this field. It should have immediately intervened to ascertain the fate of over 2 million customers of a DTH system which lost a majority of its transponders for many days.

However the situation could have turned ugly, if the satellite was one, which was located at an isolated spot with no visibility of nearby systems(such as 74 or 83E). In this case what would have the fate of millions of customers if the satellite was lost and if the set top boxes of customers were proprietary and not open? What measures would TRAI have taken to restore service to such customers of proprietary devices?

On the other hand with interoperable STBs, the situation could be handled much more efficiently. As repeatedly asserted by many DTH operators, CAM cards are easily and inexpensively available and could have been used to provide alternatives to customers.

The TRAI has no policy on service continuity considerations of DTH operators nor the types of contracts which customers of various systems are made to sign. It is certainly suggested that the TRAI should give due attention to these aspects and provide for well thought out policy guidelines for dealing with such potential situations.

Allowing DTH operators to provide proprietary decoders is certainly not a solution to such scenarios. Open STBs fully compliant with DVB-CI recommendations are a pre-requisite to any such policy.

2.2 Use of CAMs and Interoperability in Europe

While recommendations are framed for Interoperable STBs in India it is also instructive to look at the scenario in other countries which have multiple DTH systems.

EU has recognized that Interoperability is a key requirement for creating confidence and trust with consumers who will inevitably need to invest in new digital receiving equipment. In return for that

investment, they are expected to be able to access all available services from multiple service providers where appropriate, over multiple platforms and without a consumer lock-in to specific services.

EU has recognized that Conditional Access assumes a central role for interoperability at the consumer level, and the present degree of fragmentation in CA systems becomes a key obstacle to full digital switchover.

Directive 95/47/EC of the European Parliament and Council has provided a crucial contribution by recognizing that “it is essential to establish common standards for the digital transmission of television signals whether by cable or by satellite or by terrestrial means as an enabling element for effective free-market competition”. For this purpose, the Directive required use of a transmission system which has been standardized by a recognized European standardization body. This Directive therefore enabled uniform implementation of the DVB transmission standards across Europe.

Article 24 (and Annex VI referenced therein) of the Universal Service Directive (2002/22/EC) mandates Integrated Digital Television (IDTV) sets beyond a certain display size to be fitted with an open standard interface to allow connection to external systems such as payTV modules. This open interface is currently interpreted by industry as the DVB Common Interface (CI). Consequently, all European IDTV sets in the market are equipped with the DVB CI interface.

The STBs in India parallel the use of decoders in IDTVs in Europe and proprietary demands that the STBs be open, Interoperable and be fitted with a CI interface. The EU has also noted that:

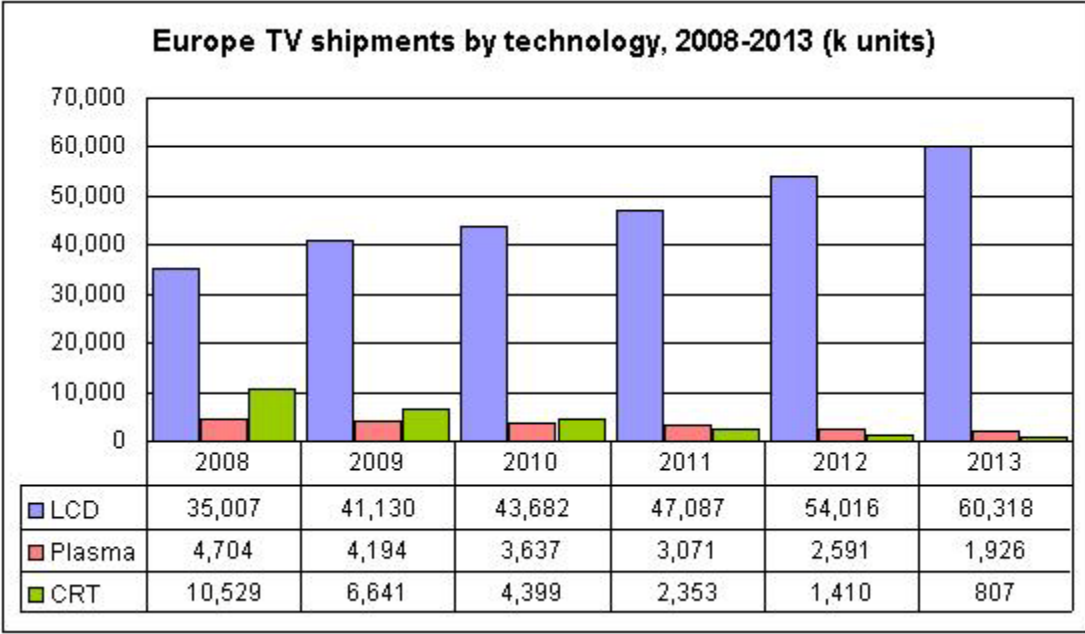
- The captive business model enabled by embedded CA creates a very powerful position for CA vendors towards their customers which cannot so easily be established with CA modules

- Security concerns are raised by CA vendors on Common Interface but are infact measures to maintain proprietary systems.

It is noteworthy that the EU comprises of countries such as the UK which is dominated by a single CA system(NDS). Moreover NDS is the only system which does not provide CAMS for its encryption system.

International Experience : Growth of Integrated Digital Televisions IDTV

There is an estimated sales of 50 million following is the market projections of the IDTV's which shows that the current market it is bound to grow and the by law all the IDTV have CAM slot.



Source : iSupply

It is estimated that the CAM market share of the of 15% today and the is having a CAGR of 10% to 12%. As long as these feature a Common Interface (CI) into which a conditional access module (CAM) can be inserted, the use of a separate decoder is superfluous, once the module is inserted in iDTV or STB with a DVB CI Slot , the subscriber experiences the pay TV channels in same manner as the free to air with minimal impact on the power consumption, The advantages for the consumers are clear
 Design : No additional Box under the TV Set and no additional cables,

User experience : No additional remote control

Green : Low power consumption

In an article in the Digital TV.net (Annexure IV) all CAS providers who are opposing the provision of the CI slot here have been quoted as supporting the model of the CI slot, they all have launched the products which is CI + which provides enhanced security and is capable of providing the value added services like VOD , Push VOD etc, then why Indian consumer is being treated as a second citizen. The conventional model has been that Conditional Access Technology providers have been taking royalties from the STB manufactures and the Operators, thus each time a consumer changes his service provider the Service provider loses money which he had spent at the time of the acquisition of customer but the Conditional access Technology provider gains as he gets additional royalty on the Set Top box and the Card he has sold. In the article referred, all Conditional Access Providers such as Nagravision, Conax, Irdeto have been quoted supporting the CAM, it is a market which is growing and no player in Europe is able to ignore it.

It is high time that we replicate the retail model for the consumers, they should be freed from the complexity of buying a new STB everytime he wishes to change his service provider, he should have the freedom to choose without spending additional amount and should be able to switch as is the case in telecom service.

2.3 Interoperability in USA

USA is dominated by two DTH systems (Dish Network and DirecTV). Owing to this there has been no move towards interoperable STBs. The cable market, however has been the subject of open standards which are followed industry wide.

The FCC has taken the regulatory approach of separating the CA functions with the rest of the device and has provided for a common interface (called the POD interface) which must be used in all decoders.

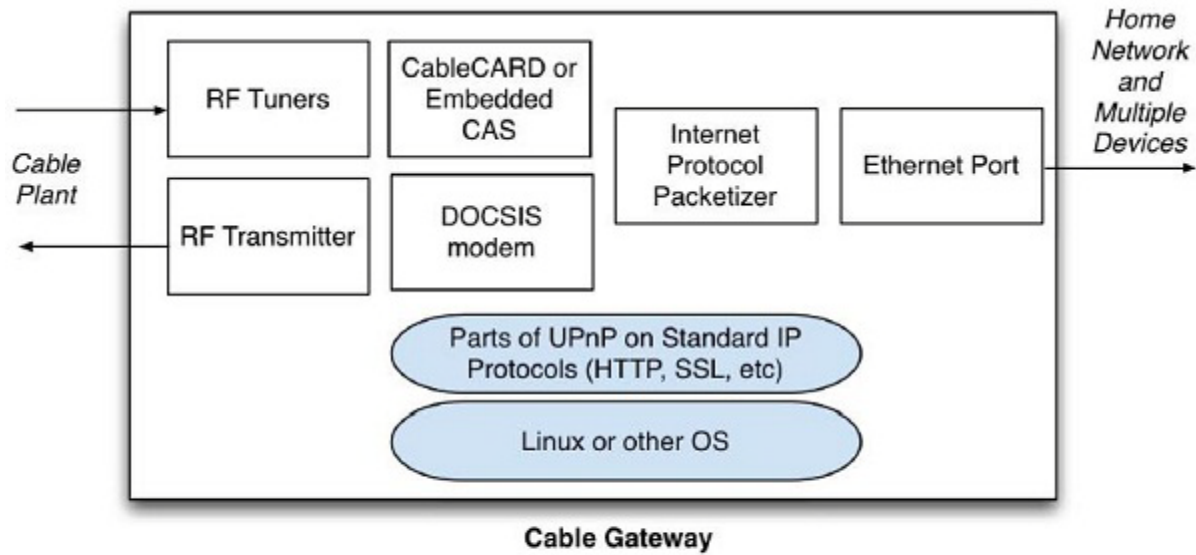
The functionality of a STB thus comprises of two systems:

(i) The CA module (called the Cable Card) which interfaces to the rest of the system using a common interface

(ii) The open STB using a POD interface to the Cable Card.

The Cablecard mandate was specified in 2007 by the FCC and within one year (by April 2008) 4 million Cablecards were deployed with another 50 million homes set to use the same thereafter.

The Cablecard was nothing but effectively a CAM, which was specific to the particular CA, but used a POD interface.



However as this approach did not find much industry acceptance, an alternative approach was used which was that of a CA neutral receivers. The CA functions could be down loaded in the receiver based on the service provider used. This method (DCAS) provided a downloadable security solution. Subsequently the US approach has moved to a position similar to Europe i.e. to provide a CI interface which is inexpensive to implement.

On April 21,2010, the FCC issued a notice for proposed rulemaking to move away from the Cable Card system and provide customer greater choice in selection of service providers. (Annex-1).

These efforts of both the EU as well as USA demonstrate the urgency with which they wish the customers to move to open and interoperable systems.

3. Response on the 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?

Response : Yes, It is possible to have an open architecture based STB that could ensure technical interoperability and technical compatibility and effective interoperability among different DTH operators who have adopted same standard. The BIS standard IS 15377: for DTH STBs was developed to meet this requirement. It does this by mandating the use of the same DVB-S DTH transmission standard by all operators and by further mandating the use of the same DVB Common Scrambling Algorithm for the scrambling of encrypted channels. While each operator can choose a different CAS, the decryption of the access keys is to be done on an external module (CAM) and the STB will be provided with a DVB CI connector for externally plugging in the CAM.

Now to answer the second part of the question: is it possible to achieve interoperability while using different standards? The answer is yes but with certain limitations/ constraints. Let us consider the actual case of using two different standards viz: DVB-S and the second generation DVB-S2 standard. The DVB group when introducing this new standard was faced with the same dilemma which was faced in the past by the developers of Color TV transmission system. i.e. how to provide backward compatibility? At that point of time, millions of Black & white TV sets were in use around the world and the national governments did not want to render these sets non functional overnight. So the CTV expert group came out with a solution :they designed a common CTV emitted signal, which is used by both the existing B&W set to produce a monochrome picture and the new CTV set to produce a color picture, even to this day. Taking their cue from this example, the DVB has also come out with a solution. They have provided a **backward compatible broadcast mode** for the DVB S2 emission standard. This mode enables a

broadcaster to broadcast a mix of MPEG-2 and MPEG-4 channels. From this mix an existing DVB-S STB would be able to receive and display all the MPEG-2 encoded channels while the new DVB-S2 STBs would be able to receive the entire bunch of channels.

The DVB-CI is a common interface and CAM cards for either MPEG2 or MPEG4 are widely available to be used in the CI slots. Using the appropriate CAM, which can be approved by the one DTH operator, it is possible for a DTH customer of any other operator to use the services. This is so, as all the CAS and decoding functions can be provided in the CAM card. Such CAM cards are also available for HD channels. As all the operators in India use either on MPEG-2 or MPEG-4, CAMS are available which decrypt either MPEG-2 or MPEG-4.

Annex-2 provides the specifications of a typical MPEG-4 HD CAM card which once inserted in a regular CI based STB can enable viewing of TV channels which are MPEG4 coded and are available on various satellites under the Hotbird system.

3.2 If yes, how can the interoperability be implemented and what would be the implications to the stakeholders?

Response : It has been established that implementing the CI slot as specified in the BIS standard IS 15377 item at 3.1.1 will enable the boxes to be interoperable , this is being followed internationally and was agreed by all the stake holders in the Draft Standards formulation for the MPEG4, Digital Set Top boxes for Direct to Home Services as circulated by BIS vide its letter reference LITD 07/T-149 dated 16/03/2009. The said para reads as under

“The STB shall be based on an open architecture (non proprietary) and shall ensure technical compatibility and effective interoperability amongst different DTH service providers in the country. The interoperability shall be achieved by using common interface conforming to EN 50221 “Common

interface specification for conditional access and other digital video broadcast decoder applications” including “TS 101699 Extensions” to DVB-CI specification. and via software download where the software download mechanism shall be transparent, interoperable and available in the public domain complying with ETSI TS 102006. The STB shall have at least one common interface slot complying to EN 50221.”

The need of the time is that BIS should notify the new standards for the MPEG4 Direct To Home Service Providers so that the operators who are providing those services are also seen to be complying with licensing conditions. It is pertinent to mention that as on date there are no standards governing the MPEG4 format of encoding.

It will be good if the BIS can come out with the standards for the IDTV's in India as already one service provider is providing the IDTV with an embedded conditional access and it should not happen that consumers buying those are left high and dry in case they wish to change the service providers.

Impact to Stake Holders

Manufacturers

It is interesting to note that a similar debate was there when the European Union was thinking of bringing the mandate to have the slots in the European Union, The Digital Television Group (DTG) which coordinated the UK launch of the Digital Television, in their response to consultation on the role of Integrated Digital Television Sets in Achieving Digital Switchover responded in favour of the IDTV's and the responses of the DTG is attached as Annexure VI

The Manufacturers of the consumer equipment are very well capable of the developments as they are already supplying such products in the Europe.

Dish TV has conducted test with multiple Consumer electronics manufacturers who are leading providers of the flat panels in India successfully.

DTH service Providers

As mentioned that all the DTH operators have stated on affidavit in Hon,ble TDSAT they are compliant with the CI slot and are offering interoperability. Accordingly it will good for them as these service providers based on their service/offering can get the consumers for their service.

It is correct that certain service providers have chosen to adopt MPEG4 encoding formats and the quality of a digital TV picture is ultimately determined by how real life the picture looks. In technical terms this means, the higher the picture resolution both in the horizontal and the in the vertical dimension, better the picture quality. The pictures are digitized using an International standard and has a resolution of 720 x 576 pixels per frame (SDTV) and the quality is fixed by this.

When compression is carried out strictly as laid down in the respective standard, it enables the operator to maximize the number of channels broadcast over the platform without compromising the quality of picture as seen by the viewer and using MPEG-4, he can further increase the number of deliverable channels., as compared to MPEG-2 Similarly by migrating from DVB-S to S2, a service provider can transmit more channels in a given transponder.

Now as far as the consumer is concerned, the picture quality remains the same in either case, as the picture resolution, aspect ratio etc remains the same which are fixed at the time acquiring. In other words operators use MPEG-4/S2 to save on bandwidth. The only way to give better quality pictures is to migrate from the existing SDTV broadcasts to HDTV broadcasts. Interoperability will help consumers to make these services as a retail product so that they can get the benefit of the competition

Interoperability in the present scenario should continue to be implemented using the CI based decoders and CAM cards. All existing and new operators which use the DVB-S2 decoders will thus be interoperable with all DTH transmissions including DVB-S, DVB-S2, MPEG-2 or MPEG-4. Operators based on DVB-S will continue to provide STBs which will enable compatibility with DVB-S based operators. As elucidated in the Table above, only two operators use DVB-S2 and will not be covered in this mode of upward interoperability. However their customers with DVB-S2 decoders will still have a choice for any other DTH operator channels.

It is also a fallacy to state that a CI Slot or interface entails any extra expenditure. All STB chips without exception provide a DVB-CI interface and the only expense required is the CAM slot/ connector.

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?

Response: Yes there is a need to mandate certain set of standards in order to achieve the objectives of technical interoperability as has been already explained in the answers to the previous questions. As regards the question of which standard, the answer depends upon the candidate standards available for selection for use in our country. In this case there are only the DVB S/S2 standards which have become de facto world standards in the absence of any other competing standards. So the correct logical step forward is to continue with DVB-S as well as DVB-S2 with backward compatible broadcast mode for an interim period.

Further in the near future integrated DTV sets, where the STB functionality will be built into the TV set itself, will appear in the market. Mandating a set of standards for interoperability is absolutely essential in this scenario as these sets would be quite expensive and will rule out the possibility of commercial interoperability

As mentioned earlier we already have one operator offering IDTV hence it is right time to get the standards for the IDTV also in place.

The Standards in force for the MPEG2 box BIS 15733: 2003 and draft standards for the MPEG4 if circulated in the format as formulated by the Sectional committee of the BIS LITD 07 will provide enough flexibility to the operators and will ensure that the consumer interests are protected.

3.4 If technical interoperability for STB is not possible, is there any other mechanism to safeguard the interests of the subscribers.

Technical Interoperability of STBs is entirely possible and there is no cause or occasion to move away from the BIS standards on interoperability using standard DVB-CI interface and interchangeable CAMs. The Authority had rightly reviewed the situation in 2006 and 2007 when it had maintained that the interoperability of STBs needs to be maintained.

It may be recalled that TRAI had recommended the following in its 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. We believe that these recommendations are valid in current scenario as well and there is no need to dilute these recommendations in any manner and permit the use of oprietary decoders or STBs. We believe that permitting proprietary decoders swill be highly disadvantageous to the Indian customers and will derail the growth story of DTH in the country.

As we have detailed out there are many reasons to maintain interoperability through CAMs and DVB-CI which are in addition to simple considerations of MEEG2/MPEG4 or DVB-S or DVB-S2. These include

viewing by a customer of more than one DTH system, providing for contingencies in event of satellite or DTH operator failure or mergers and consolidations. Open DVB-CI standards together with CAM are universal and for the benefit of all customers in India.

As such the Dish TV strongly opposes any move to introduce proprietary technologies in customer devices such as STBs. We reiterate our support for open STBs based on globally used DVB-CI standards and use of CAMs for additional encryption systems, decoding of MPEG4 or HD and other functions supported by DVB-CI.

National / International Regulatory bodies as well Standardization organizations take care of this to safeguard the interests of consumers while introducing new technologies. The Color TV emission signal and the backward compatible broadcast mode of DVB-S2 are two classical examples of this. There is another fact which is worth mentioning here. The DVB organization before starting work on any new standard goes through a process of elaborate consultations with would be consumers. Thus every new project has a 'commercial module' which provides the initial input on the feasibility of the project .BIS can consider the possibility of having a similar process here.

Annex-1 FCC NPRM for Cable Devices DOC-297665A1



NEWS

Federal Communications Commission
445 12th Street, S.W.
Washington, D. C. 20554

News Media Information 202 / 418-0600
Internet: <http://www.fcc.gov>
TTY: 1-888-835-5322

This is an unofficial announcement of Commission action. Release of the full text of a Commission order constitutes official action.
See *McI v. FCC*, 515 F.2d 585 (D.C. Cir. 1974).

FOR IMMEDIATE RELEASE:
April 21, 2010

NEWS MEDIA CONTACT:
Janice Wise (202) 418-8165
Email: janice.wise@fcc.gov

FCC TAKES ACTION TO UNLEASH VIDEO INNOVATION AND CONSUMER CHOICE

Washington, D.C.: The Federal Communications Commission acted today to promote innovation and consumer choice in the video device marketplace by issuing a Notice of Inquiry (NOI) and a Fourth Further Notice of Proposed Rulemaking (FNPRM), as recommended in the National Broadband Plan. The NOI seeks to better serve the goals of Congress in creating a competitive retail market for navigation devices for use with multichannel video programming distributors (MVPD). The FNPRM proposes changes to the current CableCard system to make it more consumer-friendly while a new technology approach is being developed.

Consumers are increasingly accessing video from multiple sources, including MVPD services, the Internet, DVDs, and over-the-air broadcasting. The NOI seeks input on ways to foster a more competitive marketplace for navigation devices and in particular calls for comment on a standardized interface that enables smart video devices to bring video from all of these sources together for ease of selection, recording, and viewing. The standardized interface could be implemented through an "AllVid" adapter that would act as an intermediary between the consumer's device and the MVPD's service. The service provider would be free to innovate within its network to improve its services, without requiring replacement of the consumer's home devices. And a consumer could switch from one provider to another and continue to use the same smart video devices.

The FNPRM proposes to remedy shortcomings in the existing CableCARD system, to provide consumers with better service in the interim before the new AllVid approach is in place. In order to remove the disparity between consumers who choose to use a retail CableCARD-equipped video device and those who lease a cable provider's video navigation box, the proposed interim measures would: (1) ensure that retail devices have comparable access to video programming that is prescheduled by the programming provider; (2) make CableCARD pricing and billing more transparent; (3) streamline CableCARD installations; and (4) clarify certification requirements.

Action by the Commission: Chairman Genachowski and Commissioners Copps, McDowell, Clyburn and Baker issuing separate statements. April 21, 2010, by Notice of Inquiry (FCC 10-80). MB Docket No. 10-91; CS Docket No. 97-80; PP Docket No. 00-87.

Action by the Commission: Chairman Genachowski and Commissioners Copps, McDowell, Clyburn and Baker issuing separate statements. April 21, 2010, by Fourth Further Notice of Proposed Rulemaking (FCC 10-81). CS Docket No. 97-80; PP Docket No. 00-87.

For further information, Brendan Murray (202-418-1573; brendan.murray@fcc.gov); or Alison Neplokh (202-418-1083; alison.neplokh@fcc.gov).

-FCC-

Annex-2

Specifications of a Typical MPEG-4 HD CAM Card

VIACCESS 3 MPEG-4 Original CI Module (CAM),

Compatible will all Viaccess Official pay TV card including Viaccess version: 1, 1.5, 2, 2.5, 2.6 and 3.

This is a compatible VA CAM with MPEG-4 HD Official cards , it will prevent service interruptions when encryption changes and will keep your cards constantly updated.

This CAM is 100% compatible with all Viaccess 3 including the new CANAL+ / CANALSAT Cards.

Cards that can be used with this CAM:

CANAL+ / CANALSAT Cards - Astra

BIS TV French TV Cards - Hotbird

ART Sport & Arabesque Cards - Hotbird

Al Jazeera Sport Cards - Hotbird (Viaccess Cards only)

MCT Cards - Hotbird

TPS Viewing Cards - Hotbird

System Requirement: Digital Receiver with 1 CAM slot

1 Official Viaccess viewing card

Annexure IV

LCD-TV sales seen surging in Europe

John Walko

6/18/2009 10:38 AM EDT

LONDON — Sales of LCD-TVs will surge in most European countries this year, indicating a recovery in the EU countries' economic activity, according to market research group iSuppli Corp. Sales of all types of TV are expected to increase to 51.97 million units in 2009, up 3.4 percent from 50.2 million in 2008, according to Riddhi Patel, principal analyst for television systems at iSuppli.

"LCD-TVs, which will account for 79 percent of the market this year, will see their sales rise by a robust 17.5 percent in 2009 to reach 41.1 million units, up from 35 million in 2008," said Patel. The continued growth in Europe's LCD-TV market is also said to be driven by increased demand in Eastern Europe for both first-time and replacement buyers; declining prices; the introduction of new features, such as 100Hz/200Hz refresh rates, and now Light Emitting Diode (LED) backlights; as well as increased domestic production, which has led to better management of inventories.

iSuppli reiterates that CRT and plasma, which continue to lose ground in Europe, will suffer a 40.2 percent decline in sales compounded annually between 2008 and 2013.

For the same time frame, plasma TV sales will decline at 16.4 percent compounded rate while LCD-TVs grow at an 11.5 percent Compound Annual Growth Rate (CAGR) to reach 60.3 million units by 2013.

Plasma TV sales in Europe are predicted to fall from 4.2 million units last year to just 1.9 million in 2013. However, CRT based designs will see an even sharper decline, down from 10.5 million sold last year to just 807,000 by 2013

<http://www.eetimes.com/electronics-news/4195600/LCD-TV-sales-seen-surging-in-Europe>[02-09-2010 17:42:02]

Annexure III

From: jambholkar@bis.org.in on behalf of Bipin Jambholkar
To: TEC(DDG); TEC(DIRECTOR); WPC; cvioce; Dr. Yuaylakshmi Basavaraj; asthana4@vsnl.com; CEAMA; DGOA, DOA (N); ERTL (North); headsaac@becil.co.in; ALPS; IETE; DCPW2; AHJJA1; DCPW1; TATA P; DCSME A2; DCSND A2; DGAQA; ALPMCO; ATISH P1; DISH A1; ELCINA A1; CEAMA P1; CEAMA A1-1; CEAMA A1-2; BECIL; DOORDARSHAN A2-1; DOORDARSHAN A2-2; COFI; DISH P1; WPC A2; BEL; AYJNH A1; AYJNH E1; NP A1; AIR E1; DOORDARSHAN A1; DOORDARSHAN P1; NPL E1; ERTL; ELCINA E; DCSND; DGAQA; BECIL; DGAQA 1; AIR P1-1; AIR A1; AIR A2; AYJNH H; BIG TV A1; BIG TV P1; seehra@aerindia.com; sanjayosr@skynland.in; vaibhav@timebroadbandindia.com; himanshu.sahu@ustar.com; Anil Prakash; lk@sparsec.org; "sandeep Garg"; Alvin Jose; Khare_Amit; laxman@bis.org.in; tony@sundirect.in; Himanshu Patil; V.Jha@Airtel.in; railv@broadcom.com
CC: dirplimb@nic.in; jbb.inb@sbb.nic.in; Atul Kumar Kuthiala; Jayant M. Kharche
Subject: DRAFT IN WIDE CIRCULATION
Date: 25 March 2009 10:39:42
Attachments: Wide_Circulation_Document_MPEG-4_DTH_STB.pdf

Technical Committee: LITD 07

Ref :LITD 07/T-149

ADDRESSED TO:

1. All Members of Audio-Video and Multimedia Systems & Equipment Sectional Committee, LITD 07.
2. All Principal Members of Electronics and Information Technology Division Council (LITDC)
3. Ministry of Information and Broadcasting
4. All others interested

Dear Madam/Sir(s),

Doc: LITC 07 (3140)

Title: DIGITAL SET TOP BOX FOR MPEG-4 DTH SERVICES – SPECIFICATION

Kindly examine these draft standard and forward your views stating any difficulties, which you are likely to experience in your business or profession, if this is finally adopted as National Standard. Last Date for comments: 15/04/2009

This Draft Standard was finalized by the Working Group (WG) specially constituted by LITD 07. The Composition of WG was as follows:

- | | | | | |
|---------------------------|----------|-----------|--------------------|--------------|
| 1. Doordarshan – Convener | 2. BIS | 3. CEAMA | 4. Reliance Big TV | 5. Dish TV |
| 6. Tata Sky | 7. VOICE | 8. Bharti | 9. Sun and | 10. Videocon |

Comments if any, may please be made in the format indicated and mailed to the undersigned at the above address. As decided in last LITD 07 meeting, in case no comments are received or comments received are of editorial nature, we may be kindly permitted us to presume your approval for the above document as finalized for publication as Indian Standard. However, in case of comments of technical in nature are received then the draft Standard may be finalized either in consultation with the Chairman of LITD 07 Sectional Committee or referred to the LITD 07 Sectional committee for further necessary action if so desired by the Chairman, LITD 07.

Thanking you,

Dear Madam/Sir(s),

Doc: LITC 07 (3140)

Title: DIGITAL SET TOP BOX FOR MPEG-4 DTH SERVICES – SPECIFICATION

Kindly examine these draft standard and forward your views stating any difficulties, which you are likely to experience in your business or profession, if this is finally adopted as National Standard. **Last Date for comments: 15/04/2009**

This Draft Standard was finalized by the Working Group (WG) specially constituted by LITD 07. The Composition of WG was as follows:

1. Doordarshan – Convener
2. BIS
3. CEAMA
4. Reliance Big TV
5. Dish TV
6. Tata Sky
7. VOICE
8. Bharti
9. Sun and
10. Videocon

Comments if any, may please be made in the format indicated and mailed to the undersigned at the above address. As decided in last LITD 07 meeting, in case no comments are received or comments received are of editorial nature, we may be kindly permitted us to presume your approval for the above document as finalized for publication as Indian Standard. However, in case of comments of technical in nature are received then the draft Standard may be finalized either in consultation with the Chairman of LITD 07 Sectional Committee or referred to the LITD 07 Sectional committee for further necessary action if so desired by the Chairman, LITD 07.

Thanking you,



भारतीय मानक ब्यूरो
BUREAU OF INDIAN STANDARDS

मानक भवन 9 बहादुर शाह जफर मार्ग नई दिल्ली 110002
Manak Bhavan, 9 Bahadur Shah Zafar Marg New Delhi 110002

Phones 2323 0131 TeleFax +91 11 2323 7093
2323 3375 Extn 4442,4401
2323 9402

Website : www.bis.org.in
email : jambholkar@bis.org.in

**DRAFT IN
WIDE CIRCULATION**

Technical Committee: LITD 07

Document Dispatch Advice	
Ref	Date
LITD 07/T-149	16/03/2009

ADDRESSED TO:

1. All Members of Audio-Video and Multimedia Systems & Equipment Sectional Committee, LITD 07
2. All Principal Members of Electronics and Information Technology Division Council (LITDC)
3. Ministry of Information and Broadcasting
4. All others interested

Dear Madam/Sir(s),

Doc: LITC 07 (3140)
Title: DIGITAL SET TOP BOX FOR MPEG-4 DTH SERVICES – SPECIFICATION

Kindly examine these draft standard and forward your views stating any difficulties, which you are likely to experience in your business or profession, if this is finally adopted as National Standard.

Last Date for comments: 15/04/2009

Comments if any, may please be made in the format indicated and mailed to the undersigned at the above address. As decided in last LITD 07 meeting, in case no comments are received or comments received are of editorial nature, we may be kindly permitted us to presume your approval for the above document as finalized for publication as Indian Standard. However, in case of comments of technical in nature are received then the draft Standard may be finalized either in consultation with the Chairman of LITD 07 Sectional Committee or referred to the LITD 07 Sectional committee for further necessary action if so desired by the Chairman, LITD 07.

Thanking you,

Yours faithfully,

Head (Electronics & IT)
E-mail: litd@bis.org.in
jambholkar@bis.org.in
Tele Fax: 23237093

Encl: As above

Annexure IV



Pay-TV is, famously, supposed to be more or less immune to the effects of the economic downturn. As times get tougher, the argument runs, so people will be more tempted to hunker down at home and spend their leisure hours huddled around the TV. And because the TV advertising business is falling victim to plummeting consumer expenditure in the wider economy as well as the flight of ad spend to the internet, subscription-based models are the way to go. However, the resilience of pay-TV comes with a caveat. Even if people do keep up their pay-TV subscriptions in the face of recession, they are more likely than before to shop around for the best deal, which will lead to more intensive competition between service providers and put pressure on them to keep costs down. Service providers may therefore want to investigate a range of ways to reduce their cost base – as well as ways to provide more flexible payment plans to customers. One of the biggest expenses for service providers is consumer premises equipment. Set-tops are a major cost item. One way to eliminate that cost is to shift to a retail model. And what better way to do this than to eliminate the need for the set-top altogether?

Common Interface Plus Until now, pay-TV providers have largely shied away from using DVB Common Interface (CI) access modules (CAMs), which can be inserted in reception equipment (which meant set-tops until recently, when integrated digital TV sets gave rise to the possibility that the CAM could replace the box entirely), making them interoperable between service providers. CI has had something of a bad reputation in the past, largely because of its failure to secure content once it left the CAM to be displayed on the TV screen. It also failed to allow service providers to port their own branded user interface to the reception device. However, a new specification, CI Plus, which was developed outside

the DVB but which is supported by consumer electronics giants Panasonic, Philips, Samsung and Sony, combines enhanced security with interactivity – in this case based on the MHEG standard – and is seen by some as a way to replace the set-top box with a lower cost item.

One of the most enthusiastic supporters of CI Plus among the conditional access suppliers is NagraVision. “We have been pushing it from the start,” says Ivan Verbesselt, senior vice-president of marketing at NagraVision, whose parent company Kudelski also owns one of the big three global CAM manufacturers, SmarDTV. Verbesselt highlights the three main technical advances embodied by CI Plus: enhanced security, interoperability and interactivity. First (and foremost), CI Plus provides copy protection between the CAM and the TV receiver, which was not available in CI.

“Every operator I have talked to has a high level of interest,” says Verbesselt. “It’s not going to replace the set-top but it’s complementary to it. It’s got a benefit for everyone in the value chain.” Chief among these benefits is the removal of consumer equipment from the operator’s balance sheet, by taking out the need not only for HD set-tops but for expensive HDMI cables. “There is a cost advantage – most set-tops come without HDMI cables, for example,” says Verbesselt. “There is even a green factor. The average DVR consumes 16W of electricity, while the CAM consumes 1W – so there are enough benefits both for the end user and the consumer electronics manufacturer and the operator.”

There is a particular advantage to operators if the CAM can be used to deliver on-demand services. At Cable Congress in March, infrastructure provider Ericsson’s video arm Tandberg Television demonstrated the delivery of video-on-demand supported by targeted advertising via CI Plus modules from Neotion. “Basically it allows you to do VOD with targeted advertising and catch-up TV services, and you don’t need an HD set-top or DVR because you can deliver network-based DVR,” says Edward Allfrey, business development director, cable, at Tandberg Television. “In markets with high cable penetration where people plug an analogue cable into the TV, you can just plug it in and deliver value-added services to the platform.”

CI Plus also comes complete with interactive features, allowing service providers the option to provide a version of their own user interface. “You don’t need to be confronted with the user interface of the TV

itself," says Verbesselt. There has, however, been relatively little interest to date in this feature, says Verbesselt, and he admits that there are limitations. CI Plus supports the MHEG-5 browser, which has its own limitations in terms of the sophistication of the graphical user-interface. "But it's a starting point – and with what consumer electronics vendors are adding to TVs they can render all kinds of things like widgets," he says.

Rival conditional access provider Irdeto is also an enthusiastic backer of CI Plus. Unlike Nagravision, which is focusing in the first instance on the digital-terrestrial market, Irdeto's senior director, market development, Daniel Thunberg, says that his company is looking at the cable market initially, and also believes that there may be an untapped market for CI Plus among IPTV service providers.

Thunberg sees the ability of the specification to support operator-branded environments as important. "One thing we think will be critical for success is the UI. We are looking to create applications that enable operators to transfer their user experience to the CAM," he says. "Most consumer electronics manufacturers now accept that those who wish to watch pay-TV via a CAM will want to have their own UI. If they switch to free TV then they can use the UI of the TV manufacturer."

On the downside, Thunberg says the CAMs are still a bit expensive. "There is definitely a need to get the bill of materials down a bit. I think the trend is downwards but, on the other hand, as operators want to add more functionality they need to increase power of the processing chip," he says. "I think that supporting the right level of functionality is something we are going to have to watch going forward."

Additional security

Thunberg also points out that 'pure' pay-TV operators will probably require the additional security of a dedicated chip inside the CAM to prevent unauthorised redistribution of their content. "What we offer is a personalised chip that's unique to a specific operator so it would be controlled completely in that case. This would be the case when an operator bought the CAM and subsidised it with unique IDs embedded so it becomes like another set-top." He says this fits the pattern of existing operator retail

models (such as in the Dutch cable market) where subscribers can buy boxes at retail outlets but the choice is not completely open. "It's pretty much the same with a CAM," he says.

Thunberg believes that CI Plus plays into the vision of a managed home network very well. "What we see happening is that if you want to enjoy the full range of services you still need a set-top that goes in the living room, but a lot of people will have TVs in other rooms. For those TVs [the CAM] can almost replace the set-top market. We believe a lot of CAMs will go to these types of device." He says that most operators that Irdeto is talking to want to take advantage of the MHEG-5 capabilities of the box, and adds that the possibility of porting advanced middlewares to the CAM is also being considered for the future.

François Moreau de St Martin, CEO of France Télécom-owned conditional access supplier Viaccess, also believes that operators are going to want to protect their brands. "We believe CI Plus is a market that will take off. We have targeted integrated digital TVs but for the operators it has to be introduced and managed carefully to take into account the user experience," he says. "Is it to be defined by the operator or the manufacturer? These questions could slow down the trajectory for the operators concerned about the management of the user experience. On a set-top they have control of that. So I think it will take some time to really take off in large volumes."

CI Plus can also support software-based encryption, and software-based content security provider Verimatrix has teamed up with CAM vendor Neotion to address the market. "CI has a pretty well-established market and CI Plus is the natural extension of that, but the fly in the ointment is the standardisation process," says Steve Christian, vice-president of marketing, Verimatrix. "It's a consortium standard. [However], it's in favour with the MPA and other content producers so that's a strong endorsement."

Less enthusiastic about CI Plus is conditional access provider NDS. "We will provide such solutions to customers that ask for them," says Howard Silverman, product marketing manager at NDS, who adds the caveat that one of the main ways for operators to differentiate their service is through branding, which might be compromised if CAMs are used. He also questions the economic benefit of CAMs. "For a

pay-TV operator to have a fully branded service, including the user interface across the platform is a way of really providing a compelling service,” says Silverman. He says that for the same price, an operator could deploy a set-top that will deliver a unified brand. Silverman concedes however that there may be “a niche market of consumers with big wide-screen TVs up on the wall that don’t want a set-top – although you can get set-tops that are pretty elegant.”

Conditional access provider Conax, which does support the initiative, also has a few reservations, particularly about the danger of consumer confusion brought about by the lack of interoperability between CI and CI Plus. “There are CI modules in the market already and many TVs can support CI but will not be able to support CI Plus,” says Geir Bjørndal, vice-president of sales and marketing at Conax. He points out that, for pay-TV operators, there are also other solutions available, such as embedding conditional access in TV sets themselves, which Conax is doing with a Chinese partner for the Chinese cable market and certain African markets. However, this requires a degree of scale.

Bjørndal nevertheless believes that CI Plus will be successful. He sees the terrestrial market as the one that is likely to embrace the technology first. He is more sceptical about how swiftly the interactive capabilities of the CAM will be adopted by service providers. Bjørndal believes that one of the major benefits of the technology is its ability to eliminate the need for a set-top box and, crucially, a second remote control. “For the consumer it simplifies things by eliminating the box. With set-tops you have an additional remote control and in certain regions of the world this is not wanted,” he says. For this reason, CI Plus may see a strong uptake connected to digital switchover in a number of countries.

One criticism leveled at CI Plus is the fact that the specification was developed outside the DVB, and that therefore it lacks the latter’s stamp of approval as a standard. However, NagraVision’s Verbesselt points to the fact that the initiative is very pragmatic, that it has been open for anyone to contribute and that the licensing thresholds have been set very low.

Hybrid systems

While CI Plus vendors are initially looking to target the terrestrial broadcast and cable markets, other types of service provider are also looking for flexibility in the way they approach the market and target different groups of subscribers, which also has implications for the way in which content is secured. One of the most talked about trends in pay-TV in recent months has been the growing popularity of hybrid delivery of content combining a broadcast infrastructure with IP delivery of on-demand and so-called 'long-tail' content.

Hybrid comes in various flavours. The most frequently-cited example of DVB-IP hybrid service is the DSL-based IPTV provider that wants to make use of the availability of digital-terrestrial free-to-air services to lighten the load on its network.

Verimatrix's Christian says that hybrid deployments of this sort will grow in popularity over the next few years as IPTV service providers seek to take advantage of the large market of people forced to convert to digital TV as a consequence of digital switchover. Verimatrix developed a DVB-compliant version of its software-based content protection technology to target exactly this market.

Another variation is the network-agnostic operator that wants to extend his reach by making use of whatever physical infrastructure – cable, satellite, terrestrial or IP – is available. "Basically you have normal pay-TV operators that would distribute broadcast content over DVB and have a hybrid set-top that would connect via Ethernet to broadband and deliver on-demand services over IP," says Irdeto's Thunberg. However, he adds, most operators have focused on getting HD and DVR services up and running rather than invest time and effort in building a hybrid VOD platform.

Other examples of hybrid could include free-to-air or satellite pay-TV players using an open internet connection to deliver on-demand services, while a fourth type of hybrid deployment could involve an IPTV service provider using a broadcast system to increase reach and the number of services offered. Software-based content security provider SecureMedia's vice-president of business development and studio relations, Whit Jackson, sees over-the-top internet-delivered content as a major emerging trend. One of the company's customers is over-the-top provider Gek TV, which delivers Mandarin and

Cantonese-language content to subscribers in the US via internet devices that can be plugged into the TV or PC.

“We are now starting to see managed networks and over-the-top blending together a bit,” says Jackson. He points to the example of major US content providers such as HBO and Time-Warner that want to enable viewers to be able to watch their cable-delivered services while traveling or outside the home. Jackson points out that cable operators (and programmers) are nervous about cannibalising their core business, however, and have a desire to at least restrict such services to customers that have paid a regular subscription for their home cable service. “Programmers and operators want to provide expanded viewing [opportunities] but still have control from the headend to make sure only authorised viewers have access to content and it’s not being shared with many people that are not know to them,” he says. Jackson adds that SecureMedia’s content security can support a range of models, including delivery via peer-to-peer networks: “We can [support] the delivery of content to the set-top or PC or mobile device. The system is network agnostic; it doesn’t care about the transport.”

Jackson believes that the technology exists to support more flexible business models, allowing content to be removed from a network that’s controlled end-to-end by a service provider while still remaining in a secure state. “When SecureMedia processes [content] we start with a base key and then make keys for every video frame, so every frame is encrypted differently,” he says. “No-one is going to go through it on a frame-by-frame basis.” He points to the example of the company’s recent deal with UK-based hospitality industry specialist Vode, which uses SecureMedia’s Encryptonite ONE system to pre-encrypt on-demand content at the source that can then be delivered to multiple resellers and accessed via SecureMedia’s MediaPass servers when a hotel signs up for a service. “In terms of multiple storefronts, what we are deploying in the hospitality space might provide a model going forward,” says Jackson. Verimatrix sees European cable as a key opportunity. “Cable operators going from analogue to digital want to be hybrid, not only delivery RF cable but IP-based video,” says Christian. He believes that this presents an opportunity because it makes no sense in the long term to run a smartcard-based

conditional access system for RF video and a software system for IP video. The company believes that operators will converge on software. "I believe that the customer we have talked to realise that it makes no sense to operate two CA systems," says Steve Oetegenn, chief sales and marketing officer at Verimatrix.

One example of an operator that has gone down the hybrid route is France's Numericable, which delivers services over DSL and fibre as well as cable. Numericable, which uses Nagra conditional access, also delivers on-demand content over IP on its cable network. IPTV operators such as France Télécom and Portugal Telecom have similarly turned to satellite to extend their reach. "IPTV service providers with DSL networks can find it difficult to bring triple-play services to all their subscribers," says Viaccess's Moreau de St Martin, who supplies conditional access services to France Télécom. "A hybrid system with satellite is a good solution to that. Orange is already doing it and has [signed up] 200,000 subscribers in six months."

Software-based content security provider Latens already provides a hybrid system to Polish cable operator Multimedia Polska, which delivers content from a single conditional access headend to cable and IPTV-over-DSL subscribers in order to extend its reach. The concept of a pay-TV operator delivering on-demand content over both satellite and broadband connections through a mix of push and pull technologies is very much in the ascendant. However, not all broadcasters with one-way networks are looking to broadband connections. SecureMedia is providing content security to a DVB-T player in Spain that is delivering on-demand content over-the-air, with subscribers ordering titles via SMS messages on their mobile phones. The content is encapsulated in IP and delivered over the air to secure set-tops. SecureMedia uses secured storage on the system-on-a-chip in the box to give an additional level of security. Jackson sees similar opportunities emerging in central and eastern Europe.

"There is a huge potential for growth in hybrid systems," says NDS's Silverman. "We see it as a central part of our business. Many of our customers are looking at hybrid to bridge TV and the web. We certainly see a strong uptake of hybrid satellite-broadband set-tops." NDS has already delivered systems

that support the delivery of on-demand content over the internet via progressive download to Nordic pay-TV group Viasat and France's Canal Plus.

According to Silverman, security is still best provisioned via a smartcard. "For the satellite market smartcard systems are still the most secure and robust way of protecting your branded services. When you have a two-way IP network there are ways to leverage the two-way network to put some security functions at the headend, and we have got a couple of customers for that in Europe."

Conax's Bjørndal also believes there will be a significant market for this type of hybrid system. Conax customer ITI Neovision in Poland has adopted a similar approach to delivering on-demand content and Canal Digital in the Nordic markets is also interested. For broadcast clients with internet-delivered on-demand content, Bjørndal says that a single smartcard-based system will be adopted. Conax has also teamed up with DVR technology provider TiVo to develop hybrid systems that could enable the latter to market. **Additional services**

Ultimately, giving operators (and their customers) flexibility extends not only to the ability to deliver content over multiple network types but to multiple devices within the home as well. This has further security implications, involving the maintenance of the conditional access system to other devices in the home (perhaps via use of USB keys to transfer content rights between one device and another – a solution favoured by NDS and NagraVision) or some form of bridge to a DRM system. The former is unlikely to meet with approval from consumer electronics companies, while the latter suffers from the lack of interoperability between different DRM systems.

DRM interoperability initiatives are many and various. One with a strong pay-TV bent is the Copy Protection and Copy Management (CPCM) initiative within the DVB. NDS has devoted a considerable amount of attention to this area, contributing to CPCM – basically a digital rights management standard – which would offer a standards-based way to transfer content rights between trusted devices inside and outside the home "NDS has put a lot of effort into [CPCM] as part of an industry-wide effort," says Silverman. The main priority now, he says, is to establish a trust authority that can license the

technology and enter into agreements with technology providers. "CPCM can be implemented in a wide range of devices – including TVs," he says.

Pay-TV providers are likely to take in-home distribution one step at a time. Verimatrix's Oetegenn says that the focus for now is on whole-home DVR: "We are seeing requests about how to support that and support the movement of content around the home." Verimatrix markets its own PC security software, and for devices outside that ecosystem it recommends what it calls the Multirights approach of managing keys for different DRM systems from the headend.

Some CA players such as Latens and Viaccess have begun to emphasise the usefulness of combining conditional access with middleware in order to better target content at IPTV subscribers and manage the distribution of content to multiple devices in the home via DLNA-linked devices. Viaccess's recent acquisition of IPTV middleware provider Orca Interactive highlights the growing importance to the company of the hybrid market. "We want to make it easier for operators to launch end-to-end," says Moreau de St Martin. "All the integration is done in advance and there is no difficulty in introducing new features." He cautions however that integrating triple-play services and multi-device distribution is far from easy. While the level of integration achieved by Viaccess customer Orange is very advanced compared with other providers it still has a long way to go to integrate all the services it runs over a single infrastructure. Operators are also still attached to the security provided by hardware solutions for premium content, he says. "Card-less solutions only make sense when you have a permanent IP connection to the network and you can rely on the networks as the hardware part – it's not easy to hack that," he says.

"Middleware and CAS together allows you to be much more efficient," says Jeremy Thorp, CEO of Latens. "If you think about a CAS database and a middleware database there is a lot of information that's shared. If you do it in one platform you provide a single point of integration." This, he says, makes personalisation of services easier to manage. Viewer preferences and identity can be stored at the headend, enabling users to reboot a set-top or add a new set-top to the network without losing their preferences.

The use of gateway devices for in-home distribution involves a degree of complexity in DVB systems such as cable, according to Thorp. "In the gateway, if you want to enable devices other than set-tops, you have to take off the common scrambling algorithm. You have DVB-CSA re-encrypted in AES – you don't want smartcards in a PC or laptop," says Thorp. "We can provide a CA system that can talk to any device," he adds, pointing out that Latens' technology is DVB-compliant but uses AES scrambling. "Cable operators are being persuaded to [use AES] because it gives them advantages in DVR and VOD, where you have to be careful what you leave in the clear. With DVB-CSA you need hardware assistance; with AES it's all software." (Nagravision's Verbesselt, on the other hand, says the use of AES in mixed DVB-IP networks is "a big mistake" because it involves a proprietary element. "There are things that need to be in the silicon. In HD it's not going to improve. That's where standardisation can play a big role," he says.)

Outside the service

Moving content to devices outside the service provider's control is complex. "Potentially we can bridge to other DRMs. There isn't going to be a standard DRM system," says Thorp. "If you have, for example a PlayStation 3 connected to a TV and want to play content from a DVR, you could use a linked encryption approach. The PS3 could discover the network and negotiate [to play the content]. It requires the DVR vendor to have DTCP-IP functionality in the box to be able to send out content link-to-link encrypted that can be played out but not stored."

Nagravision's Verbesselt says DRM bridges have so far largely failed to catch on. He says that Nagravision is a strong backer of CPCM, the big advantage of which is that it defines most of the business models that operators would be likely to think of, he says. "There aren't many business models that could not be supported by it," he says. However, the future evolution of content security in the networked home is far from clear. DLNA 2.0, the latest version of the homenetworking specification, has embraced Digital Transmission Content Protection IP (DTCP-IP), the proprietary DRM specification mentioned by Thorp, which protects the digital outputs of DVD players and integrated products.

Verbesselt says that Nagravision will also support DTCP. "One [possibility] could be to bring CPCM into DLNA, which also includes discovery that's UPnPbased, but 'could be done' and 'has been done' are different things," he says. To make matters more complicated, a number of Hollywood studios and consumer electronics manufacturers have

also recently banded together to create another specification, the Digital Entertainment Content Ecosystem (DECE), which appears to be more internet-centric.

Conax's Bjørndal argues that alternative technologies may play a role. "We are looking at how to bridge content from the conditional access to the DRM domain but we are also looking to see how watermarking can play a role," he says. "If you can watermark the content in every home so that it's traceable then that's a good technology that will enable more content to be made available in a more open platform." The extent to which these technologies can be meaningfully integrated is something that service providers and technology companies are still trying to work out. Irdeto's Thunberg says that CPCM is a complementary technology to CI Plus and that it could be retroactively integrated with the CAMs later this year. "Our customers have asked us also to support various types of interactivity," he says, referring to the possibility of adding VOD services and also transferring content to PCs and other devices in the future.

Operators are likely to be cautious about making too many bold moves at one time in the current economic climate, especially when the future evolution of technology remains so unclear. However, the days when one-size content security schemes fitted all are disappearing. In the new world of integrated TVs, hybrid networks and multi-device distribution, flexibility will be key.

Sidebar: Pre-paid for growth: smart-cards for sale

One way to give pay-TV customers greater flexibility in the way they buy content is to get rid of the subscription model altogether and sell content on a pre-paid basis. In Europe, the pre-paid model has achieved its greatest success in Italy, where Mediaset and Telecom Italia Media have deployed services

over the digital-terrestrial network. Nagravision, which supplies conditional access to Mediaset, in fact sees the Italian pre-paid market as a key opportunity for CI Plus, which could be used to enhance the pre-paid model of selling pay-TV services for example by bundling the CAM with a smartcard and three months' worth of premium content.

Ivan Verbesselt, senior vice-president of marketing at Nagravision, points out that pre-paid can be a good place to start and doesn't preclude migration later on to a (partly) subscription-based model. "Mediaset has gradually made a more sophisticated pay model out of it. Had they started with long-term subscriptions they would never have got to the amount of customers they have," he says. "In general I think it is very interesting for countries without a strong pay-TV history or low ARPU."

The success or failure of pre-paid may depend on cultural factors. In countries where the market is based around football, it may make sense to market a service that allows fans to go to a tobacconist and buy a card to watch a pay-per-view game. "Latin America could be a good fit there," says Verbesselt. The anonymity of buying pre-paid cards could also serve the adult content market – although this has been hit by the migration of services to the internet.

Viaccess is another supporter of pre-paid, delivering pre-paid content protection for Canal Plus Horizons in North Africa, ART in the Middle East and AB Group's Bis TV in North Africa. "If you have a good retail distribution network, pre-paid can be convenient and easy, but for many operators it's more important to own the subscriber," says François Moreau de St Martin, CEO of Viaccess.

Irdeto, which has also been active in the pre-paid market (supplying its system to Telecom Italia Media), takes a slightly more sceptical view. "I'm a fan of pre-paid myself and I'm a bit disappointed that it's not really taken off," says Irdeto's senior director, market development, Daniel Thunberg. "There is a lot you

can do with it but operators are a bit conservative in introducing it as a serious alternative.” He suggests that this could be because revenues are much easier to predict with a subscription model. Nor has pre-paid proved to be particularly popular in developing markets. It is possible, he says, that the pre-paid model could be more attractive in the case of mobile TV.

Conax, another player in this market, is also sceptical about its future. One variation delivered by Conax in emerging markets including Albania and Nigeria is the scratch-card, where a consumer buys, for example, a six-months subscription to a service via a scratch-card that contains a code that can be sent via SMS to the service provider to enable the service for a fixed term. “As a start-up model it can work,” says Geir Bjørndal, vice-president of sales and marketing at Conax. “But almost every operator wants to collect the names of their subscribers so most move away from [pre-paid].”

Nagravision’s Verbesselt says DRM bridges have so far largely failed to catch on. He says that Nagravision is a strong backer of CPCM, the big advantage of which is that it defines most of the business models that operators would be likely to think of, he says. “There aren’t many business models that could not be supported by it,” he says. However, the future evolution of content security in the networked home is far from clear. DLNA 2.0, the latest version of the home-networking specification, has embraced Digital Transmission Content Protection IP (DTCP-IP), the proprietary DRM specification mentioned by Thorp, which protects the digital outputs of DVD players and integrated products. Verbesselt says that Nagravision will also support DTCP. “One [possibility] could be to bring CPCM into DLNA, which also includes discovery that’s UPnPbased, but ‘could be done’ and ‘has been done’ are different things,” he says. To make matters more complicated, a number of Hollywood studios and consumer electronics manufacturers have also recently banded together to create another specification, the Digital Entertainment Content Ecosystem (DECE), which appears to be more internet-centric. Conax’s Bjørndal argues that alternative technologies may play a role. “We are looking at how to bridge content from the conditional access to the DRM domain but we are also looking to see how watermarking can play a role,” he says. “If you can watermark the content in every home so that it’s

traceable then that's a good technology that will enable more content to be made available in a more open platform."

The extent to which these technologies can be meaningfully integrated is something that service providers and technology companies are still trying to work out. Irdeto's Thunberg says that CPCM is a complementary technology to CI Plus and that it could be retroactively integrated with the CAMs later this year. "Our customers have asked us also to support various types of interactivity," he says, referring to the possibility of adding VOD services and also transferring content to PCs and other devices in the future.

Operators are likely to be cautious about making too many bold moves at one time in the current economic climate, especially when the future evolution of technology remains so unclear. However, the days when one-size content security schemes fitted all are disappearing. In the new world of integrated TVs, hybrid networks and multi-device distribution, flexibility will be key. |

Sidebar: Pre-paid for growth: smart-cards for sale

One way to give pay-TV customers greater flexibility in the way they buy content is to get rid of the subscription model altogether and sell content on a pre-paid basis. In Europe, the pre-paid model has achieved its greatest success in Italy, where Mediaset and Telecom Italia Media have deployed services over the digital-terrestrial network. Nagravision, which supplies conditional access to Mediaset, in fact sees the Italian pre-paid market as a key opportunity for CI Plus, which could be used to enhance the pre-paid model of selling pay-TV services for example by bundling the CAM with a smartcard and three months' worth of premium content.

Ivan Verbesselt, senior vice-president of marketing at Nagravision, points out that pre-paid can be a good place to start and doesn't preclude migration later on to a (partly) subscription-based model. "Mediaset has gradually made a more sophisticated pay model out of it. Had they started with long-term subscriptions they would never have got to the amount of customers they have," he says. "In general I think it is very interesting for countries without a strong pay-TV history or low ARPU."

The success or failure of pre-paid may depend on cultural factors. In countries where the market is based around football, it may make sense to market a service that allows fans to go to a tobacconist and buy a card to watch a pay-per-view game. "Latin America could be a good fit there," says Verbesselt. The anonymity of buying pre-paid cards could also serve the adult content market – although this has been hit by the migration of services to the internet.

Viaccess is another supporter of pre-paid, delivering pre-paid content protection for Canal Plus Horizons in North Africa, ART in the Middle East and AB Group's Bis TV in North Africa. "If you have a good retail distribution network, pre-paid can be convenient and easy, but for many operators it's more important to own the subscriber," says François Moreau de St Martin, CEO of Viaccess.

Irdeto, which has also been active in the pre-paid market (supplying its system to Telecom Italia Media), takes a slightly more sceptical view. "I'm a fan of pre-paid myself and I'm a bit disappointed that it's not really taken off," says Irdeto's senior director, market development, Daniel Thunberg. "There is a lot you can do with it but operators are a bit conservative in introducing it as a serious alternative." He suggests that this could be because revenues are much easier to predict with a subscription model. Nor has pre-paid proved to be particularly popular in developing markets. It is possible, he says, that the pre-paid model could be more attractive in the case of mobile TV.

Conax, another player in this market, is also sceptical about its future. One variation delivered by

Annexure VI

THE ROLE OF IDTVs IN ACHIEVING DIGITAL SWITCHOVER

Response by the Digital TV group

RESPONSE TO THE QUESTIONS

Q1 To what extent do you think consumers can benefit from having digital decoders included in television sets? Are some consumers, such as those with disabilities, particularly affected?

There is no doubt that at some stage in the future digital television will completely supplant the existing analogue services. The arguments in favour of digital TV have been well rehearsed elsewhere. Broadcasters want to see an early changeover to digital because of the extra cost of simulcasting analogue and digital services and because spectrum currently occupied by analogue transmissions is to some extent needed to complete digital terrestrial coverage. As with previous transitions, in the early stages of switchover an add-on adapter box is attractive as a low-cost way of converting an existing TV to receive the new transitions. But it also has drawbacks, in that it does not always neatly integrate to the TV cluster in the living room and the user has to contend with an additional remote control. Thus, as the technology matures and as coverage improves, and as the value to the consumer of the content offering appears more attractive than simple analogue TV, we would expect that they will take a greater market share and eventually supplant analogue products completely. Digital terrestrial is different to other platforms in this respect, since the use of open standards and free-to-air broadcasts means that digital tuners can be built in to a wide range of CE products in just the same way that analogue tuners are currently fitted. Integrated products have particular advantages in a number of situations, particularly where portable products are moved between rooms (for example small screen TVs which are allowed in children's rooms only at certain times). They are generally easier to operate and have particular advantages also to people with certain disabilities.

Q2 How far do you think iDTVs can contribute to encouraging take-up of digital services?

IDTVs are currently a very small part of the market for the following reasons:

- Availability of free set-top boxes from subscription providers in the pay TV market.
- Uncertain signal coverage causing returns of iDTVs to retailers, making analogue TV plus set-top box an easier sell since if signal problems occur only the set-top box need be returned.
- Uncertainties about the future of digital, exacerbated by the failure of ITV Digital
- Limited promotion of iDTVs due to poor retail staff training.

All of these factors will diminish with time. In the near future, sales will concentrate on low cost converter products. These volume sales at the bottom end of the market will in turn encourage iDTV sales at the mid / high end.

In the meantime, consumers need to be warned that the government intends an early cessation of analogue transmissions and that analogue TVs will require a converter box to continue to operate. Increasingly, consumers will opt to purchase an iDTV rather than a new analogue TV.

We believe that in a few years iDTVs will become an important market driver for the mid to high end market segment. The area of greater concern is the sub £100 small screen TV market where:

- (i) the cost differential of digital is a greater percentage increase
- (ii) the use of an external digital adapter is physically problematic

Q3 How far do you think iDTVs can contribute to reaching the point at which analogue terrestrial transmissions could be switched off in the UK? And in the rest of Europe?

We do not see a distinction between this question and the previous one. As iDTVs become important market drivers, so they will contribute to reaching the point where analogue may be switched off. The sooner an iDTV becomes the natural purchase in the replacement TV market, the sooner we shall get to the conditions where analogue could be switched off.

In terms of the development of digital in Europe, services on Sweden, Spain and Finland have so far failed to find any great success and the pay TV provider in Spain suffered the same fate as ITV Digital. So there is a natural delay whilst other member states review the commercial model on which their plans were based. A success is needed to point the way.

The danger for governments is that analogue TV is allowed to wither on the vine such that the scarce spectrum resource is locked up with an increasingly small population of users. The impact of attractive, low-cost iDTVs, offering additional services which are attractive to consumers, will surely offer the greatest incentive for users to switchover.

Q4 How might we ensure that any proposal to make sets contain a digital decoder did not favour one platform over any other?

We understand that legislation has to be general and allow cable and satellite iDTV solutions. On the other hand, it is terrestrial analogue that is being switched off and that the objective of the exercise is to provide a low-cost alternative to the reception of existing free-to-air analogue services. We note that the EU supports open standard content, so perhaps the requirement should be more specific to those platforms adopting open standards.

It has been suggested that TVs should be required to have an MPEG decoder only, leaving the choice of platform to be added as a plug-in module or separate box. It seems to us that this is the worst of all

worlds, interfering with the manufacturers freedoms in product strategy, forcing additional cost which will be born by the consumer and not having the convenience of a truly integrated solution. In the future, the development of home local networks may make such solutions feasible but it is for the market to decide.

Q5 How might we ensure that any proposal to make sets contain a digital decoder was neutral with respect to the market models and technical choices made by individual service providers?

Any government action should allow consumers and the market place to decide which form of digital TV best replaces their analogue services, but at the same time must recognise that consumer choice facilitated by free-to-view services using open standards should be 'encouraged' by member states.

Q6 If there was a proposal to make sets contain a digital decoder, what conditions should apply? For example, should the proposal apply only to sets of a certain size, or including certain features, or from a certain date? Should it include all receivers (including VCRs) with a PAL or SECAM decoder?

The Consultation paper makes clear that the view of the British Government is that legislation would only be possible within the context of a European Commission Directive. We believe that it would be disastrous to attempt to set a single timescale across Europe, leading to a situation where our remaining major CE manufacturers abandoned TV products for more profitable areas of operation. If legislation is to be effective, it must be subject to the setting of timescales in individual territories and implemented by NRAs with the cooperation of major manufacturers in each territory.

What conditions should apply? It seems clear to us that it should include all terrestrial tuners, including VCRs. Most manufacturers believe that the VCR will be phased out from product sales within the next few years and replaced by devices that are inherently digital. However, it would be inconsistent to exclude VCRs

The case of small screen TVs, there may be a good case for excluding them in the short term, while the cost premium of adding a digital tuner remains relatively high. This interim period of say three years or so should again be determined by NRAs and major manufacturers in each territory to suit local conditions. Legislation that applied to all tuners, would allow for monitor screens without a tuner (either analogue or digital like some currently available plasma screens) to be excluded from a directive. A further question is whether it should also apply to cable and satellite receiving devices, or perhaps the question is Why should it not apply also to cable and satellite in order to preserve a level playing field. This is no so much a problem for the UK, where conversion to digital is well advanced on cable and completed on satellite. But in other territories migration to digital on these platforms is much less advanced. Also, cable and particularly - satellite receivers are purchased in retail stores in a horizontal market. Support for open standards, as referred to earlier, suggests that any legislation should therefore apply to these platforms as well as terrestrial. It will be necessary to work through this scenario in the process of preparing any European Commission directive.

Annexure V