

## **COMMENTS ON PRE-CONSULTATION PAPER ON**

### **SET TOP BOX INTER-OPERABILITY**

Lt Col VC Khare (Retd), Cable TV Industry Observer

#### **Introduction**

1. It is heartening to view the pre-consultation, which indicates that, perhaps, TRAI themselves are NOT sure of its cost effective feasibility with the Indian psyche. However, comments so received may set misgivings, if any, right.

2. Main issue, in Indian context where DTH or DAS subscriber subscriber has to buy the Set Top box, is that STBs provisioned by a service provider do not work with services of another service provider of similar services. Very often one comes across a quote that ‘In Mobile Telephony, Subscribers obtain a SIM card for themselves to be used in any handset and can change TELCO by changing SIM Card and NOT the handset’. Thus Mobile handsets are deemed to be inter-operable. We forget that in that case too GSM SIM cards do NOT work on CDMA handsets and vice-versa. Further, TELCO services are usage based billing systems, with TELCO owning the customer without an intermediary like a cable operator(NOT in DTH) without any content security/piracy issues since no pay content is to be protected in TELCO services, which are addressable from inception (one point to another point) by way of subscriber specific numbers/IP addresses. TELCO users obtain mobile handsets with features compatible with affordability without any hardware service backup for the CPE (Hand Set) from the TELCO. Keeping in mind this fundamental difference comments are offered for pre-consultation.

#### Observations Para 1.2

3. Coaxial cable carrying TV content stream connects to domestic TV receivers for  $75 \Omega$  impedance cable input to the domestic TV receiver for analog reception. But when digital signal stream is required to watch programs, digital to analog conversion is necessary. This is achieved by using a Set Top Box (STB) which, now in Cable TV also, is mandated to be addressable. Addressability in simplistic terms means facility to enable or disable viewing remotely and selectively from the Headend. Thus, in digital content delivery platform(DTH, IPTV, HITS or DAS Cable) STB constitutes the essential CPE at subscriber premises to watch addressable TV content in analog mode on domestic TV receivers. While digitization enhanced the content transportation capacity, concern for security of content of PAY TV broadcasters too has been addressed by encryption of the content and viewing authorization controlled by SMS (Subscriber Management System) installed at the Headend. Pay TV Broadcasters introduced addressability first at Headends by use of addressable IRDs followed by compelling use of STBs at subscriber premises. It was therefore natural that PAY TV Broadcasters used proprietary encryption themselves and later got HSPs(Headend Service Providers) to follow suit. Hence HSPs encoded, encrypted( changing video and audio

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parameters deliberately to make them un-intelligible unless the change so caused was removed at the subscriber end), multiplexed, modulated, combined and fed the service wireline network with proprietary encryption. Hence STBs to enable programs viewing from a Headend had to be compatible with its encryption for decryption resulting in compelled use of HSP provisioned STBs. Technical specifications for STBs have been published by BIS for CATV, DTH and IPTV. Essential difference in their categorization is the input tuner (5-862 MHz for CATV, 12-18GHz for DTH and 100Base T Ethernet for IPTV) whereinafter the decryption process and decrypted display is similar. There can be some differences in the middleware affecting EPG.

4. It is stated that a large number of DTH STBs are lying de-activated and considered an avoidable waste. In this connection it may be recalled that Broadcasters, both PAY and FTA, have substantial earning from advertisements claiming reach of their programs to the subscriber eye-balls on the network. But advertisers insisted on clear visibility criterion of the Broadcaster's program on the network. Cable TV Networks, in analog transmission regime were transporting programs on SOMEHOW CONNECT practices without proper design to equalize the attenuation due to skin-effect and cascading limitation of amplifiers. Hence all programs were NOT delivered with equal audio and video clarity throughout the network. On 1-5 subjective scale, hardly any programs could be graded 5, most fell in 3-4, a sizeable number i 2-3 and some in 1-2. Hence Broadcasters wanted their programs mapped at the headend in 3-4 clarity zone which was directly proportional to network wireline distance from the Headend/Optical Node in Coax domain . The HSP therefore wanted to capitalise on virtues of their network and started demanding Carriage/Placement fee primarily to off set arbitrary content price hikes by the Broadcasters.

5. It is also an established fact that DTH platform abroad were used to serve cable dark areas. In India MIB promoted DTH co-existence with Cable as a better service. Hence subscribers who were NOT happy with 2-3 grade reception, changed over to DTH. But with DAS implementation, quality of Cable TV reception is compatible with DTH while providing higher number of programs. Hence Subscribers have NOT renewed their subscription resulting in deactivation of DTH STBs not being used by subscribers who have reverted to CATV. Hence deactivated DTH STBs are no reflection of waste but only impulsive decisions or flirting with available alternatives.. DTH STBs cannot be used on CATV networks because of demodulation, decryption and tuner difference

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#### Observation on Figures 1 and 2

6.Fig-1 The block diagram is incomplete. Output of digital modulators goes into passive combiners 8/16/24 Input Ports and 1 Output ports. Then 5 to 12 such combiners outputs are fed to a single combiner, generally 16 input ports and one output port. This passive combiner causes insertion losses and hence its output (106 RF channels) is amplified through a launch amplifier with flat equal output for all channels (95-120dB $\mu$ V). This output is fed to frequency converter for DTH and a power amplifier while the combined RF output in case of CATV is fed to an optical amplifier for HFC networks or direct to coaxial networks for Coaxial Cable Networks.

7.Fig-2 At the subscriber premises, input for the STB for DTH as well as CATV is a  $75\Omega$  coaxial cable, generally RG6. But these two STBs are not compatible because Frequency input for DTH is in 12-20GHz QPSK mode while for CATV it is 47-862 MHz QAM mode. The demodulators are therefore NOT compatible.

8. In case of IPTV, the encoded (NOT encrypted) output is served through a server and switch to a DLC (Digital Loop Carrier) connecting STBs on Ethernet through MDF(Main Distribution Frame) via an IDF(Intermediate Distribution Frame) to the IPTV STB with Ethernet port( $100\Omega$ ). The carrier frequency is 0-5 MHz. These STBs do NOT have a  $75\Omega$  coaxial cable input for connection to a DTH or CATV terminal.

#### Observations on Para2.7

9.The PAY Content security environment is not elucidated. A DESIGN HOUSE develops the algorithm as per DVB-C or DVB-S requirements and offers it to CAS vendor who approves it and brands the same. The CAS vendor seeks acceptance from PAY TV Broadcasters and seeks order from HSP for a volume of STBs wherein the chip is to be soldered into the STB. The chip manufacturer bakes the chip on a minimum volume of the same to be supplied to the STB manufacturer for shipping of STBs to nominated HSPs. STB Manufacturer does NOT pay royalty to CAS vendor. Only the cost of chip is paid to the chip manufacturer for the number of chips ordered to be released to the STB manufacturer, who in turn include it in raw material cost for pricing of the STB. Royalties are however payable by the HSP to the CAS vendor as per terms of business

10.In the Indian environment, CAS is to be embedded in the chip for CI slot since CI slot is not authorized for CATV STBs making them HSP specific for deployment. For DTH the standards mandate a CI slot(though this is violated in many cases) which slides in a CAM

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module in circuit substitution to the CAS sub-system shown in Fig-2 and works against viewing card compatible with the alterative platform.

11.IPTV does NOT mandate encryption under the Cable Act. It is addressable through IP addresses and every time the program is to be tuned, request is made on Central Office(Headend in CATV parlance) and program is released for viewing through multicast or unicast. This takes time as compared to zapping experience in CATV or DTH and is termed as latency which is often related to congestion in peak hours. This service at present is largely confined to TELCOS who work under a different Ministry. This service does not seem to be covered under the DAS Act.

#### Observations on Para 4.3.1

12.CSA only specifies the key structure (48 bits)for the ECM and EMM for algorithm authors to work on permutations. The key structure is standards but its arrangement is proprietary to the CAS Vendor, otherwise once hacked the security gets compromised.

#### Observations on Para 4.3.2

13.In both, CATV and DTH, platforms tuner interface has different input frequencies 5-862 MHz for CATV with QAM and 12-20 GHz for DTH with PSK (QPSK or 8PSK). Interoperability would require plug and play substitution in the STB with instrumentation for fine tuning.

#### Observations on Para 4.3.4

14.EPG is loaded on the middleware which is software convertible at workstations equipped for the same. This feature is unique with the HSP and is no-where standardized. However in good quality STBs an FPGW(Field Programable Gate Way) is provided for alterations in field.

15.In Indian domestic TV STB environment, subscriber has no clue on features of a good STB. They are only interested ion CHEAPEST. This thought always compromises QUALITY which never comes cheap.

#### **16.Answers to Questionaire in the Pre-Consultations**

***i. In your opinion, what are the concerns that should be taken care of at the time of development of framework of interoperable of STBs?***

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17.Theoretically it is possible to have an interoperable STB for DTH and CATV with two tuners (5-862 MHz and 12-20 GHz) housed in the STB with pluggable CI Module. Or tuner itself can be detachable. However with detachable tuners tracking and fine tuning is required which may only be possible at suitable instrumented labs. This will require design changes and enhancement in size of the STB.

***ii. What are the techno-commercial reasons for non-interoperability of STBs other than those mentioned above? Please provide reasons with full details.***

18.At present STB is procured by the HSP, with warranty terms and conditions. DTH operators do specify a percentage of the ordered volume to be supplied as service replacements for field returned unserviceability restoration (FRUR), particularly for remote hand sets. More enlightened HSP managers order populated PCBs and Front Panel replacements to rectify the FRURs free in warranty period and against payments in post warranty periods. A back-to-back agreement can be signed with STB manufacturer for obsolescence and factory/authorized off-shore repair centres for re-cycling of defective STBs.

19.However, many people do NOT understand the difference between WARRANTY and GUARANTY. In India only the terms warranty is practiced implying restoration (NOT replacement) of serviceability provided, in the opinion of the supplier defect is attributable to manufacturing infirmity. Even this warranty is NOT transferable.

20,When a subscriber wishes to procure the STB, the invoice has to be made in their name with terms and conditions. If STB is procured from open market, HSP shall have no obligation to restore unserviceability and service centres may be located away from Subscriber. The subscriber shall have to fend for themselves with no commitment from the retail vendor to provide service replacements which shall have to be programmed in the SMS as replacements for accessibility.

21,If STBs with pluggable tuners and CI slots can be made available and subscriber wishes to migrate to another HSP, the STB shall have to be tampered making warranty void. Further, the cost of CAM and tuner in retail may be as much as WBD(written down book value) of the STB.

22. In case of DTH, re-alignment of mini dish antenna too is required which will be difficult for the subscribers without proper instruments. However, these Dish Antennae also act as popularity sign posts of DTH Service Providers hence they always tell the migrant that existing dish and LNB may NOT work with the new STB or say Dish and LNB shall have to be paid for whether installed

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or not. Just in case, only STB is changed and dish or LNBC is damaged, old HSP will NOT respond and the new HSP will only insist on replacement.

#### ***iii. What are the plausible solutions for technical interoperability of STBs and their impact on the sector growth?***

23.Design of boxes with pluggable tuners and free availability of CAM for mandated CI Slots. Provision shall have to be made for the new HSP to convert existing STB with subscriber, with or without charges, and warrant serviceability of the STB so upgraded by them.

24. In this alternative cost of STB shall have to go up.

#### ***iv. Any other issue which you feel will be relevant for development of technical interoperability of the set top boxes.***

25. Provision of CPE could be mandated for the HSP, against a non-interest bearing security deposit by the subscriber to be refunded on return of CPE in serviceable condition to the existing HSP when subscriber wishes to migrate to a new HSP. Serviceability restoration shall remain the responsibility of the HSP, for the entire life cycle of the subscriber, including but NOT limited to version upgrades. This was the spirit of commercial inter-operability by TRAI.

26.In practices with reputed HSPs abroad, three categories of STBs are made available under the above environment, viz (a)Vanila Box with no memory, (b) middle end STB with some memory and (c) High End interactive STBs with HDD. Upper end users prefer (c) above and retain the STB when wishing to change the HSP because of their recordings on the HDD.

#### **Conclusion**

27.Comparison with mobile users usage and lose statements like changing service provider by just changing SIM card are not well founded. Even there CDMA and GSM handsets from same service providers are NOT interchangeable and SAFs have to be filled up again with KYC verifications and plan changes. Service providers do provide hand sets too but subscriber can buy the handset from open market and avail warranty from the vendor without any involvement of the service provider.

28.In any case, PAY TV content security and piracy are non-issues in TELCO services.

29.Hence such comparisons are not considered maintainable.

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30. It must also be realised the Ministries for TV content distribution and Telecommunications are different and so is the services philosophy. Telecom since inception was never a free service but was backed up by a time proven and rugged usage based billing system. Cable TV was a technology entrant by stealth where legislation trailed practice and has remained un-organized with many infirmities like upskilling and corporatization. DTH had a short term advantage in terms of cable dark areas penetration but is losing subscribers in DAS areas where STBs have been seeded.

31. Looking at DAS implementation, where implementation is being reckoned from number of STBs sent out of HSP's ware houses, without materialization of itemized billing for choice of viewing by subscriber is at best a saga of inabilities. Indian mindset for TV content distribution does NOT seem to be matured for addressability in DAS as legislated.

32. Cable operators seemingly want fixed monthly subscription based un-encrypted but encoded( for more programs) content delivery with a cheap D2A converter of match box size wireline powered and plugged in.

33. That may usher in the inter-operability being envisaged.