

COMMENTS ON TRAI CONSULTATION PAPER No 20/2016

INFRASTRUCTURE SHARING IN BROADCAST TV DISTRIBUTION SECTOR

Lt Col VC Khare(Retd) – Indian Cable TV Industry Observer

Observations on the Consultation Paper

1. Para 1.1. - Cable TV is NOT recognized as Broadcast. IPTV, by definition, point to point, cannot be treated as Broadcast. It falls under telecommunications.
2. Para 1.2 - Value Chain comprises of Broadcasters, Headend Service Providers (registered with MIB managing technological functions like turn-around, encoding, encryption, multiplexing, modulation, combining, access authorization by subscriber through SMS and transportation over HFC or similar medium), Cable Operators(registered with Dept of Posts and NOT performing any functions like that of Headend Service Provider) and the Subscriber. It may be noted that Cable Act 1995 and its Amdt 2011 give an impression that Cable Operator runs a headend, which was the case when Cable Act was drafted because MSOs did NOT exist.
3. Para 1.11(v) -In reality SMS, installed as pre-condition for registration of the Headend, is NOT functioning. The result is that benefits to subscriber as envisaged are NOT accruing.
4. Para 2.3(iv) Upconverter and uplinking transmitter for uplinking to the satellite transponder and a down linking console to receive the program stream downlinked from the satellite and transmodulate the stream without changing any parameter in the digital transport The downlinking console may be operated by a Cable Operator, or an MSO (as known at present) without DAS Registration with MIB, for transporting program stream over HFC to subscriber premises for viewing through set top boxes.
5. Para2.7(f) This issue is much more complex than stated simply. Over the last 13 years, neither TRAI nor MIB have been able to extract the basis for pricing of content to determine the reasonable basic content cost to a Headend Service Provider. To this cost are added, as COST PLUS (a) OPEX of Headend and Network(b) remuneration for services provided to the Cable Operator (c)Network peace keeping expenses (d) reasonable profit percentage for the HSP and percentage share of Cable Operator in the revenue subscribed by the subscriber. Such compilation is to lead to a rate card to be prepared by the HSP showing (i) a-la-carte rates for content (FTA, for selections over and above BST as well as PAY TV) and (ii) bouquet rates for the content for subscriber to select the viewing combination, at rates mentioned in the rate card, and pay for the same when presented with an itemized bill.
6. Para 2.8 HITS essentially has a wireless satellite casting segment in the content distribution chain. This is limited by number of transponders and hence number of programs that can be packed in the transport stream. As against this, content volume handling capacity of the HFC transporting content from Cable TV headend to subscriber is much higher.
- 7 Para 2.10 Optical fibre infra-structure has never been an issue. Its range is an issue primarily because of lack of RoW. The requirement, therefore, is to provide for leasing of long haul optical fibre trunks of TELCOS, Natural Gas Companies or the Railways. Networks designed on Core and edge Network topology

COMMENTS ON TRAI CONSULTATION PAPER No 20/2016

INFRASTRUCTURE SHARING IN BROADCAST TV DISTRIBUTION SECTOR

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transport program stream to edge network converting from QAM to IP and re-Conversion from IP to QAM at Edge network where a virtual Headend get created for serving existing CATV networks.

8. Para 2.14 This presumption will soon be obsolescent. Cable Operators served the subscribers through their technicians as service provider interface. Most of these technicians have NOT received any structured installer's training and therefore could NOT deliver all programs with equal audio and video clarity till the end of the line at the farthest subscriber outlet in terms of wireline length. Rather than tackling the void and organizing/stipulating minimum qualifications for such under skilled work force Govt went about introducing DTH as a better delivery platform form/substitute for Cable TV. As an alternative DTH flourished int5ially. However with DAS implementation, though very indifferent, volume of content and quality in clarity have improved and hence more and more DTH subscribers are tending to return to Cable TV. Further, in the context of Digital India, Broadband proliferation in residential segment, will be enhanced further highlighting DTH limitations by way of transponder availability and rain fade stigma. Hence way forward will be integrated HFC for residential segment.
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10. Para 2. 15 What is that affordable price ? Bouquets from DTH Operators, Average Rs 500/- p.m. for all SD channels, All programs transmitted from Headend in Cable TV for Rs 200- to Rs 275/- per month or something else. The intention of DAS legislation to empower subscriber to chose and pay for watching content of choice has not been established. With Phases I.II and III claimed completed by MIB. Affordability comes after empowerment availability and accessibility.

COMMENTS ON TRAI CONSULTATION PAPER No 20/2016

INFRASTRUCTURE SHARING IN BROADCAST TV DISTRIBUTION SECTOR

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- 11 Para 2.19 Broadcasting services, from inception, operated on transmitting content in to air without ever knowing how many viewers accessed it or bothering about the QoE (Quality of Experience). Broadcasting aimed at dissemination of information, in general interest and without charging the receiving subscriber in point to multi- point mode. Broadcasters were not selling TV content to viewers as PAY TV.
- 12 Para 2.21 In context of Headend Service Provider for CATV Networks, HITS DTH, Headend operation is nearly the same except that in case of CATV digital outputs are on QAM while in the other two it is QPSK or 8PSK. In DTH there are no intermediaries like a cable operator. In HITS as well as CATV, subscriber is served by a Cable Operator with deemed addressability, in the spirit of DAS, provided SMS is established, ICOs with Cable Operators are signed and itemized bills are issued regularly. So ! Headend like establishment is clearly established in authorized locations. HFC networks, fibre and Copper are strung without RoW on 'SOMEHOW CONNECT' basis. Hence their compliance to sound engineering practices cannot be established. Such shoddy networks can handle uni-directional video but NOT DOCSIS based broadband.
13. Para 2.22 In all TRAI consultations, on TV content delivery through wireline medium, clarity lacks in describing Cable Operator with Headend, i.e. DAS Headend, to deliver content to Cable Operators(registered with Deptt of Posts) who do NOT have a Headend, as well as to popularly called DIRECT POINTS, i.e. subscribers delivered content without a Cable Operator. Such Direct points network too has to be registered with Deptt of Posts a Headend Service Provider's network.
14. Para 2.22 DAS Legislation mandates registration of a Headend with the MIB. But if processed transport stream is obtained from such a headend, the received location need NOT be a Headend. It will be a Node on some thing like a core network of the Headend Service Provider. HITS policy, as drafted, envisaged satellite casting of PAY TV content only to a terrestrial FTA Headend for combination and trans-modulation, without interfering with encryption. As such it was essentially a PAY TV Platform distribution. With DAS un-encrypted FTA transmission too is prohibited. So! HITS Headend at the Earth Station Could as well pack total content (FTA + PAY TV) encrypt and download to NETWORK Operators (At present small, Headend operators or Cable Operators).
- 15 Para 2.23 This suggestion is NOT maintainable. HITS and MSO system deliver addressable digital program stream to subscribers through an intermediary i.e. a Cable Operator. DTH, by definition, delivers addressable program stream DIRECT to the subscriber, WITHOUT an intermediary like a Cable Operator.
16. Para 2.26 Shows more concern of TRAI for Broadcaster as an entity. DAS envisages B2B agreement only between Broadcaster and Headend Service Provider. Subscriber and Cable Operator and NOT supposed be visible on the Broadcaster horizon. Hence this connotation clearly violates the spirit of DAS as legislated.

COMMENTS ON TRAI CONSULTATION PAPER No 20/2016

INFRASTRUCTURE SHARING IN BROADCAST TV DISTRIBUTION SECTOR

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17. Para 2.27 TV content delivery is uni-directional. Broadcaster to HSP, HSP to Network Operator, i.e. Cable Operator and Network Operator, to Subscriber. Content flows down stream and revenue(NOT services) flows up stream. The only exception is that in DTH, entity Cable Operator does NOT exist. In actual practice HSP in CATV and HITS, except for transport stream transmission, do NOT provide any services to Cable Operators who alone serve the subscriber.
18. Para 2.28 This too appears to be a Broadcaster's dictate to this paper. Piracy guards are built into B2B agreement with Headend Service Provider. Piracy detection is rudimentary and crude in India because neither piracy detection processes are outlined in the ICO nor are professional Piracy Detection Agencies established in India. Finger printing by Broadcasters will help detection of the location of IRD and finger print at detecting site STB will help identify the rogue STB operating in jurisdiction of Headend irrespective of simulcrypt. Hence this dictate sounds impractical.
19. Para 2.30 Repeatedly this paper is concerning Broadcasters. Targeted advertising is essentially a feature of addressable subscribers. DAS as implemented is enabling all STBs receiving a feed and acting only as D2A converters. Hence DAS as legislated needs to be repealed to provide mandatory encoding and ad insertions by Cable Operators (including HSPs for their direct points) and enshrining conditions/ procedures for the same in ICOs.
20. Para 2.32 DAS, had it been implemented verbatim, would have dispensed with phenomenon of Carriage fee and/or placement(the mal practice erupted from varying visibility/clarity in analog regime due to SOMEHOW connect practices in cable networks due to ignorance about SKIN EFFECT in coaxial cable. In digital wireline transmission either signal is received or not. When received all content is equally clear or nothing is received

Comments on other issues relevant to the present consultation paper which are not found elaborated

21. Essentially, therefore, elements of TV content distribution in wireline medium are HSP(Headend Service Provider)/DPO/MSO, the physical wireline (fibre with copper inclusive i.e. HFC) and the subscriber(as viewer and source of revenue) In CATV segment, DTH and HITS inclusive, Headend/Earth Station is registered with MIB to perform technical functions of turnaround, encoding, encryption, multiplexing, modulation, combining, subscriber management and transmission of aggregated program transport stream to through HSP owned/resourced fibre to Cable Operator proximity(node) terminating at subscriber premises for viewing..
22. The Network operators in CATV are registered with Deptt of Posts. All networks, from egress at Headend to Subscriber premises, are constructed on SOMEHOW connect philosophy without any assurance on conformity with IS- 13420. Cable Operators have, reportedly neither received any formal training nor are aware of expectations from them for EoL conformity, QoS and QoE

COMMENTS ON TRAI CONSULTATION PAPER No 20/2016

INFRASTRUCTURE SHARING IN BROADCAST TV DISTRIBUTION SECTOR

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23. .In TELCOs this part of networking (like of Cable Operator) is NOT a separate category. Telcos own technically sound networks from Central Office to DEMARC point at Subscriber's premises. What is common is that program transport stream cannot be tampered with once it leaves Headend/Central Office. All TELCO networks have valid RoW, protection and grounding/bonding fore noise minimization.
24. Longhaul optical fibre layouts are largely owned by TELCOs with restrictions on leasing dark fibre. Some Cable HSPs lease fibre from TELCOs for long hauls.
25. Hence the discussion in this paper would get confined to sharing of turnround of TV content and the distribution (HFC i.e. Hybrid Fibre Copper).

26 The Turn Round Aggregation

26.1. The Headend/Central Office should be professionally constructed with scope for expansion/upgradation. Each such facility should be able to drive core and edge networks terminating into subscriber premises. Such facilities should be capable of running entire country from one such facility only. Such a facility could also up link the content to satellites for HITS and DTH too. In fact such a facility can free up transponder space on the satellites being used by DTH and HITS operators.

26.2. Such facility should also include stout CAS(simulcrypt) and SMS supported by empathetic customer care.

26.3 4 to 6 such facilities could be got constructed and integrated.

26.4The sharing suggestion would tantamount to closing a number of Headends on understanding that CAPEX and OPEX for 'state of the art' headend shall be shared, content shall be transported by QAM to IP conversion at Central Headend , long haul fibre bringing program stream shall terminate at location of closing down headend, IP to QAM conversion will take place, including but NOT limited to change in program mapping and sent on HFC to existing Cable Operators by from the HSP.

27 Distribution Networks

27.1 These would comprise of National Trunks and terrestrial Edge Networks properly engineered and maintained at National Level as central networks and comprise of fibre long hauls only..

27.2 The fibre from Edge Network could terminate into a Cable Operator's proximity node or on to a DLC. Both feeding FTTP, FTTB or FTTF.

27.3 Strict engineering compliance norms could be laid down for such fibre terminations.

COMMENTS ON TRAI CONSULTATION PAPER No 20/2016
INFRASTRUCTURE SHARING IN BROADCAST TV DISTRIBUTION SECTOR

Lt Col VC Khare(Retd) – Indian Cable TV Industry Observer

27.4 Nationalising such networks and franchising the same to existing cable operators may also warrant consideration.

28. TV Content Distribution over wireline networks (CATV and HITS inclusive) is regulated by TRAI in accordance with Cable TV Networks Regulation Act 1995, Amdts 2002 and 2011. At present these networks are supposed to be multi-program (often wrongly connoted as channel), multi- RF-channel digital addressable. They are point to multi point wireline broadcast networks but have NOT been accorded the status of broadcasts, a central Govt subject, and hence left to State Govts to administer, which don't have I&B Ministry. This act has largely remained monumental due to lack of enforcement mechanism at MIB and TRAI levels.
29. The country has NO broadcasting Act promulgated as yet. However Govt Broadcaster is PRASAR BHARATI in wireless Free to Air mode. Other than Prasar Bharati, all other TV broadcasting is Private, partly FTA and partly PAY.
30. The appeal/preference for Private TV Broadcaster content, compared to Door Darshan, resulted in proliferation of such content, loosely connoted as channels, over CATV and DTH..
31. Cable TV networks operate on 47-862 MHz RF spectrum totalling 106 channels,7 or 8 MHz wide. In analog mode each program occupied one RF channel in the spectrum limiting max number of possible program transmission to 106. In absence of a Broadcasting law, a private Broadcaster only needs a down-linking permission from MIB for business in India. When Cable Networks got saturated to 106 analog transmissions, while MIB was granting permissions to Private Broadcasters and had obligations to create avenues for eye balls reach, Digitization was mandated because many programs could be compressed in each RF channel, thus enhancing program transportation capacity of Cable Networks, HITS and DTH to meet that obligation several times.
32. This digitization enactment involved procurement of an addressable set top box by each viewer to access the digitized programs. Further they were to be facilitated with choice to select content to watch and pay for the same accordingly when billed item wise. This requirement has not been fulfilled.
33. DAS implementation is reckoned from number of Set Top Boxes despatched from warehouse of Headend Service Provider.
34. So the infra-structures involved are Headends(not necessarily conforming to Indian Standards), a network whose layout cannot be deemed legal and subscriber drops which too do not conform to Indian Standards.
35. Under these circumstances it would be any ones guess how can such unorganised infra-structure be shared ?
36. Possibly for such sharing, Govt should set up regional Headends, lay long haul distribution fibre leased to Headend Operators. Mandating RoWs to licensed

COMMENTS ON TRAI CONSULTATION PAPER No 20/2016

INFRASTRUCTURE SHARING IN BROADCAST TV DISTRIBUTION SECTOR

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operators and creation of an inspectorate to certify networks would be needed
Headend Operations could be entrusted to Prasar Bharati. Then and only then
infrastructure sharing would appear feasible

Answers to Issues In The Consultation Paper.

(1) Is there a need to enable infrastructure sharing among MSOs and HITS operators, or among MSOs? It is important to note that no mandate for such infrastructure sharing is being proposed

CABLE TV business is totally privately funded. Investor wants supremacy and is not keen to share any thing. Hence Industry is NOT likely to accept it.

(2) Which model is preferred for sharing of infrastructure among MSOs and HITS operators, or among MSOs? Kindly elucidate with justification.

Sharing would be better suited to Telco oriented IPTV where encryption is not mandated, addressability exists and content is served from servers. In that case delivery is over 50 or 100 Ohms impedance UTP copper. However HSPs can rent long haul fibre from TELCOs for QAM-IP-QAM trans-modulation modes for long haul if core and edge networks are engineered equally clear. Revenue flowing, from subscribers, in properly implemented DAS, was to be appropriated /apportioned at the Headend SMS. In partially implemented DA how can the intended benefits be expected to accrue, even for taxes.

(3) Is there a need to enable infrastructure sharing among DTH operators? No !

(4) What specific amendments are required in the cable TV Act and the Rules made there under to enable sharing of infrastructure among MSOs themselves? Kindly elucidate with justification.

This question ignores the fact that Cable TV Networking was a technology entrant by stealth. Regulations succeeded practices aimed at providing enhanced TV programs volume, as compared to the then drab Door Darshan offering, without charging for the content. This included cable casting of indian feature films as video replays, impacting box-office revenues of the CINEMATOGRAF. Established over 20 million connectivity, through the technique was NOT LEGAL. Hence were subjected to raids triggered by Motion Picture Producers Association. Enactment of Cable Act legalised the operating practice and gave rise to Headend Service Providers, popularly called MSOs(though they hardly provide MULTI-SERVICES). Introduction of PAY TV, in this service, arbitrarily by PAY TV Broadcasters, caused Amdt 2003 to Cable Act i.e. CAS, and then the aftermath of DAS.

COMMENTS ON TRAI CONSULTATION PAPER No 20/2016

INFRASTRUCTURE SHARING IN BROADCAST TV DISTRIBUTION SECTOR

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Basically, Cable TV Networking constitutes the mother networking with HITS as a layer. DTH does not fall under purview of Cable ACT, hence need not be debated under this question. Infra Structure sharing has two parts to it First the Headend which will encode, encrypt and manage viewing of content transmitted to a core and edge fibre and last mile copper. Largely RoW for the networks does NOT exist officially. Hence mandatory transportation of content ONLY to networks with licensed RoW shall have to be compelled.

(5) What specific amendments are required in the MSO registration conditions and HITS licensing guidelines in order to enable sharing of infrastructure among MSOs and HITS operators? Kindly elucidate with justification

Looking at DAS implementation realities (wherein subscriber has not been facilitated with rate cards, choice of programs, Subscriber ID creation and pairing of STB with Subscriber ID), only two things have been achieved FIRST transport stream is digitized and encrypted but STBs are authorized to show all programs, SECOND subscriber except for paying for STB pays for service as before i.e. no perceivable impact of DAS. This means that digitization has only enhanced program volume on the network with the same RF bandwidth. Hence simulcrypt (at least 6 encryptions) must be mandated both for Cable TV and HITS. Requirement of SMS should be repealed since existing practice is Headend Service Providers are billing Cable Operators (NOT subscribers) on fixed amounts per STB. Why keep laws which cannot be implemented?

(6) What specific amendments are required in the guidelines for obtaining license for providing DTH broadcasting service to enable sharing of infrastructure among DTH operators? Kindly elucidate with justification.

Mandate simulcrypt for encryption, remove requirement of embedded CAS in the STBs and specify only CI slot in the STBs to be customized through CAMs. This will facilitate aggregated feed from Cable Headend Service Providers, trans modulate from QAM to QPSK and satellite cast the content to subscribers.

(7) Do you envisage any requirement for amendment in the policy framework for satellite communication in India to enable sharing of infrastructure among MSOs and HITS operators, and among DTH operators? If yes, then what specific amendments would be required? Kindly elucidate with justification.

COMMENTS ON TRAI CONSULTATION PAPER No 20/2016

INFRASTRUCTURE SHARING IN BROADCAST TV DISTRIBUTION SECTOR

Lt Col VC Khare(Retd) – Indian Cable TV Industry Observer

The problem is NOT with the techniques. It is due to inefficient implementation of DAS by MIB and TRAI both lacking enforcement mechanisms. Instead of confining DAS implementation reports only from number of STBs sent out of HSPs ware houses, Headends should have been audited for implementation of SMS and TRAI regulations No 12 and 13 of 2012 and registrations of HSPs with MIB suspended/revoked. This cannot be achieved because Headend Audit training has not been organized. Auditors employed by Broadcasters for imposing faith in SMS of HSPs themselves have no experience in operation of DAS hardware

(8) Do you envisage any requirement for amendments in the NOCC guidelines and WPC license conditions relating to satellite communications to enable sharing of infrastructure among MSOs and HITS operators, and among DTH operators? If yes, then what specific amendments would be required? Kindly elucidate with justification.

This question exhibits apparent ignorance. DTH is a service for delivery of TV content to subscribers, without an intermediary like a cable operator (definitions in the Cable Act are vague on Cable Operators and tend to include MSOs with direct points too as cable operators) while CATV implies delivering TV content to subscribers through Cable Operators. Hence except for possible aggregation of content, with simulcrypt, its transmission over fibre link to earth station, trans-modulation to QPSK/8PSK and frequency conversion to KU Band, nothing is common. Since quality of installation at DTH earth stations is better, the feed from Cable Headends may NOT be acceptable to DTH Operators. For HITS operators, similar processes are involved like CATV, hence the provision can be helpful in cost reduction.

For specific amendments, after OHDs by TRAI, if consensus is established, people known for their drafting acumen, with hands on knowledge on networking could be associated to do the needful.

(9) Do you envisage any requirement for amendments in any other policy guidelines to enable sharing of infrastructure among MSOs and HITS operators, among MSOs, and among DTH operators? Kindly elucidate with justification.

In view of the spirit of DAS and TRAI Regulation No 9 of 2012, the ICO is a B2B agreement between Broadcaster and HSP without any mention of entities Cable Operator and Subscriber. Provision must therefore be made in the ICO to recognize Cable Operator as an entity and clauses to disable STBs with the Cable Operator provided STBS and Viewing Cards are paired with the Cable Operator. This implies dilution of DAS as legislated from Addressability down to Subscriber to its confinement to

COMMENTS ON TRAI CONSULTATION PAPER No 20/2016

INFRASTRUCTURE SHARING IN BROADCAST TV DISTRIBUTION SECTOR

Lt Col VC Khare(Retd) – Indian Cable TV Industry Observer

Cable Operator. This doesn't apply to DTH because that is service without any intermediaries.

(10) What mechanisms could be put in place for disconnecting of signals of TV channels of defaulting operator without affecting the operations of the other associated operators with that network after implementation of sharing of infrastructure among MSOs and HITS operators, among MSOs, and among DTH operators? Kindly elucidate.

In view of the spirit of DAS and TRAI Regulation No 9 of 2012, the ICO is a B2B agreement between Broadcaster and HSP without any mention of entities Cable Operator and Subscriber. Provision must therefore be made in the ICO to recognize Cable Operator as an entity and clauses to disable STBs with the Cable Operator provided STBs and Viewing Cards are paired with the Cable Operator. This implies dilution of DAS as legislated from Addressability down to Subscriber to its confinement to Cable Operator. This doesn't apply to DTH because that is a service without any intermediaries.

(11) Is there any requirement for tripartite agreement to enable sharing of infrastructure among MSOs and HITS operators, among MSOs, and among DTH operators? Kindly elucidate with justification.

In case of DTH there are only two parties. Content aggregator (DTH Operator) and Subscriber and hence question of tripartite agreement would NOT arise. It would be immaterial whether DTH Operator establishes their own headend or takes content feed from a third party, trans-modulates and up-converts frequency for satellite casting. CATV and HITS are similar except that medium for transmission of content in HITS is partially wireless and partially wireline. Two other entities i.e. Cable Operator and Subscriber do exist. But in DAS subscriber is supposed to be owned by HSP with B2C agreement through SAF. Cable Operator is supposed to sign a B2B agreement with HSP. Hence in both streams only two entities exist nullifying the need for any tri-partite agreement. Infrastructure being envisaged in this paper largely seems to cover the aggregation facility, i.e. Headend for content transport packaging, amongst various players i.e. HSP, HITS Operator and DTH Operator. While CATV HSPs are less bothered about ultimate quality of TC content transported out, due to use of hardware NOT conforming to Indian Standards, DTH operators have better installations. If guide lines are modified permitting them to deliver content to Headend Service Providers, economy of scale and enhancement in quality, both, will accrue.

COMMENTS ON TRAI CONSULTATION PAPER No 20/2016

INFRASTRUCTURE SHARING IN BROADCAST TV DISTRIBUTION SECTOR

Lt Col VC Khare(Retd) – Indian Cable TV Industry Observer

But provision shall have to be made to decrypt content, encrypt again and serve through SMS from CATV headends.

In any arrangement, for infrastructure, only two parties would matter.

(12) What techniques could be put in place for identification of pirates after implementation of sharing of infrastructure among MSOs and HITS operators, among MSOs, and among DTH operators? Kindly elucidate.

In view of the spirit of DAS and TRAI Regulation No 9 of 2012, the ICO is a B2B agreement between Broadcaster and HSP without any mention of entities Cable Operator and Subscriber. Provision must therefore be made in the ICO to recognize Cable Operator as an entity and clauses to disable STBs with the Cable Operator provided STBs and Viewing Cards are paired with the Cable Operator. This implies dilution of DAS as legislated from Addressability down to Subscriber to its confinement to Cable Operator. This does 'nt apply to DTH because that is a service without any intermediaries.

Let us NOT forget that addressable content shall only be accessible with STBs linked to a location where CAS and SMS are located. Also finger prints transmitted to identify the suspect location would reveal the stage of piracy. Hence the rogue source can be located. In any case all piracy detection is invariably on leads.

There is need for specifying the Manner of incriminating evidence credibility. Piracy detector must carry a splitter and a dongle operated lap top with TV viewing software loaded. At suspect end, STB with CI slot and CA Module can be paralleled, Location, date and time screen printed, mailed to headend and saved as evidence. Professional piracy detection works on similar lines.

(13) Is there any need for further strengthening of anti-piracy measures already in place to enable sharing of infrastructure among MSOs and HITS operators, among MSOs, and among DTH operators? Kindly elucidate with justification.

Same as above.

(14) Is there a requirement to ensure geographically targeted advertisements in the distribution networks? If yes, then what could be the possible methods for enabling geographically targeted advertisements in shared infrastructure set up?

Such facilities abroad too exist in noise minimized inter-active professionally erected wireline networks where STBs viewing log is recorded. The age details of family members(age) are fed in the SMS, viewing hours and programs viewed a

COMMENTS ON TRAI CONSULTATION PAPER No 20/2016

INFRASTRUCTURE SHARING IN BROADCAST TV DISTRIBUTION SECTOR

Lt Col VC Khare(Retd) – Indian Cable TV Industry Observer

accessible for analysis. Further teleshopping facility on line is available to promote impulse buying.

In the Indian DAS implementation, reckoned only on statistics of numbers of STB. Even subscriber is NOT visible in SMS leave alone pairing of their ID with STB. Hence this at best can be termed wishful thinking.

Repeal DAS, mandate only encoding to enhance program transporting capacity of networks with STBs acting only as D2A converters and allow insertion of advertisements at Headend/Cable Operators receiving Node.

(15) Whether it is possible for the network operator to run the scrolls and logo on the specific STBs population on request of either the broadcaster or the service delivery operator after implementation of sharing of infrastructure among MSOs and HITS operators, among MSOs, and among DTH operators? If yes, kindly elucidate the techniques.

Provision exists in CAS for global and specific STB messaging at the Headend. Scrolls can be inserted similarly.

(16) Whether implementation of infrastructure sharing affects the differentiation and personalization of the TV broadcasting services and EPG? If yes, then how those constraints can be addressed? Kindly elucidate with justification.

In derailed DAS implementation personalization of TV content Delivery has already been scuttled. Making EPG optional could be one solution. If there is no EPG, the problem will vanish.

(17) Whether, in your opinion, satellite capacity is a limiting factor for sharing of infrastructure? If yes, then what could be the solutions to address the issue?

In the context of TV content delivery, turnaround, aggregation and wireline delivery to subscriber is implied. Wireline network has to be erected and operated by Cable Operator extending content fed from a Headend. The infrastructure sharing this paper is addressing seems to be more at level of Headend/Earth Station. Satellite capacity concerns only

DTH and HITS and NOT CATV. DTH operators are NOT likely to share satellite transponders. HITs is more or less a non-starter.

(18) Is there a need to permit sharing of SMS and CAS?

CAS Yes ! SMS cannot be commented because except for DTH with pre-payment it is NOT implemented. Hence unless SMS implementation in DAS is enforced this question has no relevance.

COMMENTS ON TRAI CONSULTATION PAPER No 20/2016

INFRASTRUCTURE SHARING IN BROADCAST TV DISTRIBUTION SECTOR

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(19) If yes, then what additional measures need to taken that ensure that SMS data remain accessible to the tax assessment authorities and Authorized officers as defined in the Cable TV Act for the purpose of monitoring the compliance with relevant the Rules and the Regulations?

SMS if implemented, is supposed to apportion revenue received against itemized bills(BST, FTA over and above BST, PAY TV 'a-la-carte', PAY TV Bouquets, STB provisioning, Service Tax and Entertainment Tax) into account heads (a) Broadcaster (b)Cable Operator (c) Entertainment Tax (d) Service Tax and remainder in Headend Service Provider Accounts. Any auditor can visit SMS console and see the status of taxation accrued, received and remitted if any. But unfortunately SMS is NOT functioning with such mindflows.

This question would have had relevance if MIB and TRAI could vouch that SMS is implemented as envisaged in DAS legislation.

(20) Whether sharing of CAS can in any way compromise the requirements of encryption as envisaged in the Cable TV Act and The rules and the regulations?.

Sharing of CAS is feasible only if implemented properly. HSPs have flouted DAS by authorizing viewing of all programs transmitted from Headend on every STB, which at subscriber end is acting only as D2A converter. CAS amendment in 2003 and its implementation, which was in principle partial, was a failure. No lessons learnt and remedies have been carried forward for DAS implementation. Can anyone make evident, from subscriber point of view, a rate card for subscriber's selection, an MoP in subscriber hands, an itemized bill and verifiable existence of 18x365 customer care?