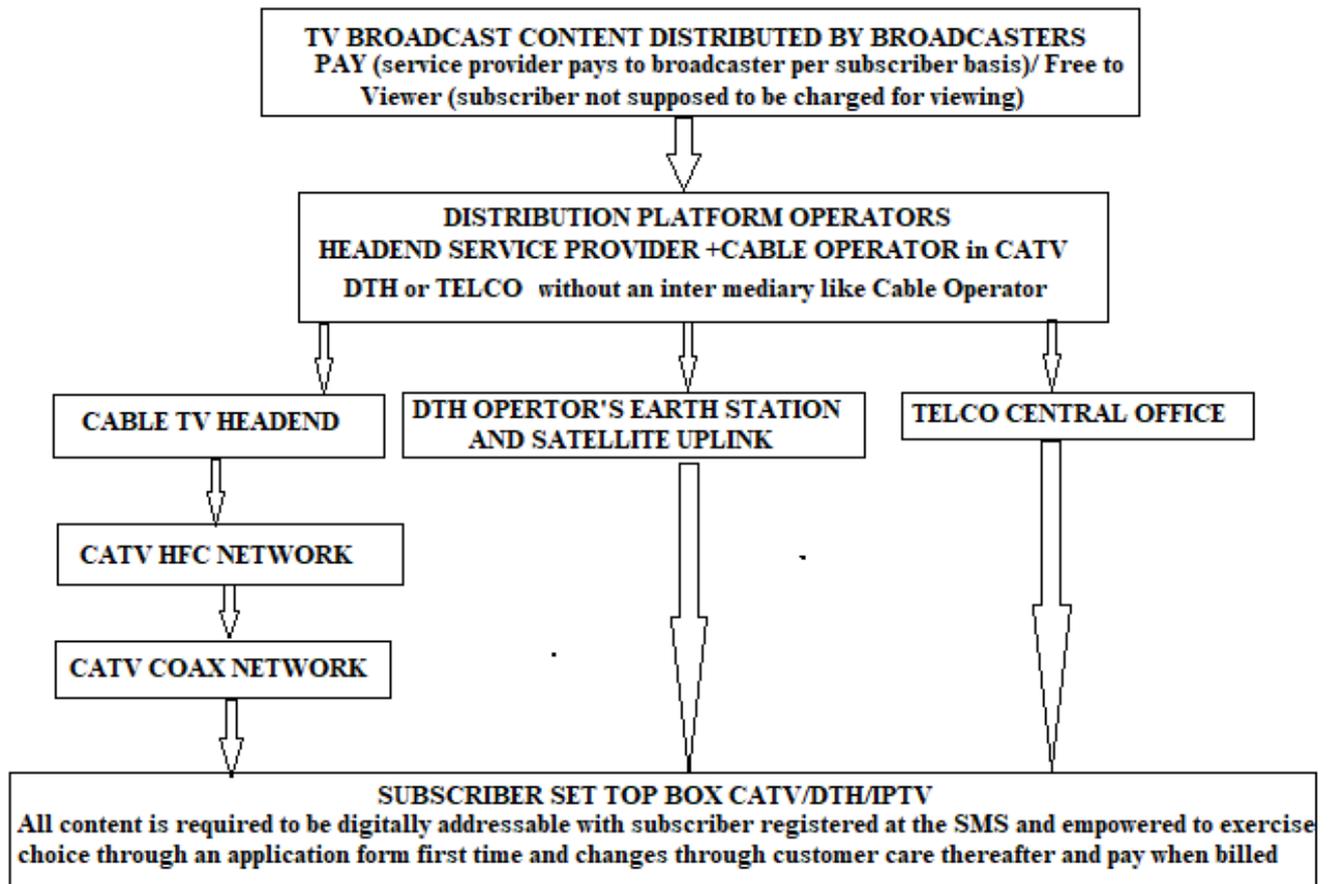


COMMENTS ON TRAI CONSULTATION PAPER No 10/2019 ON
TARIFF RELATED ISSUES FOR BROADCAST AND CABLE SERVICES

Lt Col VC Khare (Retd) Cable TV industry Observer

Essential Re-capitulation

One way video is most popularly delivered in the residential segment by DTH operators and Cable DPO (comprising of Headend Service Provider, i.e. HSP and LCO) deemed seamlessly integrated but in reality work as separate entities.



TELEVISION CONTENT DISTRIBUTION SCHEMATIC FOR SUBSCRIBERS

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In common parlance broadcast connotes 'One to multipoint, RF uni-directional wireless transmission, for reception by compatible device held at the receiving premises. It implies throwing content in the air for any one to receive. Broadcaster does not know who or where the receiver is.

India, a Broadcasting Act. has not legislated as yet. Cable TV services, akin to Broadcasting over wireline medium have the backing of a legislated Act of the Parliament.

In governance, Cable TV is de-facto multi RF Channel, multi program digital addressable broadcast, over wireline medium, but is NOT accorded the status of Broadcast, a Central Govt subject, by the MIB.

Another fundamental mis-connotation is :-

- (a) CHANNEL in CATV context is a 7 or 8 MHz wide strip in 47-862 MHz RF Band. Total number of such channels in this band work out to 106.
- (b) According to glossary in Cable Act, 'Program' means any television broadcast and includes (i) exhibition of films, features, dramas, advertisements and serials, including playouts, (ii) any audio or visual live performance or presentation.
- (c) In analog regime each program occupied one RF channel and hence program and channel got synonymous.
- (d) In DAS environment, 10-24 programs are compressed into each RF channel. Hence channel and program are NOT the same. In MPEG terminology too the tables are called PAT(Program Allocation Table) or PMT(Program Mapping Table). What subscriber selects is 'program' NOT 'channel'.
- (e) Now in Third party application development too the word CHANNEL is used.

Programs, largely satellite casted, are received in the Headend, digitized(encoded), encrypted, multiplexed, modulated and combined for driving a wireline network. In analogy with TELCO parlance the DEMARK POINT ends at exit wall of the Headend. Thereafter, the long haul is either without RoW or leased dark fibre from a TELCO comprising the core network. The tail ends of the network are located and work on FTTP in LCOs proximity. In this proximity fibre terminations O2E (Optical to Electrical) conversion takes place and converted electrical program stream transported over LCO's network to subscriber homes, drop lines terminate in subscriber premises, into a Set Top Box (STB). This segment is

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largely without any easement rights or RoW. The entire distribution system is uni-directional to deliver only video programs.

Thus the existing entities in CATV service are :-

- (a) Broadcaster estimated at over 900 inclusive of PAY and Free TV contents.
- (b) Headend Service Provider estimated at over 1100 as per reported registrations with MIB.
- (c) Cable Operator reportedly over 100000
- (d) Subscribers

Tariffs constitute the soul in this service with impact on service entities and incidence on subscriber.

DAS implementation progress was reckoned, by the task force, primarily on number of STBs(Set Top Boxes) issued from HSP ware house, without any pairing, and deemed seeded.

In DPO premises, it was , perhaps, assumed that rules and regulations listed in minutes of meetings of the task force will be seamlessly appraised by HSPs to LCOs and, in turn, to Subscribers, who, will get empowered to select what they want to watch and pay accordingly when billed. This neither happened nor seems to be known to have NOT HAPPENED to those in governance.

Broadcasters

They are registered with MIB to downlink their programs to be distributed in Indian Territories. The activity involves seeking the content from content producers and broadcasting the content through satellite, terrestrial transmissions or server based replays. The content is in two categories viz PAY content for which HSP pays to the Broadcaster as per B2B agreement with HSP against declared subscriber numbers and FREE TO VIEWER (FTV) for which neither the subscriber nor HSP are required to pay.

Broadcasters earn through Subscriptions from subscribers for PAY content and Advertisements inserted in the video content. This advertisement revenue remains a sole benefit for the Broadcasters and is NOT shared with any other entity. It is, therefore, natural that advertiser wants the advertisement to reach subscriber eye-balls. Due to ill-designed coaxial cable segment of the networks (attenuation with rise in frequency caused higher attenuation and hence poorer clarity of picture on the screen), the Broadcasters , in general

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and PAY broadcasters, in particular, wanted their content to be so positioned in the Program Allocation Table(PAT), at the headend, that it was visible till the farthest end. This required preferential placement. HSPs encashed upon this desire by levying a Carriage Fee for such preferential treatment. Thus, it caused a fund outflow from Broadcasters, including FREE content providers to the HSP. This was, perhaps, relevant in analog transmission regime, when every program occupied one RF channel(out of 108 in 47-862 MHz band) for enveloping the program. With adoption of fibre optics in transportation of content and mandatory digitization, this anomaly got removed. In DAS, either all programs will be received with equal voice and sound clarity or nothing will be received. Thus the requirement of placement in good visibility frequency band of network was eliminated. But, HSPs kept charging this amount from Broadcasters to dilute their payouts to Broadcasters if any. Another anomaly was created by way of placement fee in the genre list, in the EPG, closer to popular content of same genre. HSPs extracted money from Broadcasters for this too. TRAI, without amendments/provisions in the Cable Act legalized these fund flows through their regulations.

Further, till date, the basis for pricing of PAY content has not been revealed by PAY Broadcasters to MIB or TRAI. As such the pricing by broadcasters remains arbitrary.

The pricing declared by PAY broadcasters is in two parts. 'A-la-carte' and bouquet basis. From inception of PAY content netcasting, broadcasters resisted a-la-carte system by pricing them exorbitantly high to discourage subscribers from selecting that basis. The same highly priced content, with some other programs from associated broadcasters/ new entrants was bundled at a price lower than rate for one popular program in the a-la-carte listing.

TRAI made efforts to resolve this through their Regulations, mandating MRP for each program and capping the rates for bouquets made by broadcasters. This has run into litigation in several courts.

TRAI, in its assumptions, seems to be overlooking the fact that Broadcaster does NOT interact with CATV subscriber. Their B2B agreement, i.e. ICO, is confined to the HSP only and NOT even the component LCO. Hence presumption that Broadcaster will bother about choice of subscriber is not maintainable.

The Cable TV Act, since 2003 stipulates that programs, PAY or FEE, will be provided to the subscriber on a-la-carte basis and that these will NOT be bundled by the broadcaster. Subscriber could make a bouquet for conveying the preference. Later, HSPs were encouraged

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to make bouquets. The insistence remained on appraising the subscriber about the nature of program, PAY or FREE, and charges for the service as well as the content excluding taxes.

Under influence from the Broadcaster, without amendment in the Act, bundling and Carriage Fee has been legalized by TRAI through their Regulations.

PAY Broadcasters do not get any revenue directly from subscribers. For PAY content it is the HSP who is supposed to bill the subscriber at rates entered in the ICO. HSP is supposed to bill the subscriber at MRP for Pay content. But in existing practice HSP bills the LCO.

Headend Service Providers

They have to be registered with the MIB to establish and operate a DAS headend.

HSPs have different categories such as National, State or Confined area coverage. They differ in financial muscle, management skills and technical training of network service providers.

All rules and regulations are deemed implemented, by TRAI, in letter and spirit, by HSP and it is presumed that they have appraised the subscriber on addressability aspects, including but NOT limited to subscriber empowerment in terms of selection of programs to watch and pay accordingly when billed or be disconnected in default.

DAS is broadly implemented only in terms of digitization of content, CAS imposition and SMS installation in the Headend, which is NOT/ILL functioning (Subscriber IDs and subscriber choices are NOT punched in for SMS to generate bills) and Customer Care is not established. Set Top Boxes were issued without pairing and programming, as per subscriber preferences, and thus enabled for viewing all programs cable casted from Headend. Thus desired addressability was sabotaged and these devices only functioned as D2A converters in subscriber premises.

Network Capacity at the Headend connotes total number of programs(both PAY and FTA) aggregated into a single program stream in the Headend at the output. HSPs obtain content from various sources(broadcasts, local generation and playouts) and aggregate them into a single stream to be transported over a network. The aggregated content stream travels over HFC network part of which is erected and operated by the Cable Operator. A large part of such networks is erected and operated by Distributors who represent HSPs in long hauls interleaved between HSP and LCO.

There are reportedly over 1000 HSPs. About 10 to 15 out of them can be 'deemed corporatized' in terms of professional management, the rest are a MEE TOO type consortium of LCOs pooling up funds to get a low consumer grade hardware, hardly compatible with

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TRAI regulations on QoS or any semblance of QoE. This category is motivated to set up headends feeling that their salvation lies in setting up own headends and becoming HSP themselves. Their financial constraints often compel them to procure lowest consumer grade hardware with namesake SMS.

The network strands, from exit at the headend to LCO network proximity, and thereafter to subscriber premises, hardly have RoW or conformity to any standards. The stranding approach can at best be described as SOMEHOW CONNECT. There is a serious void in technical training at all levels. These are uni-directional video delivery systems erected by CATV operators functioning in the residential segment with very high penetration density.

TRAI, as regulator, appears to be working on semblance with TELCO practices. They, even as part of DAS implementation task force, have NOT been able to enforce DAS implementation as legislated. Their recommendations on Restructuring of Cable TV did NOT see the daylight.

Cable Operators

Cable operators are registered with the Deptt of posts to erect and operate a wireline network in the stated area to transport video program streams received from HSPs to premises of subscribers. They are NOT expected to perform any technical functions similar to those at the Headend.

LCOs, numbering over 100000, fire-walled DAS implementation in their portion of wireline network. They evolved their own business practice of enabling viewing of all content from the headend (primarily because STBs were issued in bulk from HSP warehouses without allocating them against a particular subscriber ID with subscriber's initial choice of programs only authorized for viewing) against a fixed monthly subscription, without itemized bill or receipt. The basis of this subscription figure was NOT disclosed in public domain. SMS though rudimentarily installed could not function as intended. Perhaps TRAI is NOT aware of this situation as described in so many words. Thus subscribers got habituated to viewing several programs against a fixed monthly subscription, contrary to the spirit of NTO being implemented now. The NTO is drawing criticism from wrong publicity by Cable Operators such as (a) TRAI wants to make subscriber pay for FTA in the NCF (b) NCF is to annihilate Cable Operator, (c) Subscriber will have to pay much more for watching all the programs as were accessible prior to NTO etc.

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LCOs devised their own business model of charging a fixed monthly subscription, varying between Rs 225/- to Rs 275/-, collected without a bill or receipt. Out of this amount about 40% was given to HSPs, who, in turn billed LCOs, not subscribers, for such amounts. The basis for arriving at this figure was never revealed to TRAI. This arrangement is shrouded in mystery. LCOs say these amounts were suggested by HSPs.

TRAI has attempted imparting rationality to subscriber billing by braking charges in two parts FIRST, the Network Capacity Fee (NCF) as minimum connectivity charges when coaxial drop cable is entered in subscriber premises and STB is connected. This is based upon number of programs in SD format, providing that if any HD programs are chosen then each HD program will be equated to two SD programs for the count. Such count is initially confined to 100 for a charge of Rs 130/- excluding taxes. Additional programs beyond 100 shall attract extra charges. No of programs in the bouquet will count in the count of 100 (i.e. if bouquet has 13 programs, count will not be ONE for a bouquet but 13 in those 100) SECOND, the PAY content charges for a-la-carte and/or bouquets, distinctly different from NCF. THIRD any other charges. All charges plus taxes are payable when billed by a particular date or the service could be disabled in default..

Here also a controversy exists, which needs to be clarified.. MIB has mandated HSPs to carry all Door Darshan Programs numbering over 20. These have to be aggregated with all other programs in the program stream pushed over HFC network from the Headend. Technically all the programs land up at the RF tuner input of the STB. If addressability was really empowered to the subscriber, it is not binding upon him/her to integrate these in the choice of 100 programs in the NCF. The subscriber, paying for 100 SD format equated programs, cannot be compelled to include those in his/her choice when paying for such selection. Some HSPs are conveying an impression that de-facto choice of subscriber stands reduced, from 100, by the number of DD programs mandated by MIB, in that number. This would not be maintainable in law. The subscriber is to be empowered to select to watch programs of choice, not strangled to include DD programs and pay for that number.

Subscribers

This is the entity to whom video content from the Broadcasters or playouts from HSP is delivered through STB necessary for viewing digitally addressable content from the HSP.

Subscribers were required to seek the service, formally, by making an application on a prescribed form, SAF (Subscriber Application Form) through the LCO, submitted to the HSP

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with choice of programs selected from a rate card prepared by the HSP with fee for provision of STB. Upon receipt of SAF, the HSP was required to create a Subscriber ID and have the subscriber data punched into data base server in the SMS. One STB was then expected to be released in the name of the subscriber, its serial number paired with ID and programmed for watching the first choice of programs as mentioned in the SAF. The STB was to be packed, labeled with subscriber Name Address and ID to be collected by LCO to be taken to the subscriber premises for installation and messaging to the HSP about successful installation and commencement of billing. In addition each subscriber was to be issued with MoP(Manual of Practice) mentioning the QoS envisaged.

The subscribers, Firstly were not appraised about DAS by LCO serving them, Secondly Application forms were not filled, Thirdly content rate/information card was neither prepared nor shown to them, Fourthly information about Customer Care was never conveyed, Fifthly STBs were sold without receipts and transfer of lien, Sixthly STBs were not made addressable; they functioned only as D2A converters, Seventhly Subscribers were content with improved program clarity and more programs, Eighthly were given discounts on additional connections(whereas in the spirit of DAS every activated STB was to be reckoned as a different subscriber). Subscriber is NOT even aware of provision of DAS Act.

Current Scenario

TRAI promulgated tariff order to be enforced upon service providers to enforce DAS as intended. But the well intended order ran into dis-array due to many infirmities/ misunderstandings.

TRAI, till date, has not been able to seek the basis for pricing of PAY content from Broadcasters. Hence reasonability of rates to be charged cannot be determined.. Broadcaster does not interact with subscriber. MRP is to be entered in ICO with the HSP, who is supposed to include it in their rate card, also to be promulgated on their web site, LCO is supposed to appraise the subscriber and seek their choice to be communicated to HSP for punching in the SMS.

TRAI has envisaged, Network as a pure DPO activity, and also prescribed a 'Network Capacity Fee (NCF)', explained as pipe/conduit charges for the transport network for the content and payable by the subscriber. The NCF does NOT pertain to any charges for content and refers only to a program numbers count. It is based upon a count of 100 SD programs for Rs 130/- per month, excluding taxes. This payment by subscriber is to be shared between HSP and LCO at proportions mutually agreed and entered in the B2B ICO between the two.

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NCF provides that each HD program included in NCF will be counted as equivalent of two SD programs in the count. *(This aspect is not very clear to cable operators who think that this is earlier basic tier in new incarnation. Some people consider this as TRAI's camouflaged attempt to levy charges for FTA upon the subscriber.)*

TRAI had claimed that new NTO will reduce cable TV payouts by the subscribers. In reality, subscribers being unaware of the NTO and not assisted by Cable operators are used to watch all programs from Headend. If the number of such programs is taken at, say 300, the NCF it self will be Rs 290/- plus taxes. Pay content charges would be extra. Hence NTF as implemented is deemed contrary to what was claimed.

Now TRAI seems to be introspecting on the problematic areas through this consultation paper.

Answers to the issues for consultation are being submitted with the forgoing compilation.

Summary of Issues for Consultation

Q1. Do you agree that flexibility available to broadcasters to give discount on sum of a-la-carte channels forming part of bouquets has been misused to push their channels to consumers? Please suggest remedial measures.

Yes ! As spirited in the Cable Act, unless amended, Broadcasters should promulgate only a-la-carte rates chargeable from subscribers as MRP. The ICO with HSP should include the discount percentage for the HSP as Distribution Facility offset. This amount should be shared by the HSP and Cable Operators at mutually agreed sharing rates.

Q2. Do you feel that some broadcasters by indulging in heavy discounting of bouquets by taking advantage of non-implementation of 15% cap on discount, have created a non-level field vis-a-vis other broadcasters?

Yes

Q3. Is there a need to reintroduce a cap on discount on sum of a-la-carte channels forming part of bouquets while forming bouquets by broadcasters? If so, what should be appropriate methodology to work out the permissible discount? What should be value of such discount?

Yes ! Broadcasters should declare 'a-la-carte' rates only for PAY content. Same pay content when offered as bouquet should mention individual rate for the content in the bouquet providing that sum of all pay content in bouquet shall not average out to be more than 85% of the same content rate in the a-la-carte.

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Q4. Is there a need to review the cap on discount permissible to DPOs while forming the bouquet? If so, what should be appropriate methodology to work out the permissible discount? What should be value of such discount?

No

Q5. What other measures may be taken to ensure that unwanted channels are not pushed to the consumers?

Have every headend audited for Customer Care functionality at least once and revoke registrations of those in default.

Q6. Do you think the number of bouquets being offered by broadcasters and DPOs to subscribers is too large? If so, should the limit on number of bouquets be prescribed on the basis of state, region, target market?

Yes ! limiting to about 10 programs in a bouquet would be reasonable.

Q7. What should be the methodology to limit number of bouquets which can be offered by broadcasters and DPOs?

Scrutiny of composition of programs in bouquets required to be uploaded on Broadcaster's web site by TRAI and suo-motto actions.

Q8. Do you agree that price of individual channels in a bouquet get hedged while opting for a bouquet by subscribers? If so, what corrective measures do you suggest?

Not really ! PAY content pricing, and hence MRP, are a prerogative of the Broadcaster. It is their wish as to which HSP is to be charged what ? What matters is that rate must be included in the B2B ICO. Who can stop a broadcaster from publishing a price for a program but favouring a particular HSP by giving it free.

Q9. Does the ceiling of Rs. 19/- on MRP of a a-la-carte channel to be part of a bouquet need to be reviewed? If so, what should be the ceiling for the same and why?

No need !

Q10. How well the consumer interests have been served by the provisions in the new regime which allows the Broadcasters/Distributors to offer bouquets to the subscribers?

HSPs should NOT be allowed to change bouquets formed by the Broadcaster . The broadcaster should offer, their content only, as a-la-carte the FTA content as well as the PAY content. The same broadcaster could then form a bouquet of their content and offer at slightly lower monthly rate. There is no restriction on how many bouquets can a subscriber select.

The total no of programs selected will have a bearing on NCF pay out.

Q11. How this provision has affected the ability and freedom of the subscribers to choose TV channels of their choice?

Confusion due to lack of elaborate rate cards by the HSPs, understanding of pricing by LCO in general and their technician in particular. The subscriber is still not clear about pricing details.

Q12. Do you feel the provision permitting the broadcasters/Distributors to offer bouquets to subscribers be reviewed and how will that impact subscriber choice?

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Factually, broadcasters and distributors are not in contact with subscribers. LCO and their technicians are the ones who converse with the subscribers. Broadcasters should only offer bouquets to HSPs (Not even Distributors). HSP should not be permitted to alter the bouquet as formed by broadcaster. Review, if done, should impose this condition.

Q13. How whole process of selection of channels by consumers can be simplified to facilitate easy, informed choice?

First, by making a user friendly catalogue of programs describing title with its logo alongside, Second, posting the same on the EPG and thirdly by making subscriber access and see the EPG. Technicians being frequent visitors to subscriber premises should be appraised to assist subscriber either during their visits or on call by subscriber.

Q14. Should regulatory provisions enable discount in NCF and DRP for multiple TV in a home?

If business model envisages every STB as a separate subscriber ... then...NO !

Q15. Is there a need to fix the cap on NCF for 2nd and subsequent TV connections in a home in multi-TV scenario? If yes, what should be the cap? Please provide your suggestions with justification.

No ! this DO KE SAATH EK FREE attitude should be discouraged.

Q16. Whether broadcasters may also be allowed to offer different MRP for a multi-home TV connection? If yes, is it technically feasible for broadcaster to identify multi TV connection home?

No ! In the prevailing business model, an outcome largely of PAY TV phenomenon, Broadcaster has no communication with the subscriber. Then how can broadcaster be expected to dig out a multi-TV subscriber and offer a discount by exception ?

Q17. Whether Distributors should be mandated to provide choice of channels for each TV separately in Multi TV connection home?

No ! Distributor cannot be deemed to be an entity in the business model.

Q18. How should a long term subscription be defined?

Not really relevant in CATV which is largely on post paid model. This should not be compared with pre-paid DTH model where service provider is not in proximity of the subscriber. Hence for administrative convenience a long term advance subscription is offered to lure the subscriber with roughly 6 months savings bank rate of interest.

Q19. Is there a need to allow DPO to offer discounts on Long term subscriptions? If yes, should it be limited to NCF only or it could be on DRP also? Should any cap be prescribed while giving discount on long term subscriptions? No !

Q20. Whether Broadcasters also be allowed to offer discount on MRP for long term subscriptions?

No ! all fallouts of MRP should go to DPO.

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Yes ! many HSPs do not understand DVB(digital Video Broadcasting) and MPEG(Motion Picture Engineers Group layouts), PAT(Program Allocation Table) and PMT(Program Mapping Table) therein. Their tabulation was perhaps got done by the vendor installation team with rudimentary knowledge of making additions/alterations. EPG should be made genre wise and programs listed alphabetically. This will kill the urge to be listed to appear close to a popular program of the same type.

Q21. Is the freedom of placement of channels on EPG available to DPOs being misused to ask for placement fees? If so, how this problem can be addressed particularly by regulating placement of channels on EPG?

YES ! educate Broadcasters/content providers that appearance in the EPG does not mean that program is in same RF channel. In statistical multiplexing it could be accommodated in RF channel in consideration of loading of the RF channel

Q22. How the channels should be listed in the Electronic Program Guide (EPG)?

Understand the description above !

Q23. Whether distributors should also be permitted to offer promotional schemes on NCF, DRP of the channels and bouquet of the channels?

Distributors are middlemen created by Broadcasters. They are representatives of Broadcasters but NOT broadcasters. Hence, as entity are NOT broadcasters. They should not be permitted to offer any discounts including but not limited to promotional schemes.

Q24. In case distributors are to be permitted, what should be the maximum time period of such schemes? How much frequency should be allowed in a calendar year?

Answer above is in the negative.

Q25. What safeguards should be provided so that consumers are not trapped under such schemes and their interests are protected?

If such offers are not permitted, consumer interests shall remain protected.

Q26. Whether DPOs should be allowed to have variable NCF for different regions? How the regions should be categorized for the purpose of NCF?

NCF, in principle, are pipe charges through which video content from headend flows into the STB of the subscriber. Therefore, in analogy with fluid mechanism, pipe charges for the same fluid flow has to remain the same across all regions.

Q27. In view of the fact that DPOs are offering more FTA channels without any additional NCF, should the limit of one hundred channels in the prescribed NCF of Rs.

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130/- to be increased? If so, how many channels should be permitted in the NCF cap of Rs130/-?

If such violations have been permitted in due knowledge of TRAI, without any disciplinary action against the DPO, then TRAI should rescind from regulating B&CS.

Q28. Whether 25 DD mandatory channels be over and above the One hundred channels permitted in the NCF of Rs. 130/-?

The spirit of this question stinks of dislike of carriage of this content by DPOs and their inability to convey the mandate implications to the subscriber. Mandatory aggregation of DD content can be imposed on HSP to include these in the program stream and listing them in the list of programs. But when subscriber is seeking pipe capacity by payment, DPOs cannot force the subscriber to include these in the list of programs. The mandate of MIB remains complied if these programs are aggregated in the headend, and are visible in the stream at every place in the wireline network as a check, including but not limited to that in subscriber home. But legally the subscriber cannot be coerced to include them in the list of programs selected against NCF to be paid for by the subscriber. Such imposition will never be maintainable in a court of Law.

Q29. In case of Recommendation to be made to the MIB in this regard, what recommendations should be made for mandatory 25 channels so that purpose of the Government to ensure reachability of these channels to masses is also served without any additional burden on the consumers?

These mandates are dictates of Ministry of Broadcasting while CATV is NOT broadcast. A provision should be made in the EPG to enable viewing of any program at any time, free of charge, for a few hours in any one day , without altering the choice in the NCF list, to decide if such a program is to be added to the list. It is not that all content of DD is content-non-grata. DD News, for example, is considered a very authentic news program, DD Elite. Lok Sabha and Rajya Sabha have takers. If the content appeals to the subscriber, he/she can order it in the choice. But forcing a subscribers to compulsorily include all 25 programs, out of 100 for basic NCF, would contravene persons right to watch he/she wants to watch.

Q30. Stakeholders may also provide their comments on any other issue relevant to the present consultation

TRAI officials need to understand that existing CATV systems work on signal strength voltage bus system and not on current handling like capacity. Hence all RF channels enveloping programs arrive at the input of the set top box with visibility dependent upon signal voltage level, MER and C/N ratio at the end of line. The subscriber, as per DAS Act provisions, opts for a number of programs, payable in terms of NCF and PAY content. Hence there is no question of choking of network. So far CATV DPOs have not complained about bandwidth starvation. Bandwidth essentially connotes volume of digital data flow, like current flow in electrical engineering. Minimum threshold carrier voltage for STB to be driven is akin to a voltage bus. Hence saying that hundreds of programs landing at subscriber STB tuner constitutes choking of bandwidth is technically incorrect.

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Too many bouquets are also complicating functioning of SMS at the Headends
CATV networks operate in 47-862 MHz spectrum with channels, 7 or 8 MHz wide, limiting the number of RF carrier channels to 106. In analog system each RF channel carried only one program. Hence number of programs too was restricted to 106. This limitation of restricting entry of more broadcasters in the business stands overcome by digitization wherein 10-24 programs can be compressed in each RF carrier channel envelope.

All content, comprising of programs, is offered through an ICO to Headend Service Provider (HSP) and NOT to LCO. The aggregation of programs comprises of encoding, encryption, multiplexing, modulation, combining, subscriber management and electrical to optical conversion for transporting the aggregated program streams. Distribution network starts From egress of signal stream at the wall of a Headend, comprising largely of Optical Fibre and some coaxial cable terminating into a set top box in subscriber premises. Optical fibre from Headend falls in the domain of HSP or their distributor. Optical Fibre is terminated in proximity of LCO's network wherefrom the network comprises of coaxial cable. Thus LCO only transports the program stream aggregated by HSP to subscriber premises. They do not perform any function of technical processing of content.

This paper states that Tariff order was not applicable to cable TV, prior to 2010, because transmissions were analog. This is, factually, an incorrect statement. Networks are transparent to both analog and digital transmissions. The transmissions from Headend were largely analog, but many programs had been digitized prior to 2011. Thus program streams in the CATV networks were carrying some programs in analog mode and some in digital mode(for better clarity). Compression of many programs in one channel may NOT have been resorted to.