

Comments on TRAI Consultation Paper No. 5/2020 on Framework for Technical Compliance of Conditional Access System (CAS) and Subscriber Management System (SMS) for Broadcasting and Cable Services

Note: This document is divided into two (02) sections and one (01) Annexure. Section I entails fundamental approach in which the given problematique should be viewed. It also entails systemic and specific solutions to address the issues raised. Section II entails answers to specific questions posed in the consultation paper. This section should be read along with Section I. The Annexure contains explanation of key technical concepts.

Section I

1 Introduction

Today TV services reach more than 800 million people across 298 million households with a much wider range of programmes than was available in the days when the TV content was not digitalised. The process of digitalisation on the one hand ensures compression of content in the digital form leading to expanded channel capacity and hence greater choice for the consumer, while on the other hand it is supposed to enhance the viewing quality along with secure delivery to the authorised consumer.

But has the situation played out as described for all consumers alike? The answer is an emphatic ‘No’, even by TRAI’s own admission.

The digital ecosystem was meant to put the consumer at the centre of TV ecosystem with concurrent benefits for all other stakeholders as well. This was to be facilitated through a response mechanism triggered from the consumer end and enabled by Digital Addressable System (DAS) environment comprising Conditional Access System (CAS) and Subscriber Management System(SMS) – a fact evident from the construction of addressability in the Cable Television Networks (Regulation) Amendment Act, 2011.

It defined **addressable system** as follows:

*“an electronic device (which includes hardware and its associated software) or more than one electronic device put in an integrated system through which signals of cable television network can be sent in encrypted form, which can be decoded by the device or devices, having an activated Conditional Access System at the premises of the subscriber within the limits of authorization made, through the Conditional Access System and the Subscriber Management System, **on the explicit choice and request of such subscriber**, by the cable operator to the subscriber”.*

While CAS is responsible for encryption and decryption of content, SMS is a management module entailing aspects like consumer (subscriber) information, channel information, management of STBs, billing and other activities. *(Please see **Annexure I** for conept details)*

Unfortunately, there is a lot left to be desired in the optimum functioning of these systems. The consultation paper No. 5/2020 launched by TRAI on Framework for Technical Compliance of

Conditional Access System (CAS) and Subscriber Management System (SMS) for Broadcasting and Cable Services, is therefore a step in the right direction. Through focus on these aspects, TRAI has shown intent to address anomalies that come in the way of the following cognate and interconnected areas:

- **Supply Chain Dynamics**: Transparency in the provision of services across the entire value chain that includes MSOs, LCOs and third party service and equipment providers.
- **Stakeholder Welfare**: Enhancing consumer choice, providing access to better quality content to the consumer, preventing piracy, increasing revenues across the supply chain, contributing towards better revenue realisation for the government, reducing consumer grievances and preventing distortions that may lead to market failure.
- **Effective Policy and Regulation**: Ensuring greater regulatory and policy clarity to avoid frequent disruptions for the industry and consumers.

2 Factors Causing Anomalies

Many of the factors that lead to anomalies in the above areas emanate from two key sources namely TRAI's own regulation and lack of processes in certain other areas having a bearing on regulation:

2.1 Issues Emanating from Regulation:

Schedule III of the Interconnection Regulations 2017 sets out a macro level framework and only provides for the minimum requirements to be fulfilled by Digital Addressable Systems. Since the criteria laid out in Schedule III are generic in nature, it does not control deployment of sub-standard solutions.

As a result, some of the problems that surface are as follows:

- Prevalence of non-tested/non-certified CAS and SMS system;
- Lack of mandate on installation of advanced STBs with System on Chips;
- Prevalence of cloning of STBs;
- Prevalence of legacy hardware making it difficult for better technologies to integrate (Eg: CSA 3);
- Reliance on 3rd parties supplying sub-standard CAS/SMS systems and lack of timely support to enforce proper billing etc;
- Non-compliance of watermarking or finger printing by DPOs as mandated to prevent breach of security by the compromised STBs and blacklisting them;
- Inability of sub-standard SMS to enforce blacklisting of STBs or automatically disentitle STBs;
- Prevalence of mirror Subscriber Management Systems containing incorrect information;
- Prevalence of logs that can be fudged by the operators;
- Weak encryption due to sub-standard CAS leading to possibility of hacking of control word, ECM and EMM;

- Sub-standard CAS/SMS leading to prevalence of editable reports leading to increased scope of fudging.

Analysed carefully, these issues reveal that Interconnection Regulations leave much to be desired to rein in the market failure caused due to resultant distortions. It may also be recalled that to extend the full benefits of digitalisation, TRAI notified a comprehensive regulatory framework comprising Interconnection Regulations, QoS regulations and Tariff Order. However, the objectives of those comprehensive regulations cannot be achieved in light of the existing distortions. No wonder therefore, there is several issues that have surfaced on account of other two regulations as well.

Another fact that the above mentioned issues indicate is the issue signal piracy which has come defne deeply entrenched vested interests. For instance, following the implementation of the new framework for TV broadcasting in 2019, it was reported that piracy by local cable operators went up by 300 percent. Further, it is also reported that over 200 complaints of piracy was sent to the Ministry of Information and Broadcasting (MIB) between February and March 2019. The pirated content is not only transmitted within the borders but also reaches neighbouring countries.

2.2 Lack of Processes

In addition, it may be noted that MSOs obtained registration from MIB to establish a DAS head-end against a fee, without any provision for checking of Proof of Performance or even Installation and Commissioning Report committing conformity to QoS Regulations. Such processes must be followed in letter and spirit, and must be reflected in the audit process also as they are intricately linked to the regulation.

Further, the processes that are required to be followed for sincere DAS implementation have not been followed. The process in an ideal situation involves the following crucial steps.

- Consumer applies on a form for a service to be provided based on a rate card, a-la Carte and bouquet.
- A copy of this application is attached to the application form, which is known as Subscriber Application form (SAF). This form, in effect, is a business to customer agreement between the MSO and the consumer against a fee paid by the consumer.
- After the form is received by the MSO, the MSO account department is supposed to allocate subscriber ID to that number. Then the fax copy of this ID goes to the warehouse where the storekeeper is supposed to issue a set top box and programme it for a specific consumer.
- The cable operator representative then picks it up and installs it at consumer end. This should be communicated to the MSO to confirm installation.

However, in reality this does not happen. The so-called MSOs give thousands of boxes to the cable operator. The cable operators generally are very protective about the connectivity. They do not want to reveal the connectivity. With addressability they would have had to reveal the actual connectivity. They started to take un-programmed STBs i.e. the ones that were supposed to be programmed for a specific consumer. The consumer on the other hand has little or no

knowledge about DAS and therefore the consumer till date does not know her/his entitlements but continues to pay the bills without receipt. Moreover, the box does not belong to the consumer because the lien is not transferred. The box in the consumer premises exists in the inventory of the MSO on which depreciation in tax is claimed.

Therefore, even today it can be said that while DAS in the DTH space it about 75% complete, in the Cable TV space its implementation is less than 25 %. (Source: <https://www.newindianconsumer.com/events> , <https://bit.ly/3672EeW>).

3. **Possible Solutions for Better Regulatory/Policy Approach**

3.1 **Structural Solutions**

- **Understand Structural Issues**: There is a need to move beyond paper audits to understand structural issues leading to mal-practices on the ground. For so long this is not done, regulation will continue to falter. Some of these issues may include incentives/disincentives that prevent MSO/LCO from upgrading to more secure technologies and other political-economic considerations in the value chain.
- **Enhance Competencies**: There appears to be conspicuous lack of competencies at the regulatory level as well as at the level of MSO/DPO/LCO to appreciate true facts causing distortions. This increases reliance on third parties for technical recommendations and suggestions. In a market scenario, it also gives way to lack of due processes like tendering or RFPs to procure standardised and secure equipment, and undue reliance on the suggestions of sales agents. A combination of expertise of sound generalists and domain specialists is needed at various stations of the value chain as well as regulatory and policy level to avoid this.
- **Understand Costs and Distribute Rewards and Risks Proportionately**: A lay reading of the issues discussed above suggests that there are two key dimensions to the problem, namely cost dimension to modernise and technological dimension for seamless integration of technology across the value chain. This is also bound to have winners and losers. It is therefore crucial to do systems analysis and distribute rewards and risks proportionately across the value chain. TRAI or MIB should convene a series of systems thinking meetings to take this forward. Needless to say that this should be done in the context of rapid changes occurring in the domain.

3.2 **Specific Solutions**

- **CAS Related**: With regards to CAS, there is a need to have greater degree of specificity mandated by regulation to ensure compliance with due standards all the way from the head-end to the consumer end. This should be done after thoroughly examining the cost implications, rewards and risks as discussed above.
- **SMS Related**: With regards to SMS, the trend of global practices must be followed. Nowhere in the world is SMS standardised. A well functioning SMS should be developed

over performance, monitoring and evaluation processes, compatible with CAS and well-structured across well defined functional architectures. It must entail a secure software architecture and rich data base. In order to develop well functioning SMS, there is a need to understand various factors that undermine optimum SMS. In other words, both various ground realities and technologies must be understood in totality to define process guidelines for SMS.

- **STB Related:** Signal piracy is also fuelled by counterfeit STBs because of a lack of standardization of Customer Premises Equipment (CPE). In this regard, TRAI should evaluate the feasibility of maintaining a list of authorized third-party STB manufacturers. This list must be developed in collaboration with DPOs, MSOs and LCOs. STB manufacturers may be authorized following compliance with minimum standards that may be evolved by the BIS/STQC/TEC. These standards must seek to standardize watermarks and protect against intellectual property theft or other lapses in information security. Similar standards for technical interoperability has already been prescribed. The same procedure may be replicated with the objective of curbing signal piracy and counterfeit STBs. Another solution is to implement TRAI recommendations on KYC for Set-Top Boxes. The objective of KYC for STBs is to prevent smuggling of DTH equipment to other countries. KYC could also assist in weeding out counterfeit STBs from the market and illegal use of STBs for unauthorized transmission.
- **Penalising Piracy:** Pertinently, the legal framework that governs TV broadcasting, namely the Cable TV Networks (Regulation) Act, 1995 does not define 'piracy' or penalize it. Piracy is penalized under provisions of the Copyright Act, 1957. The Cable TV Networks (Regulation) Rules, 1994 were drafted at a time when there were no independent charges for content. There were no Pay TV channels nor Multi Service Operators (MSOs). Understandably, the Act in 1994 did not address any piracy aspects. Delivery and security were addressed in the 2003 Amendment to the Act and the Rules by mandating CAS. The reason why this does not solve for security is discussed in the earlier section. Signal piracy should be defined and penalised under the CTN Act. This will deter bad actors and provide a mechanism for copyright holders to seek compensation.
- **Other:** As highlighted in the previous section, there should be due accountability between MSOs and the MIB through a well-articulated process of proof of performance and reporting on Installation and Commissioning in conformity with QoS Regulations. Such processes must be followed in letter and spirit, and must be reflected in the audit process, as they are crucial to effective regulation.

4 Conclusion

As per TRAI, the current regulatory framework establishes a trust based transparent regime. However, it is apparent by TRAI's own admission that such a regime has not worked on the ground. The structural solutions to address this have been explained above together with specific solutions. A combination of the two will be essential to foster a healthy TV services sector.

Section II

Response to Specific Questions in TRAI Consultation Paper No. 5/2020/ on Framework for Technical Compliance of Conditional Access System (CAS) and Subscriber Management System (SMS) for Broadcasting and Cable Services

- 1. List all the important features of CAS & SMS to adequately cover all the requirements for Digital Addressable Systems with a focus on the content protection and the factual reporting of subscriptions. Please provide exhaustive list, including the features specified in Schedule III of Telecommunication (Broadcasting and Cable) Services Interconnection (Addressable Systems) Regulations, 2017?**

Please refer to the Annexure I

- 2. As per audit procedure (in compliance with Schedule III), a certificate from CAS / SMS vendor suffices to confirm the compliance. Do you think that all the CAS & SMS comply with the requisite features as enumerated in question 1 above? If not, what additional checks or compliance measures are required to improve the compliance of CAS/SMS?**

The existing audit procedures entail only documentation and there is no secondary verification of details included in the audit report by the regulator. Because of this, cable operators emphasize on attaching list of documents rather than checking compliance. Gaps and loopholes in the technical system go unaddressed because of this. The existing procedure is not satisfactory and TRAI needs to explore alternative methods of monitoring and evaluation. In the absence of concerted efforts towards developing an efficacious feedback loop, rigorous regulation-making would not have any impact. The focus should be on ensuring existing requirements before seeking new compliances.

In this regard, TRAI should consider getting a demonstrative audit done by experienced persons and create a model audit manual for headends. This model can then be replicated across the country by auditors empaneled by TRAI.

- 3. Do you consider that there is a need to define a framework for CAS/ SMS system to benchmark the minimum requirements of the system before these can be deployed by any DPO in India?**

It appears that in the case of CAS, there is a need for minimum standards for technology. SMS is not standardised anywhere. This means that for SMS 'process standards' and technology should be institutionalised in the interest of sectoral hygiene. SMS vendors should be clearly informed of what to install, configure and enable with liability for defaults with legal implications.

- 4. What safeguards are necessary so that consumers as well as other stakeholders do not suffer for want of regular upgrade/ configuration by CAS/ SMS vendors?**

A regular consumer feedback should be conducted. The feedback questions should be designed in such a way that the response can be linked easily to deficiencies in service.

5. **(a) Who should be entrusted with the task of defining the framework for CAS & SMS in India? Justify your choice with reasons thereof. Describe the structure and functioning procedure of such entrusted entity.**

The answer to this question should be arrived at after following the steps mentioned below

(b) What should be the mechanism/ structure, so as to ensure that stakeholders engage actively in the decision making process for making test specifications / procedures? Support your response with any existing model adapted in India or globally.

There is a need to engage stakeholders in a structured way so that they revisit the expectations from each other and collectively arrive at decisions after having evaluated different scenarios. One such methodology is Transformative Change Making Methodology <http://library.fes.de/pdf-files/bueros/indien/13477.pdf>. The secretariat of New Indian Consumer Initiative (<https://www.newindianconsumer.com/>) is well experienced in executing the methodology in different states in India as well as international level.

6. **Once the technical framework for CAS & SMS is developed, please suggest a suitable model for compliance mechanism.**

a) Should there be a designated agency to carry out the testing and certification to ensure compliance to such framework? Or alternatively should the work of testing and certification be entrusted with accredited testing labs empanelled by the standards making agency/ government? Please provide detailed suggestion including the benefits and limitations (if any) of the suggested model.

It is advised that TRAI should first do exhaustive diagnostics through multiple stakeholder consultation following the structured methodology discussed above to better answer the question.

(b) What precaution should be taken at the planning stage for smooth implementation of standardization and certification of CAS and SMS in Indian market? Do you foresee any challenges in implementation?

(c) What should be the oversight mechanism to ensure continued compliance? Please provide your comments with reasoning sharing the national/ international best practices.

Please refer to answers for Questions 3 to 5.

7. **Once a new framework is established, what should be the mechanism to ensure that all CAS/ SMS comply with the specifications? Should existing and deployed CAS/ SMS systems be mandated to conform to the framework? If yes please suggest the timelines. If no, how will the level playing field and assurance of common minimum framework be achieved?**

Please refer to answers for Questions 3 to 5.

- 8. Do you think standardization and certification of CAS and SMS will bring economic efficiency, improve quality of service and improve end- consumer experience? Kindly provide detailed comments.**

Please refer to answers for Questions 3 to 5.

- 9. Any other issue relevant to the present consultation.**

Pertinently, the legal framework that governs TV broadcasting, namely the Cable TV Networks (Regulation) Act, 1995 does not define ‘piracy’ or penalize it. Piracy is penalized under provisions of the Copyright Act, 1957. The Cable TV Networks (Regulation) Rules, 1994 were drafted at a time when there were no independent charges for content. There were no Pay TV channels nor Multi Service Operators (MSOs). Understandably, the Act in 1994 did not address any piracy aspects. Delivery and security were addressed in the 2003 Amendment to the Act and the Rules by mandating CAS. The reason why this does not solve for security is discussed in the earlier section. Signal piracy should be defined and penalised under the CTN Act. This will deter bad actors and provide a mechanism for copyright holders to seek compensation.

Annexure I

Explanation of Technical Concepts

Digital Addressability System (DAS)

DAS is an environment consisting of CAS and SMS mainly. It enables expanded capacity in terms of number of television channels providing more choices to consumers and better viewing quality etc. it also protects the content DAS and brings in transparency among the service providers. (Page 4 Point 1.3 of the CP)

Conditional Access System (CAS)

CAS is the cornerstone of transmission system as it is responsible for the encryption of content. CAS enables secure delivery of the television channels to only the authorized subscribers. (Page 4-5 Point 1.4 of the CP). Components of CAS are – (i) scrambler; (ii) ECMG and EMMG; (iii) Scrambler supervision software; (iv) STB with IC card and cable operator’s software; (v) server which runs CAS software, carries out the LAN connection and remote network connection through a SWITCH with multiplexers; (vi) Switch information exchange between server and scrambler through TCP/IP. The CAS server can control many scramblers through TCP/IP interface. STBs conditionally descramble the signals according to commission information of the receiving cards and then finish the charge of digital TV subscribers and other relative management.

Scrambling, Encryption and Decryption

Encryption is the protection or shield of the data. This is to avoid piracy. The data is protected in such a form that it is compressed and can be accessed through a certain key. CAS comprises a combination of scrambling and encryption to prevent unauthorized reception. Scrambling renders the sound, pictures and data unintelligible while protection of the secret keys during transmission is achieved through encryption.

Subscriber Management System (SMS)

Another key component of the DAS ecosystem is the Subscriber Management System (SMS), which acts as the management module. SMS is responsible for activation/deactivation of Set Top Boxes (STBs), managing subscriber information, channel information, billing and other such activities. (Page 4-5 Point 1.4 of the CP) refer point 2.7 page 16 of the TRAI CP for details)

Subscriber Authorization System (SAS)

The SAS is a subsystem of the CA system that translates the information about the subscriber into an EMM - Entitlement Management Message, it is a form of encryption of data, when the Subscriber Management System requests for it. The SAS also ensures that the subscriber's security module receives the authorization needed to view the programs. Further, the SAS acts as a backup system in case of failure. (Page 16 Point 2.6.2 of the TRAI CP)

Quality of Service (QoS)

SMS and CAS are the integral part of QoS. Therefore, in order to ensure seamless transmission of signals of television channel from broadcaster to consumer, maintaining the addressability and preventing piracy, it is necessary that certain benchmark for the CAS and SMS systems are put into place. (Page 12 Point 2.1 of the CP)

Addressability

Addressability is the ability of a digital device to individually respond to a message sent to many similar devices. In the pay television distribution framework (DTH or Cable or through IPTV etc.) an addressable system enables and controls the distribution of television channels, by encrypting the signal and ensuring only authorized users can receive channels using a set-top-box (STB) and TV set.

(Page 12 Point 2.3 of the TRAI CP)

Distribution Platform Operator (DPO)

DPOs are the distribution chain of the TV broadcasting ecosystem, they are the various platforms through which the TV signals are relayed to the subscriber's TV set.

Set Top Box (STB)

A Set-top box is a device that receives digital signal, decodes and displays it on television. Based on the transmission type, i.e. cable, satellite or terrestrial, the STBs are based on corresponding DVB standards, i.e. DVBC, DVB-S or DVB-T. Their hardware configuration generally remains same except for tuner and demodulator, as it depends on the transmission scheme. The STB retrieves the TV channels and other services from this signal through demodulation, descrambling and decompression.

Requirements that should be reported to the MSOs by cable operators include

- No of subscribers on first and last day of the month;
- Average Number of Subscribers in any month;
- No of Active STBs;
- Program-wise data of subscriber choices and ordered preferences
- Total amount of Invoiced Receivables;
- Amounts that should accrue to broadcasters and Revenue Authorities;
- Details of taxes remitted;
- CO wise details of appropriations from amounts received from subscribers;
- Ageing Reports;
- History/log of each subscriber's interaction with Customer Care;
- Statistical Data on MTTR (Mean Time Taken To Rectify) Customer Complaints;
- No of billing disputes lodged and resolved in any month;
- Reports for MIB;
- Reports for TRAI;
- Trial Balances for Own Management.