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To,

Shri Anil Kumar Bharadwaj,

Advisor (B&CS)-II,

Telecom Regulatory Authority of India.

Sub: Comments on behalf of GTPL Hathway Limited on the Consultation Paper on
“Interoperability of Set Top Box” dated 11.11.2019 (“CP”)

Dear Sir,

We would like to thank the Authority for providing us with the opportunity to share our comments on the CP.

At the outset, we state that the Ministry of Information and Broadcasting as well as this Authority have been dealing with the issue of set top box (STB) interoperability amidst all restrictive technical and commercial factors over a long period of time.

As the Authority is aware that the Direct to Home (DTH) operators started providing broadcasting services in terms of the license granted by the Ministry of Information and Broadcasting (MIB) around 2002-2003. Under clauses 7.1 and 7.2 of the License Agreement between the MIB and the respective DTH platforms, STB compatibility and interoperability has been mandated since inception but the same has remained on paper and has not been strictly adhered to, ever since, due to various reasons. The license to provide broadcasting services as a DTH operator mandates the DTH operators to architect their devices in a manner that they are inter-operable and inter-compatible with that of the other DTH operators, hence the STBs of DTH operators should mandatorily be made interoperable and DTH operators with non-interoperable STBs should be strictly prohibited from providing services till such time implementation of interoperable STBs is effected amongst all DTH service providers.



As a consequence of non-interoperability of set top boxes, even after the merger of Videocon and Dish TV, the platforms are till date, maintaining their separate systems and separate set top boxes with no interoperability. Another such example is the case of Big TV (later renamed as Independent TV) which also demonstrated a similar scenario when the existing set top boxes of the DTH player were not interoperable with other DTH players (Videocon, DISH TV, SUN Direct, Tata Sky) and viewers had to compulsorily invest in the purchase of new set top boxes to continue availing of broadcasting services, since the previous STBs were non-interoperable.

Another issue that needs to be addressed for approximately 40 million households who are availing broadcasting services through the DTH platform of Free DISH owned by Prasar Bharti is the non-interoperability of such STBs that the subscribers have purchased leading to an additional cost for the subscribers in the event they want to shift to alternate service provider/ DPO.

In furtherance to the above stated suggestions, we hereby proceed to provide our comments to the issues for consultation in the present CP.

ISSUES FOR CONSULTATION

Q1. In view of the implications of non-interoperability, is it desirable to have interoperability of STBs? Please provide reasoning for your comment.

GTPL's Response: As already suggested by us in our introductory comments, interoperability of STBs should be mandated and strictly implemented for DTH platform players as the same forms an essential part of the licensing requirement of DTH players.

Moving forward, inter-operability of STBs is not desirable for multi-system operators due to the following reasons:

1. Widely distinct STBs:

The types of set-top boxes (STBs) that are used by various MSOs are widely different from one another in terms of architecture and functionality. Such STBs incorporate features that are widely distinct from one another in terms of the following:



- i. Compression- MPEG-2, MPEG-4, H.264, H.265
- ii. Encryption – DVB Common Scrambling Algorithm, proprietary scrambling methods
- iii. Modulation – QAM, DVB-S, DVB-S2, QPSK, 8PSK, 16APSK, 32APSK
- iv. Resolution – 360p, 480p, 720p, 1080p, 1080
- v. Middleware-Native middleware provided by the STB vendor, Open TV Middleware, Mediaguard, etc.

If TRAI seeks to ensure that STB-interoperability is implemented, it would then be incumbent on part of the Authority to fix and freeze standards with respect to compression, encryption, modulation, resolution and middleware. Moreover, although under the regulatory framework, standard specification for the CAS system requirement has been provided, however, the STBs are developed by manufacturers using different CAS vendors with varying security features and with different set of infrastructure in place. Therefore, if at all, interoperability is to be achieved, it is advisable that TRAI forms a committee of technical and commercial representatives comprising of MSOs, STB Vendors, BIS and CAS vendors with a mandate to identify, fix and freeze standards for STBs.

2. Commercial feasibility for the subscribers and MSOs:

Taking into consideration the subscribers' point of view, if there is an intention to use a downloadable or interoperable CAS, middleware and other components such as key ladder, crypto firewall, etc., the cost of the STB will be prohibitive. Consequently, subscribers who could have been served with a low-cost box will need to buy a box at a manifold cost. If we take into consideration the MSO's point of view, TRAI from time to time has been issuing directions for incorporation of certain features in the STBs and the MSOs have already incurred huge costs for incorporating the requisite features and as such shifting to interoperable STBs will be an additional financial burden which the MSOs will have to pass on to the subscribers.

3. Roadblock to technical innovation:



It is also common knowledge that as technology improves, there will be introduction of advanced and better formats of STBs in the market, however fixing standards in order to achieve interoperability would directly become a roadblock and hinderance towards technical innovation.

Therefore, considering that the implication of having a situation of STB interoperability will restrict technical invention and innovation and does not even hold good as an economically feasible option for the subscribers as well as for the MSOs who have configured their respective STBs to suit the mandates of TRAI, STB interoperability for MSOs is not desirable.

However, if the Authority is still of the opinion that interoperability of STBs should also be mandated for the MSOs also, it is suggested that the following concerns and issues should be examined before developing any framework for STB interoperability for MSOs:

a. Any standardization or specification should be duly consulted before implementation:

If the Authority deems fit to fix and freeze standards, the said specifications and standards should be duly consulted by taking comments from all concerned stakeholders, i.e. the MSOs, STB vendors, CAS vendors. The Authority should, in addition, also form independent technical groups/ committees comprising of all these stakeholders for analyzing the technical and commercial feasibility and practical viability of the implementation of such standard specifications.

b. Uniform implementation of such standards across all MSOs without any exception:

Any standard specification if prescribed by the Authority should be uniformly implemented across all MSOs, irrespective of the type, size, subscriber base, target market or any such parameter. The Authority should strictly ensure, from time to time, that such standards are duly implemented by all MSOs and any single instance of violation of such specifications by any MSO shall lead to cancellation of the license of such MSOs.

c. Registration of CAS vendors:



All CAS vendors who are desirous of operating in India should be mandatorily registered with TRAI/ any other applicable authority and the Authority should certify that their systems are compliant with Schedule III of the Interconnection Regulations, 2017. Further, only such registered and Schedule III compliant CAS vendors should be allowed to operate on interoperable STBs.

d. Only Upgradable STBs should be in use:

Any scheme of interoperability of STBs, if implemented, should be such that the interoperable STBs should be configured at the highest level (OTA) and also upgradable so that it has the capacity of integrating and adapting to the advanced levels which does not hurt technical invention and innovation.

e. STBs should be indigenously manufactured:

All interoperable STBs should be indigenously manufactured by registered and approved manufacturers so that there is adequate control on the manufacturing and standards of the STBs. The government may work out a plan to provide long-term financing for set up of such indigenous manufacturing units. The government should also provide additional incentives and reduced taxes on domestically manufactured STBs which will bring the subscribers' STB acquisition cost down. Further, there should be a concerted effort from the government to promote the development of indigenous Conditional Access System (CAS) and indigenous manufacturing of chipsets which will give further impetus to the domestic STB manufacturers to produce and supply the indigenously manufactured STBs. The past experience of indigenously developed CAS (i-CAS) should be reviewed and effective measures should be built in to avoid the issues faced by the MSOs while using such CAS.

f. New MSOs should mandatorily have interoperable STBs:

Any new MSO which is prospectively granted license by the MIB, post the implementation of the regulatory framework of STB interoperability, should mandatorily have interoperable STBs and should not be allowed to provision or start its services without such interoperable STBs.



Q2. Looking at the similar structure of STB in cable and DTH segment, with difference only in the channel modulation and frequency range, would it be desirable to have universal interoperability i.e. same STB to be usable on both DTH or Cable platform? Or should there be a policy/regulation to implement interoperability only within a platform, i.e. within the DTH network and within the Cable TV segment? Please provide your comment with detailed justifications.

GTPL's Response: The STBs of DTH network and Cable TV segment are distinct from one another in terms of functionality. On one hand, the set-top box used by a multi-system operator is used for demodulating the RF signals (48-860 MHz), whereas the set top boxes deployed by the DTH operators can demodulate IF signals (950-2150 MHz). Moreover, the set top boxes of these two platforms are also widely different from one another in terms of compression, encryption, resolution and middleware.

In addition, it cannot be said to be a step forward or an economically viable solution to have a situation where the manufacturer is required to equip its STBs with such functionalities to suit both cable and satellite platforms and to support dozen-plus proprietary CAS technologies. It cannot also be reasonably expected that all the platforms will rearchitect their networks to converge on a common solution. Therefore, universal interoperability is not a viable option at this instance.

As stated in our introductory comments, STB interoperability for DTH operators has been a mandate under the "Guidelines for obtaining license for providing Direct-To-Home (DTH) Broadcasting Service in India" as issued by the Ministry of Information and Broadcasting (MIB). Articles 7.1. and 7.2 of the DTH License Agreement lay down the following conditions for technical inter-operability which are reproduced hereinbelow:

"7.1. The Open Architecture (non-proprietary) Set Top Box, which will ensure technical compatibility and effective interoperability among different DTH service providers, shall have such specifications as laid down by the Government from time to time.

7.2. The Licensee shall ensure subscriber's interests through a Conditional Access System (CAS), which is compatible with an open Architecture (non-proprietary) Set Top Box."



Therefore, the license to provision services as a DTH operator, itself mandates that the DTH operators are expected to architect their devices in a manner that they are inter-operable and inter-compatible with that of the other DTH operators. Moreover, even the conditional access system (CAS) which is deployed in the STBs of such DTH operators are developed by 3-4 out of the 14 recognised CAS vendors, the names of which are listed in the table on Page 22 of the present CP. However, no such mandate of deploying STBs in a manner to ensure that they are inter-operable amongst each other is provided for under the license mandate or under any other regulatory framework for the multi-system operator. Additionally, the STBs of the multi-system operators are grossly different from one another in terms of the fact that they are integrated with various CAS vendors, including the ones listed in the table on Page 22.

In light of what has been stated above, it is summarily stated that STB interoperability is not viable for multi-system operator(s) and is impractical and unreasonable as it will incur huge efforts and resources considering massive level of distinctiveness amongst the STBs of the MSOs.

Q3. Should interoperable STBs be made available through open market only to exploit benefits of commoditization of the device? Please elaborate.

GTPL's Response: Placing reliance on the contents of the first two responses, we seek to clarify that it is not desirable to have interoperable STBs amongst the MSOs.

We further state that even if interoperability of STB is to be achieved, the cost of such interoperable STBs will be prohibitive for the subscribers. If STB interoperability is introduced with sunset deadlines, the subscribers will have to forego and dump their existing STBs and they will be constrained to buy the advanced versions of STBs which are technologically advanced, at higher prices. At present, the operators are offering the STBs at subsidized rates. Moreover, various options have been proposed in the present CP to achieve interoperability. The subscriber will be constrained to approach STB vendor and the service provider to avail services. Therefore, the subscribers, unlike at present, will have two points of contact: i.e. firstly the STB dealer who will provide the subscriber with the box and secondly the service provider who will provide services through one of the proposed technologies. In case of any issues with the STBs, the subscriber will have to approach both the dealer and the service provider, as the subscriber will not be in a position



to ascertain if the technical malfunction is of the box or of the service provider. At present, all such technical concerns are resolved on a single platform, i.e. by the service provider. The ownership for any technical support of such an interoperable STB will remain unclear which may lead to the consumer not being able to get the problems associated with the interoperable STB resolved.

In a situation where the STBs are available in open market, adequate backup support and after-sales service will have to be ensured by the STB manufacturers including service centres/ call centres in every town/ city (as applicable), to ensure easy accessibility to the subscribers. Additionally, it also needs to be ensured that such interoperable STBs are replaced by the manufacturers/ distributors/ retailers, within the defined timeline as per the regulatory framework, if such STBs are meted out with technical complications.

It is suggested that a feasible option to achieve interoperability of services is to have television sets that are embedded with STBs with uniform features which can facilitate easy interoperability of services. An existing example with respect to the same is that of “TVKey Cloud” which has been tested and deployed in Germany, in association with Samsung and Panasonic.

From the MSO’s point of view, the process of migration of such interoperable STBs will entail deregistration/ registration in the Subscriber Management System (SMS) of the respective MSO. The systems and processes for such deregistration/ registration in the SMS should also be defined by the Authority and a platform similar to mobile number portability (MNP) should be set up under a competent authority.

Q4. Do you think that introducing STB interoperability is absolutely necessary with a view to reduce environmental impact caused by e-waste generated by non-interoperability of STBs?

GTPL’s Response: A large extent of electronic waste is generated in India out of the personal devices such as computers, screens, smartphones, tablets with the remainder being larger household appliances and heating and cooling equipment. Moreover, the average life span of set top box is quite high and hence the issue of environmental degradation caused on account of the e-waste generated by a set top box is of minimal level. Additionally, all the service providers are



getting the set top boxes repaired, recycled and reprocessed on regular basis for ensuring future usage of the device.

In order to achieve digitization, the subscribers have already got affordable and cost-effective set top boxes installed at their premises. Therefore, if interoperability is mandated with a specific deadline for implementation, it will result in the existing STBs becoming redundant & as such contributing to the ever-piling electronic waste which would adversely impact country's environment. Therefore, implementing interoperability may have severe threat to the environment as compared to the effect of continuing with the existing STBs.

Therefore, if interoperability is implemented, it should be prospective, over a period of time and at the end of the life of the existing STBs, without any deadline. The subscribers should be at liberty to have interoperable STBs and there should not be a regulatory framework mandating replacement of existing STBs. Moreover, both interoperable and non-interoperable STBs should be allowed to function simultaneously.

Q5. Is non-interoperability of STBs proving to be a hindrance in perfect competition in distribution of broadcasting services? Give your comments with justification.

GTPL's Response: It is very rare to find an example of perfect competition in the real world. Most industries, including the broadcasting industry, sell 'differentiated' products, i.e. products that are similar enough to constitute a single group but are sufficiently different for consumers to distinguish one from another. In other words, they may be close substitutes but are not exact substitutes as would be the case in perfect competition. The quality of services and the packages that are offered by the DPOs are quite distinct from one another for the subscribers to choose a particular DPO for availing broadcasting services.

The cable industry is facing a regular churn while also observing a constant drop in its subscriber base over the past few months. The consumers already have a choice to avail/ shift services based on the differentiation of packaging and quality of services of various service providers which adequately takes care of availability of competition.



Q6. How interoperability of STBs can be implemented in Indian markets in view of the discussion in Chapter III? Are there any software-based solution(s) that can enable interoperability without compromising content security? If yes, please provide details.

GTPL's Response: Interoperability is not a viable option for the MSOs for reasons as already accorded above, i.e. technical limitation and lack of economic and commercial feasibility.

As far as content security is concerned, over the past few years, there have been thousands of instances where DTH STBs have been used to source channels for unauthorized distribution in cable networks. The primary tool that broadcasters use to detect such STBs used in piracy, is "fingerprinting". Technical interoperability of STBs has potential to jeopardize the fingerprinting feature and it would be a tough task to ensure that such feature would be available in all combinations of STBs and CAS. Moreover, if technical interoperability is brought into operation, it would mean that all the STBs will have standard hardware CAS features which might lead to security breach/ threat in the event of the system being hacked. Therefore, in order to maintain diversity of security solutions, it is desirable to avoid a single standardized mechanism as it will be potentially prone to hacking. In the present scenario also, DTH STBs have been compromised by using key-sharing servers which operate out of remote geographical locations leading to widespread piracy of all channels. This concern has not been addressed till date and is leading to losses to all stakeholders including the exchequer.

On the other hand, software-based solutions to ensure interoperability have not been tried and tested. Such software-based solutions to bring interoperability require extensive trials before the implementation and deployment of interoperable STBs and are not desirable at this instance. The STB is considered as the weakest link by a potential pirate/ hacker, as it is the device that they can easily access and try to manipulate. It is common knowledge that if the STB software is compromised by a pirate/ hacker, they may get direct access to content from channels. It is to be noted that even a single instance of this nature can compromise and adversely affect the security of the content on the service network. Therefore, software-based solution to interoperability is not desirable considering security of the content and piracy threat to the service network.



Q7. Please comment on the timelines for the development of eco-system to deploy interoperable STBs for your recommended/ suggested solution.

GTPL's Response: Time bound implementation of interoperable STBs is a potential serious threat to environment. We do not suggest any timeline for the implementation of the same. Moreover, if there is a dire need to have interoperability, a transition period will have to be provided for in which the eco-system will have to be designed, built, tested extensively and then implemented while taking care to build the regulatory framework including registration of CAS vendors, STB manufacturers as well as a platform similar to mobile number portability (MNP) to ensure smooth transition. There will also have to be a time-period where both inter-operable and non-interoperable STBs will co-exist, at least till the end of life of the existing STBs.

Q8. Do you agree that software-based solutions to provide interoperability of STBs would be more efficient, reduce cost of STB, adaptable and easy to implement than the hardware-based solutions? If so, do you agree ETSI GS ECI 001 (01-06) standards can be adopted as an option for STB interoperability? Give your comments with reasons and justifications.

GTPL's Response: If a software based solution to achieve interoperability is devised, then there has to be certification of all devices including the headend devices and transport equipments and all the other equipments and devices of the set top boxes. This will be an additional financial burden on the DPOs. Moreover, in order to make the STBs interoperable, an essential feature will have to be a downloadable CAS and for effective implementation of downloadable CAS, the DPOs and more particularly, the MSOs, will have to inject additional data in the transport stream (TS). Most of the MSOs operate out of single headend (as the cost which is incurred on maintenance of multiple headends is very high) and connect to more than 100/200 cities over third party transport network. With the downloadable CAS, the MSOs bandwidth cost will considerably increase which will have an adverse impact on the overall business growth of the MSOs and will be detrimental to the entire industry, as a whole.

The standard as suggested by the Authority for providing software-based solutions to effect interoperability, can, at best, be evaluated by a CAS vendor only. However, any standard which is sought/ suggested to be adopted should be subject to proper trial and testing in order to ensure



proof of concept. It might be the case that a concept/ solution which is thought of being effective will have its practical limitations of implementation, which cannot be ascertained at this stage.

Q9. Given that most of the STB interoperability solutions become feasible through a common agency defined as Trusted Authority, please suggest the structure of the Trusted Authority. Should the trusted authority be an Industry led body or a statutory agency to carry out the mandate? Provide detailed comments/ suggestion on the certification procedure?

GTPL's Response: In our opinion, the Trusted Authority should be a statutory agency with an advisory panel consisting of adequate representation from all concerned stakeholders, i.e. regulatory authority, content-owners, broadcasters, DPOs including LCOs, STB Vendors, CAS vendors, headend equipment vendors, chipset vendors, etc. who will define specific requirements of each of the equipment, software, system, process, etc.

The statutory agency shall mandatorily provide certification to all devices including the headend devices and transport equipments and all the other equipments and devices of the set top boxes.

Q10. What precaution should be taken at planning stage to smoothly adopt solution for interoperability of STBs in Indian market? Do you envisage a need for trial run/pilot deployment? If so, kindly provide detailed comments.

GTPL's Response: As already stated, interoperability of STB is not desirable for MSO.

However, keeping ourselves limited to the purview of this question, we state that the following measures and precautions should be necessarily adopted if STB interoperability is to made effective:

1. First and foremost, feasibility and cost burden of each and every stakeholder associated with such scheme of STB interoperability needs to be ascertained and determined by the Authority.
2. Authority to fix and freeze standards with respect to compression, encryption, modulation, resolution and middleware.
3. Extended field trials need to be undertaken in order to ascertain and understand the practical implications and solutions to issues faced.



4. To design the STBs in a manner to make it cost-effective for the subscribers.

In addition, all DPOs who are prospectively granted license to provision their services by applicable licensing authority should mandatorily have interoperable STBs.

Q11. Interoperability is expected to commoditize STBs. Do you agree that introducing white label STB will create more competitions and enhance service offerings from operator? As such, in your opinion what cost reductions do you foresee by implementation of interoperability of STBs?

GTPL's Response: If white label STBs are made available, it may have an adverse impact on the quality of services since such manufacturers will be inclined to manufacture STBs which meet the minimum requirement specified for interoperable STBs. The service offering from the DPOs depends more on the infrastructure installed at their headend and does not depend on the capabilities/ technical specification of the STBs.

In our opinion, initially there will be a higher cost for procuring and maintaining the interoperable STBs as explained in our responses above. However, the cost may reduce over a period of time once adequate volumes of such interoperable STBs are manufactured due to economies of scale.

Q.12 Is there any way by which interoperability of set-top box can be implemented for existing set top boxes also? Give your suggestions with justification including technical and commercial methodology?

GTPL's Response: Reiterating the contents of our introductory comments, we state that as the STBs of DTH platforms are mandated to be interoperable, therefore, in our opinion, there is no additional requirement to achieve STB interoperability for existing DTH STBs.

As far as, the MSOs are concerned, interoperability cannot in any manner be implemented for the existing set-top boxes as the existing STBs come with unique CAS features and are widely distinct from one another in terms of technical parameters.

Q13. Any other issues which you may like to raise related to interoperability of STBs

GTPL's Response: No comments.

