18th December, 2019

To,
Sh. Anil Kumar Bhardwaj
Advisor (B&CS),
Telecom Regulatory Authority of India,
MahanagarDoorsanchar Bhawan,
Jawahar Lal Nehru Marg, New Delhi 110002

Subject: Comments on Consultation Paper on 'Interoperability of Set Top Box' dated 11.11.2019.

Sir,

Please find enclosed herewith comments of Reliance Jio Media Limited (RJML) on the consultation paper on 'Interoperability of Set Top Box' dated 11.11.2019, for your kind consideration.

Thanking You,
For **Reliance Jio Media Limited**,

Authorised Signatory

Enclosures: As above.

Comments on Consultation Paper on 'Interoperability of Set Top Box' dated 11.11.2019, M/s Reliance Jio Media Limited (RJML)

STB Interoperability (if implemented), will require a significant amount of commitment of resources of both STB manufactures, software providers and distribution platform operators. Successful implementation of STB interoperability is difficult to cite. TRAI has sought to address a concern of a small portion of the subscriber base, with regards to the wastage of STB for subscribers that may need to shift locations n which a different operator is operating. Instead of STB Interoperability, TRAI may consider implementing a STB rental schemes that are fair and transparent to both subscribers as well as DPOs and save some capital of the financially distressed distribution platform operators.

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

Implementing STB interoperability,will require substantial investments and infrastructure upgrade by the Cable TV / DTH industry, therefore, the viability, the need and resultant benefits of STB interoperability should be evaluated before undertaking the exercise.

In most localities, cable TV services are provided by a single operator (MSO/LCO). Thenew Tariff Order, QoS and Interconnection Regulations for Broadcasting 2017 have more or less created a level playing field among operators by defining the maximum Network Capacity Fee, and the maximum tariffs chargeable for PayTV. Therefore, the scope for exploiting the subscribers by overcharging them or any other malpractices have been minimized.
Broadcasters are mandated to provide content across platforms on a non-discriminatory basis, therefore, DPOs are left with little margins to play with for pricing their services aggressively, and hence the subscriber may not really benefit even if there are multiple operators in a locality.

Digitization (STB seeding) has been completed across the country. The subscribers of DAS phases III & IV have already invested their resources on STBs and therefore implementing STB interoperability at this juncture will not be viable. Further, the size of the market for interoperable STBs is expected to be quite insignificant. Interoperable STBs will be primarily taken up by those requiring to replacement. A small market size could result in making their production unviable.

As mandated under TRAI's "The Telecommunication (Broadcasting and Cable) Services Standards of Quality of Service and Consumer Protection (Addressable Systems), Regulations, 2017", subscribers have the option to acquire STB's from the service providers on (i) Rental basis (ii) outright purchase.

Interoperable STBs are likely to required by

(a) Subscribers who have to shift base – The number of subscribers who shift base frequently have the option of acquiring STBs on rental basis and hence may not require interoperable STBs.

(b) Number of subscribers that need to replace their old STBs – The replacement market is expected to be very small and hence may not justify the quantum of investments required in infrastructure upgrade for STB interoperability.

In view of factors such as convergence of technologies, small market size, the costs of implementing STB interoperability, if developed,is much higher than the expected benefits and therefore it should not be undertaken.

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.

Interoperability of STBs across several platforms, i.e. MSOs and DTH is not desirable taking into consideration that they are widely 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 (46-860 MHz), whereas the set top boxes deployed by the DTH operators can demodulate IF signals (950-1450 MHz). Moreover, as discussed before, 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 to 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.

If we consider the feasibility of STB interoperability for DTH operators, we place our primary reliance on 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 though 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 two out of fourteen CAS vendors, the names of which are listed in the table on Page 22 of the present consultation paper. However, no such mandate of deploying STBs in a manner to ensure that they are

intra 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 manufactured by all the fourteen CAS vendors as listed in the table on Page 22, and hence the architecture of the STB of one multi-system operator is extensively discrete and divergent from that of the other multi-system operator.

In light of what has been stated above, it is summarily stated that STB interoperability is not viable for multi-system operator(s) at this instance, is impractical and unreasonable as it will incur huge efforts and resources considering massive level of distinctiveness amongst the STBs of the MSOs without any commensurate benefits.

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

Placing reliance on the contents of the first two responses, we reiterate that it is not desirable to have interoperable STBs in the first place, neither presently nor in times to come.

We further state that even if interoperability of STB is achieved, the cost of such interoperable STBs will be on the higher end for the subscribers. If STB interoperability is introduced and brought in the market, 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 forward, at higher prices, therebydefeating the very purpose of introducing interoperable STBs. At present, the operators are offering the STBs at subsidized rates. Moreover, as proposed in the present consultation paper, each STB will have a separate conditional access module (CAM) that stands unique to every STB and the same has to be procured from the respective service provider. 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 the subscriber with the STB-specific CAM.

In this regard, it is also important to consider that interoperable STBs will have to have detachable components and as such, they are likely to have technical glitches and can be prone to technical complications. If we consider a situation that the STBs deployed at the subscriber's premises suffer from any technical glitch, 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 CAM. At present, all such technical concerns are resolved on a single platform, i.e. the service provider. The ownership for any technical support of such an interoperable STB will remain unclear. Since in all probability, for such boxes hardware and basic software will be manufactured by a third party, who may not be part of any of the platform owners which may lead to the consumer unable to get his interoperable STB problems resolved. Another situation could be that the subscriber on his own will may migrate from one platform to another, which would in effect terminate any contract with the original platform and such subscriber may be unaware of the support status of his interoperable STB and how to resolve his complaints.

Therefore, if the STBs are made available through open market, it will add on to the hurdles of the subscribers as they will have to keep running from pillar to post if such STBs are rendered dysfunctional on account of technical issues.

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?

Since STB's are provided to subscribers on both rental and outright purchase basis, the subscribers that avail STBs on rental basis will return the STB to the service provider and this STB will be redeployed by the service provider on rent. Therefore, onlySTBs that are require replacement or in case of shifting of subscriber to another area are the ones that are likely to be wasted.
E-Waste generated from STBs maybe disposed off as per the E-Waste Management Rules, 2016.

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

In the context of this consultation STB non-interoperability is not a hindrance to fair competition in broadcasting distribution services. As per the TRAI's New Tariff Order 2017, the maximum pricing that can be offered to the subscribers has to be disclosed to the subscribers and the consumer has been provided adequate mechanisms to select channels of their choice at the mandated prices.
Similarly, all platform operators are treated at par with each other under the current set of regulations and content is to be provided by broadcasters to all platform operators on non-discriminatory terms. Therefore, the scope for exploitation of consumers is very slim and the emergence of market imbalances among the platforms is very narrow resulting in a level playing field for the stakeholders.

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.

Interoperability is not a viable option to be taken into consideration in Indian market for reasons as already accorded above, i.e. technical limitation and lack of economic and commercial feasibility.
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.

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 are not desirable at this instance. STB is considered as the weakest link by a

potential pirate/ hacker, as it is the device that they easily access and try to manipulate. It is a common knowledge that if the STB software is compromised by a pirate/ hacker, they get direct access to content from channels. It is to be noted that even a single instance of this nature can compromise and adversely effect the security of the entire service network. Therefore, software-based solution to interoperability is not desirable considering security 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.

Reiterating the content of earlier Responses, it is stated that interoperable STBs are impractical and unreasonable, at this juncture when commercial STB interoperability is already avilable, and hence we do not suggest any timeline for the implementation of the same. Moreover, if there is a dire need to have interoperability, it needs to be taken into account that a transition period will have to be envisaged in the first place where both inter-operable and non-interoperable STBs will co-exist. However TRAI could speak to existing CAS, Compressions and STB vendors for their views of time line(if the technology is ready).

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.

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, from the "TRUST Authority" which 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 have to inject additional data in the transport stream (TS). 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. This becomes all the way more important as we are all conscious of the fact that till date, there has not been any successful model/ prescribed standard across the globe which we can follow for effecting implementation of software-based solutions to interoperability.

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?

In our opinion, The Trusted Authority should be a statutory government or a semi-government body having equal representation from all concerned stakeholders, i.e. content-owners, broadcasters, DPOs including LCOs, STB Vendors, CAS vendors, headend equipment vendors, chipset vendors, etc. As already suggested in our response to the previous question, such Trusted Authority 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.

Moreover, all the CAS vendors shall also be mandatorily certified by the Trust Authority and only the CAS vendors who are certified by such Authority shall be allowed to function in the market.

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.

Without prejudice our views stated earlier, STB interoperability, if developed, should be deployed with abundant caution.
It should be deployed in phases possibly similar to the roll-out of the Digital Addressable Systems (DAS Phases I-II-III & IV).
DPOs should be provided financial incentives to upgrade their infrastructure and recover the additional investments in hardware and software upgrades.
Live trials of interoperable STBs should be conducted on large scale basis in parallel with existing system, for a minimum 18-24 months.

After the trials, TRAI should conduct studies on the following aspects:

1. Acceptance by subscribers in terms of costs
2. Ease of implementation
3. Feasibility of co-existence of interoperable system with the existing system of DPOs
4. Availability and effectiveness of after sales support system
5. Increased burden of cost on DPOs and subscribers
6. Evaluate the total size market for interoperable STBs as per the following:
   (a)STB's due for replacement
   (b)number of people that shift base frequently and require interoperable STBs
7. Authority to fix and freeze standards with respect to compression, encryption, modulation, resolution and middleware.
8. To make the LCO's last mile cable network receives multiple feed on the same network from all the DPO'S or ensure LCO'S install parallel RG1/RG6 cable network so as to ensure "open-access" from multiple DPO'S. At present each building is connected by a LCO using a single distribution architecture out of the Amplifier.

Basis the results of the studies TRAI could determine

(a) The viability and feasibility of STB interoperability
(b) Devise corrective measures basis shortcomings discovered in the trial

(c) Phase wise roll-out plan
(d) Hike in tariffs on consumers to enable DPOs recover additional cost of investments on account of infrastructure upgrades

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?

Currently white labeled STBs are acquired in bulk by DPOs and provided to their subscribers that purchase them at a substantially subsidized price. DPOs provide the STB at a subsidized price and provide after sales service support (at charges specified by TRAI), since these are network specific devices.
Interoperable STBs will not be network specific, therefore there will be no incentive for DPOs to subsidize STBs and maintain after sales support infrastructure. Therefore, in the initial period of 12-24 months after sales support of STBs provided in the open market could be a challenge, and costs and SLA of after sales support will be determined by market forces.

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?

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. Therefore, if interoperable STBs are made operative, the existing STBs will be of no use and will have to be swapped and replaced with the interoperable STBs.

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

1. All pay broadcasters must be comply with / directed to come on the new CAS proposed by the authority and to be managed by the Trusted Authority.
2. Compression / Headend vendor must be ready for the new common CAS.
3. LCO network to a building is unique/single feed. For interoperable to work in a building, last mile cabling must be commissioned and set up by the LCO to each apartment.