NAGRA
KUDELSKI

Date: 6th December, 2019

To
Shri. Anil Kumar Bhardwaj,
Advisor (B & CS)-II,
Telecom Regulatory Authority of India (TRAI),
Mahanagar Door Sanchar Bhawan,
J.L. Nehru Marg, (Old Minto Road)
New Delhi - 110002,
India.

Subject: Comments on Consultation Paper on Interoperability of Set Top Box dated 11th November 2019.

Dear Sir,

At the outset, we would like to thank Telecom Regulatory Authority of India (TRAI) for giving us an opportunity to provide our comments regarding the interoperability of Set Top Box.

Please find enclosed our comments for your kind consideration.

Thanking You,
For Nagravision SA,

Philippe Stransky
Senior Vice President – Technology
Central Architecture Office

Comments from Nagravision SA

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

The consultation paper describes in great details the obstacles faced by interoperability of STBs. There are 3 groups of interoperability issues to be considered:

1) CAS related interoperability

CAS providers and DPOs have a contractual relationship that defines quality of service to be provided by CAS vendors to DPOs. In the case where the quality of service downgrades to a certain level, then the revenue of the DPO is materially impacted by piracy, possibly leading to loss of content licenses and probably bankruptcy.

As the CAS elements are clearly identified in the STB, a solution implying a hardware or software module implementing all CAS-specific elements must be defined with clearly identified interfaces, responsibilities/obligations amongst all parties including the security liability, to be made available to all STB vendors and CAS vendors in order to achieve interoperability of STBs

2) Functional interoperability

Each DPO has its own sales and marketing strategy, resulting in a variety of features made available to the consumer, via the user interface.
The consultation paper highlights rightfully that DPOs and STB providers have implemented a variety of operating systems, middleware technologies and applications, for the purpose of implementing the sales and marketing strategy.

Standardization committees like European ETSI, and also US ATSC and People's Republic of China Radio, Film and Television Industry Standard have defined the use of a standard middleware and runtime technology to achieve interoperability. Fortunately, all these standards are very close to European HbbTV, defined in ETSI standard TS 202796, which makes it a very suitable standard to achieving application interoperability in India.

It is also worth noting that HbbTV is now available in most if not all TVs sold in Europe, demonstrating the commitment of the industry to HbbTV and the ability of different service providers in Europe to provide HbbTV-compliant application running on TVs sold in retail. A similar approach may be adopted for the India market.

3) Modulation interoperability

The consultation paper describes that DVB-S/S2 for satellite transmission and DVB-C/C2 for cable transmission, are used in India, both obviously not compatible between each other. A STB is usually produced for Satellite or Cable networks, but not both. Full interoperability requires DVB-S2 and DVB-C2 to be implemented in the STB.

An example of modulation interoperability is found in Europe, where TVs implement satellite, cable or terrestrial (DVB-T/T2) demodulation, and where some models implement 2 or 3 demodulation types. The additional cost of the demodulator is minimal compared to the total cost of the TV.

The similar additional cost to implement 2 or 3 demodulation types inside the STB is proportionally much higher and increases the price of the STB.

It is worth noting that various practical reasons prevent consumers from moving easily from cable to satellite reception, and vice-versa. Therefore, full modulation interoperability is probably adding too much costs to the STB, overweighing the benefits to consumers.

E-Waste and Power Savings:

TVs with demodulation capabilities avoid the need for STB. As e-waste is an important aspect described in the consultation paper, total power consumption is also very important.

For example, an LCD TV requires about 40W (https://www.samsung.com/us/video/tvs/UN32EH4003FXZA-specs) and the STB between 7.5W and 19W (source http://www.tpcdb.com/list.php?type=21).

It means that removing the STB would save significant amount of power consumption per screen.

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.

Various practical reasons prevent consumers from moving easily from cable to satellite reception, and vice-versa. Therefore, full modulation interoperability is probably adding too much costs to the STB, overweighting the benefits to consumers.

However, a TV centric approach may be considered in India for universal interoperability with the 3 possible options explained in Q6 below.

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

The benefit of retail market is that it enables competition between STB vendors, for the benefit of the consumers: they have more choice and can weigh the cost of the STB compared to the features available.

However, in case of a piracy issue which may impact the entire STB population, the responsibility and cost to implement countermeasures will require support from all stakeholders such as Trust Authority, DPOs, CAS vendors, STB manufacturers, SoC vendors and Middleware vendors. Thus, the role of each stakeholder needs to be clearly defined and agreed. In case a retail STB manufacturer or other stakeholder is no longer in business, then addressing piracy issues will be challenging.

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?

STB interoperability is one of the solutions to reduce e-waste but removing the STB would also reduce power consumption in addition to reducing e-waste. For example, power consumption calculation for a low-end Zapper STB: 5W per hour x 3 hours per day x 100 Million households = 1.5GW per day!

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

NAGRA does not have the data required to express an opinion.

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.

Considering the state of technology and business constraints, NAGRA is of the opinion that interoperability can only be implemented if there is a clear isolation between the STB functions; delivering the sales and marketing strategy of the DPO; and the CAS.

Such separation can be achieved by using standards like DVB Common Interface hardware module like DVB CI+, DVB CI+ with USB or using hardware root of trust based CAS inside TVs already deployed with TV vendors such as Samsung, Panasonic etc. This hardware root of trust based CAS inside TVs does not require any hardware.

With the above approach of using DVB CI+ or DVB CI+ with USB or hardware root of trust based CAS inside the TVs, the objective of achieving interoperability across cable and satellite without compromising content security and with forensic watermarking can be achieved. However, the TV manufacturers would need to support hybrid tuner configurations (DVB-C, DVB-S/S2).

The additional benefits of such an approach would be power savings, e-waste reductions, foreign exchange savings, retail availability and investment protection for the consumer as it supports Standard Definition, High Definition and 4K formats without the need to upgrade TVs (as long as the TV supports 4K). This will also allow DPOs and broadcasters to offer 4K services in India.

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

NAGRA, Samsung and other TV vendors have already deployed in Germany a product named "TVKey Cloud", which provides a robust solution fulfilling the requirements for interoperability using TVs. The deployment schedule depends on the willingness of the stakeholders of the industry to participate to this development, but the technology can be made available to stakeholders as early as today, and equipment sold in retail market in about 1 to 2 years.

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.

Content providers and media industry have reached the conclusion that hardware root of trust is required to enforce robustness. This is also illustrated by the reference to MovieLabs ECP in the consultation paper.

The additional cost of hardware compared to software security modules is easily balanced by the longer lifetime of the STBs that implement hardware-based security resources.

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 the case where a good separation of CAS and STB is designed, then defining a Trust Authority is simpler than for a scenario where the STB has to implement the capability to support multiple CAS technologies.

There are some global examples of attempts of deployment of National Trust Authorities, for example in the US with DCAS and in China with ChinaDRM. DCAS failed because of liabilities issues, and, to our knowledge, China has still not put any Trust Authority in production.

Developing and operating a Trust Authority is expensive, as it must provide the following minimum services:
- Generate and manage 10s of Millions of keys to be programmed in the SoC (Chipset), STB and make them available to the CAS providers and application providers.
- Provide capacity to deliver keys, certificates and other cryptographic resources 24x7
- Support delivery of such keys in a confidential manner to various parts of the world, where needed, including but not limited to India, but even to countries such as , China, Taiwan, Europe where hardware (SoC) is manufactured and applications are developed.
- Undertake audit of stakeholder's STB manufacturing locations for compliance
- Define functional and robustness requirements to describe the interoperability needed
- Define a certification process for enabling auditors to verify the compliance of hardware with the functional and robustness requirements.
- Provide support during STB repair, piracy related issues.
- Define process where consumers who have bought STB from retail market can avail of repair services after warranty for receiving keys.
- Defining SoC, STB, Middleware certification process

For reference, US DCAS was a 4 year effort with about 100 Million USD invested, including starting developing the Trust Authority, before it was shutdown.

On the other hand, the program "TVKey Cloud" is an example of successful development that also took about 4 years to develop with industry partners cooperating to reach the same goal and is now industrialized.

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.

The first step could be to define the minimum functional and robustness requirements of a STB or TV in India.

DVB standards provide the foundation of such specification while the interoperability document will clarify details and options available to the adopters.

The second step is to open a project inviting industry stakeholders to setup a trial. It would be ideal if such voluntary contribution could be rewarded with some benefit to be defined (tax relief, exclusivity in case of adoption and deployment, etc).

A good way for adopters to test the benefits of interoperability is to take support from DPOs.

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?

It is difficult to evaluate whether a reduction of cost to consumers is a result of existing competition between vendors or as a result of a new technology and price reduction from more commoditized components.

In any case, a scenario that allows removing the need for a STB, as suggested earlier, will show much more tangible results and overall environmental benefits.

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?

It would be too ambitious to believe that STBs already deployed can be modified to enable interoperability. The deployed technology may not be ready to support such interoperability. This would also require significant effort and time that would be better invested in building a new generation of interoperable STB and TV.

Q13. Any other issues which you may like to raise related to interoperability of STBs
None.