



TWISE



RESPONSE ON CONSULTATION PAPER ON INTEROPERABILITY OF SET TOP BOX

TRAI

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CONTEXT OF THE ANSWERS

The answers to the questions raised in the consultation paper issued by the TRAI on Interoperability of Set Top Box date 11th of November will be made based on an approach related to the CAM technology.

Indeed our company ([Twise](#)) is involved in this technology by providing software turnkey solution to allow a manufacturer to deploy locally a finished product in a record time.

CI PLUS TECHNOLOGY

CI Plus technology is mainly used in Europe in combination with iDTVs currently as explained in section 3.3 of the document. It was the answer from the regulation to the exact same concerns of inter-operability to accompany the various digitization through Europe. ([EU directive 2002/22/EC](#) amended in 2009 by [Directive 2009/136/EC](#)).

The current version used and deployed is CI Plus 1.4 and its newer version CI Plus 2.0 with the change of form factor (from PCMCIA to USB) is available with a test regime in place for Hosts and CAM from Q1 2020.

DRAWBACKS RAISED BY THE INDUSTRY AND SOLUTIONS PROPOSED

The CONS raised against the PCMCIA form factor were mainly related to price (high production cost vs STB usage, PCMCIA interface cost for the STB itself) as well as limited features - descrambling.

As stated in the section 3.3.2 of the consultation paper, CI Plus 2.0 and USB can partially solve the issues raised above as the USB is a widely spread amongst STBs (and TVs).

Two concerns are raised in this consultation:



1. Control on the USB CAM price from traditional manufacturer and later on the various players in the STB eco-system.

To overcome this first challenge mentioned in section 3.3.2, Twise can propose a SW turnkey solution composed of (CI Plus 2.0 stack, CA loader and application) to local Indian manufacturers. It is a great opportunity to lower the cost of production to enable cost optimization and savings on the import duties. Based on a current project in Europe (PCMCIA form factor), Twise has recently brought a new CAM manufacturer within 9 months on the current PCMCIA form factor.

The CAM's manufacturer's choice can be managed by the operators which will offer them a way for further negotiation and be sure that the price is kept at the right level.

The current solution is based on a STB SoC, i.e. not specific for the CAM business/manufacturers. It lowers the risks to follow any security requirements from the CA vendors. Indeed the current chipsets used by the CAM manufacturers are proprietary and is one of the hurdle is the price to invest in such a chipset for limited CAM market. It could enable also to specify any Hardware IP SoC requirement which would be required for the Indian market. What could be requested for a STB could be done for the CAM as well.

Note that of any decision is taken not to support standard CA, the chipset which would be used for the new solution could also be used in a USB CAM (as long as USB device is embedded in the SoC).

Last but not least, in term of environment, by manufacturing CAMs locally the costs are brought lower, the carbon footprint is decreased drastically.





2. Limitations on User interface, User experience

As it has been mentioned that using the CAM may limit the User Interface, User experience, to overcome this challenge, [HbbTV technology](#) needs to be considered.

Indeed, it is a global initiative aimed at harmonizing the broadcast and broadband delivery of entertainment services to consumers through connected TVs, set-top boxes and multiscreen devices. The HbbTV specification has been developed by industry leaders to improve the video user experience for consumers by enabling innovative, interactive services over broadcast and broadband networks.

Tests suites are available and could be adapted to the Indian market by creating a dedicated profile and associated specifications.

This technology in combination with a CAM can bring the UI and UX missing to current product as long as the STBs are compatible with HbbTV 2.0.x. No need to be connected if not available as the CAM has the ability to store the HbbTV application and can deliver it to the STB.

A special attention shall be given to one of the sub-set of the specification called Op App (Operator Application) which could lead to an interoperable eco-system.

As an option, an interesting second HBBTV independent specification called Targeted Advertising could be evaluated by the Operator.

3. Other

The CAM technology can also ease the migration from one operator to the other one especially when DTH based. Indeed, CI Plus allows to manage the channels sorting via a resource called CI Plus Operator Profile. The CAM can retrieve data from the broadcast, build an operator channels list and send it to the STB as





long as the STB is supporting CI Plus.

As a sum-up, the USB CAM combined with HbbTV technology can be a path towards interoperability. It solves the conversion issue from a STB developed by an operator by converting it to another operator environment. See below the recap table:

PCMCIA form factor	PROS	CONS
External device	✓	
Standard technology	✓	
Multi –CAs support	✓	
Cost	–	✓ - solved with USB CAM
UI/UX	–	✓ - solved with USB CAM

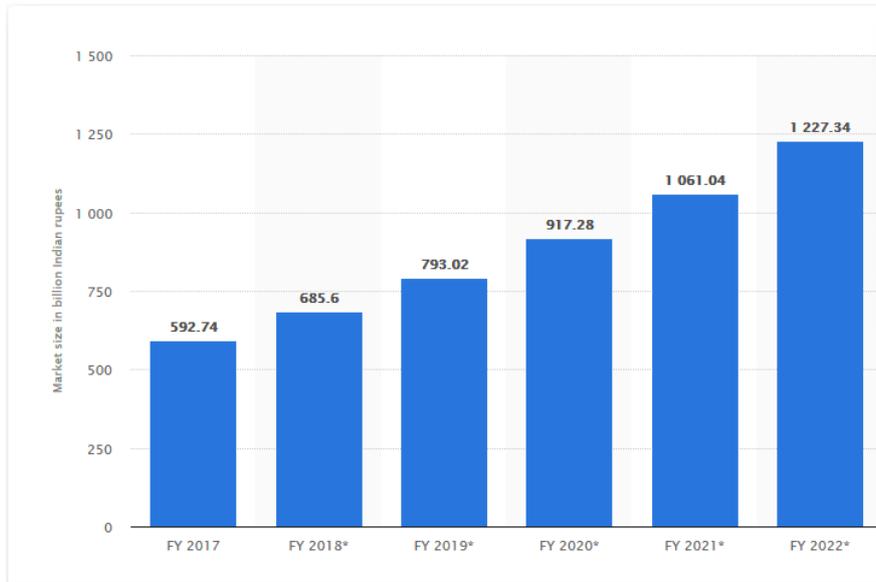
A PATH TOWARDS THE TV

Indian TV market is one of the most dynamic worldwide. India Smart TV Market is expected to grow at a CAGR of 30.2% during 2018-24

(source: [market and research](#)).

It leads to a drastic revenue increase for the coming years (source: [statistica](#)):





Hence when thinking about the next generation of CPE it is important to also consider the TV market: here, the USB CAM makes also perfect sense. The USB CAM combined with HbbTV can be reused in a TV environment if the TV is compatible with CI Plus 2.0 and HbbTV 2.0.x. A prerequisite is for the TV to embed the correct digital tuners. In Europe, most of the TVs are triple tuners (T/C/S) so it gives full flexibility for the user to choose the Pay-TV offer he wants to subscribe to.

Then, the exact same device can fit in STB and TV device ensuring a maximum of interoperability and great choice for the user.

ROOT OF TRUST (ROT) FOR INDIA

Another feature to be considered from CI Plus technology is the possibility to add a new RoT to the current one which has been specified from CI Plus specification v1.4.3 based on the TS 103 205. The CI Plus Specification v1.4.3, has introduced the CI Plus 2nd Root of Trust based on the SHA-256 Hash algorithm (Chapter 6 of this specification).



Indian Trusted Authority could declare this specific RoT at DVB (for information, one CA vendor did it) and manage the new RoT credentials distribution.

Several benefits can be foreseen:

- Create an Indian Certification regime to adapt the certification cost and process for CPE to the local market specificities
- Introduce feature such as CPE white/black lists for a better control on piracy, unauthorized CPE
- Enabling Watermarking solution
- Twise can develop and/or support local entities to establish these new tests regime and associated tests.

ENVIRONMENTAL IMPACTS

CAM has undeniable advantages when it comes to preservation the environment and limiting e-waste:

- Local manufacturing
- Small form factor
- Limited after-sales
- No additional cabling
- Limited power consumption compared to STB (10 times less)





ANSWERS TO QUESTIONS RAISED DURING THE CONSULTATION

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

[Response from Twise]

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Full interoperability seems difficult to achieve as per the document description in chapter 3.9.

However, some level of interoperability on new deployed devices will help in several axis such as:

- Harmonizing the new devices sold into the market
- Limiting the waste when recycling STB (limitation of the number deployed when used in combination with USB CAM)
- Giving choice to the subscribers

The Pay-TV eco-system shall also include the TV which is a growing market and shall be considered to re-use the technologies linked to the STB market. More and more, TVs are bringing additional features and are each year renewed: UHD is for example deployed faster in TV than STB, then benefiting from this feature, can be of great value for not duplicating it inside a STB. That's why a CAM makes perfect sense in Operator portfolio. It allows to take benefit from TVs features (codec, UI browser...) and then reduce the CPE costs (CAM price will be lower than a STB especially when hybrid services will be deployed or new codec).

As a consequence, TV specification shall also be regulated to mention the support by default of Integrated Digital Tuner and CI Plus 2.0 as a minimum requirement (HbbTV also if the UI has to be considered). Europe did it this way but country such as Malaysia is pursuing this route towards interoperability. (Please check the link: [Malaysian regulation](#))



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 and 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.

[Response from Twise]

Ideally embedding 2 tuners (S and C) in the STB would improve the reusability of the STB. However the uplift cost of one tuner might be a blocking factor. Hence the regulation should probably apply a policy per type of diffusion: Cable and DTH.

However, except the tuner, the STB specification can be identical in term of minimum requirements to lead to interoperability:

- CI Plus 2.0 shall be mandatory
- HbbTV can be requested to deal for the UI and bring a set of features such as Operator logo, banner, EPG

By the way, to extend the current level of interoperability, the current STB equipped with both CI slot and a USB interface could maybe upgraded to support USB CAM as it is mainly SW implementation except the CI Plus certificates which need to be loaded during the production.

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

[Response from Twise]

A balance shall be found between the level of required features and the price. Indeed, if the device is considered as a commodity only, the set of features proposed will be very low and won't allow deployment of additional services to consumers. Indeed the number of STB providers is decreasing and the associated quality when the STB is just low cost tends





to decrease fostering the renewal of STB pretty quickly. It is not very good for the e-waste management.

However, open market can ensure a level of price competitiveness.

Moreover, depending of the level of interoperability and in the mindset of having USB CAM, both distribution mode can be done (open market and via the operators themselves). The customer can then have the freedom to choose the correct offer/CPE.

Indeed, some operators might also understand the benefits of going through the open market to lower the logistics cost, support to the customers, manage the after-sales/CPE replacement.

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?

[Response from Twise]

Yes introducing STB interoperability is necessary to reduce environment impact.

As explained in the Context section of this document, several factors can improve this environment impact:

- USB CAM usage: reduced form factor compared to PCMCIA, local manufacturing. Other benefits from CAM (no remote control, no cable, low power consumption, no power supply...)
- Reuse of the USB CAM with a TV: no need to multiply the number of STBs but rather used the build-in features of the TV.
- USB CAM life duration is much longer than a STB (no active components in the CAM)





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

[Response from Twise]

The non-interoperability of the STB does not favor the user. Once the user is locked to a services provider, it is difficult to move to another one without adding a cost for it. Then it means that services providers are aware to lock the user which doesn't help to provide the best offer to the end user. Whereas if device such as USB CAM would be available, user would switch from one to another services provider really easily. USB CAM is also a "portable" device and could be used in several households. So by associating interoperability with the USB CAM possibility would improve greatly the competition between services providers.

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.

[Response from Twise]

Based on the context explanation above, the interoperability could be implemented by using several combinations of technologies:

- CI Plus 2.0 (USB form factor) as a removable device to take care of the CA Part. Compared to the current PCMCIA, it is optimized in term of cost as USB is a universal interface on the STB Market. It would allow flexibility in term of STB, chipset as not linked necessary to a specific CA. The USB CAM could become the operator device and foster the introduction of reusable the STB amongst several operators.
- In term of certification, in order to implement a suitable test regime for India (and probably a cost optimized version), a dedicated Root



of Trust could be used with certificates generated under a Trusted Authority.

Hence, the market will be open whilst being controlled for India.

- Last point regarding USB form factor is that it is a widely known form factor so the manufacturing is not complex. Hence a local manufacturing could be done by any CE manufacturers (TV or STB). Twise is able to provide SW CAM turnkey solution to support the local manufacturing. It is a solution which will save the import duties and allow an affordable device. From an ecological standpoint it is also better as it would reduce the carbon footprint.
- As for the UI, standard technology such HbbTV technology could be an alternative. Indeed for operator, it would allow a seamless experience for subscribers /operators between STB and iTVs. To a certain extent, a retail STB could be produced with a DVB-C/S tuners and a HbbTV browser. The operator customization could be then managed by the CI Plus 2.0 CAM embedding the specific CA and the operator HbbTV application via HbbTV technology is suitable for Hybrid and then future proof when it comes to add OTT to operators offer.
- Software based solution wouldn't bring any added value compared to the above eco-system as the market is driven by several operators with their own specificities. Moreover, software based solution imposes new chipset and time to market would be longer than using standards technology for a market adoption.

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

[Response from Twise]

Based on the recommended eco-system (USB CAM and HbbTV) the time lines to deploy the solution could be a nine months to one year process





provided all the proposed technologies are based on standards which allows a fast implementation and market adoption as they are tested and tried over various networks and will need localization as per the Local Operators.

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.

[Response from Twise]

Software based solution means new “standard”, new chipset and delay market adoption. It goes against interoperability concept as new technologies mean that the eco-system shall be ready such as SoC, and STB. It will generate additional costs for the SoC suppliers as the device won't be standard and then we can expect price increase.

We might also expect strong reluctance from the current CA vendors.

The timelines for such a solution cannot be defined as each CA vendor may like to have its own validation process and coordinating so many CA vendors may prove to be too much of time consuming.

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?

[Response from Twise]

The trusted authority could ease the process of interoperability by releasing the correct specifications as well certification regimes (especially if an Indian RoT is decided) to ensure the correct implementation. A



company like Twise could assist in setting up the tests specification and its execution. Indeed the company has acquired strong knowledge by passing several CI Plus certification run currently by Eurofins.

For the certificates themselves it could be done via local company or by company such as Digicert (current company used to support CI Plus LLP).

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.

[Response from Twise]

In order to ensure a correct interoperability execution, specification or requirements towards STB manufacturers (and also TV) shall be defined (Indian label). It will help also to control the CPE devices importation and avoid grey market, control piracy... Based on this, operators can build their strategy with the approved SoC/CPE while ensuring a level of interoperability.

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?

[Response from Twise]

White label STB would be the ultimate step towards complete interoperability which can be achieved with HbbTV technology and USB CAM. STB price are bound to be optimized.



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?

[Response from Twise]

Based on USB CAM being used, interoperability for the existing STB could be studied in cooperation with the providers especially if the copy protection (copy protection is linked to certificates available in both the STB and the CAM loaded at production) between the STB and the USB CAM is not activated.