Comments/Suggestions on specific issues in the TRAI consultation paper on NTP

Section C

At least 50% of the technology and the products have to be Indigenously Designed Developed and Manufactured.

Section D.

1. It is laudable to set a vision for the telecom sector in India. Since this is a vision document it is good to set the vision to be among the top 10 nations in the world. With policies that are mindful of todays realities, India could provide the backdrop of the largest democracy in the world to take on a public spectrum policy fully embracing a 'mobile first' strategy. PB/DOT management of public spectrum that can be used for increased utilization through hybrid application of terrestrial broadcast/broadband

2. As part of the vision we firmly believe it is time to review the DTT spectrum policy. Right now world over DTT operators and telecom operators work in silos creating spectrum scarcity. While 5g addresses capacity with spectrum in the 28GHz+ , for efficient video delivery the DTT spectrum (474 Mhz-700Mhz) is still the best option for video delivery. A converged architecture which uses broadcast spectrum and licensed telecom spectrum seamless is the way forward. Regulations to aid this will help achieve the vision. And it would be the first of its kind in the world and put us ahead of telecom faring countries in the world

3. It needs to be noted that a single architecture will not suffice the needs of a diverse population specially between urban and rural ones. In rural areas the issue is more about coverage while in urban areas it is about capacity. This drives a need to understand better the needs of a population and the sources of news/information/entertainment available to an increasingly mobile (nomadic?) people.

4.

5. An important aspect is promoting new technologies and spur new business models is the flexibility in licensing regimen. Depending on the use case the licensing scheme should be flexible to accommodate unlicensed spectrum, lightly licensed and spectrum sharing. In order to reduce costs and scarcity of spectrum, it is imperative to have a dynamic spectrum policy going forward. Systems, platforms and technologies to enable this will spur start-ups and innovation in the country

6. An important aspect that gets missed is the creation of home grown standards for both DTT and telecom. Too often we do not use our buying power to push standards that favour local companies. While it is important to leverage international standards for economies of scales, it is equally important to push local standards for local problems and then push them into an international standard. This gives local companies a chance to grow big and counter companies such as Qualcomm and Hughes who indirectly benefit from their local ecosystems.

7. It is also important to promote defense communication startups as part of the local telecom ecosystems. As network centric warfare (NCW) gains prominence, communication systems play a key role here. It also helps local companies try out ideas and solutions in niche closed markets before taking them to a broader consumer markets

Section E :

Currently telecom operators try to transplant the urban model to rural areas in technologies, platforms and business models. For faster and higher rural tele density newer OTT business models and technologies need to be adopted.

Here again it is important to promote homegrown technologies like TVWS that cost lower and have a smaller carbon footprint. Spectrum policies that aid the TVWS technology can spur innovation and also tele-density very rapidly. The WS policy need not be on the lines of the FCC in the US but specific to Indian needs. In fact a PPP between Doordarshan , BBNL and private companies might be a good way to implement this.

It is to be noted that the white spaces are touted here for a NLOS backhaul or middle mile technology. We don't believe that TVWS can substitute WiFi or cellular as a access spectrum.

Long-distance Communication √
UHF and VHF signals in sub Giga-Hertz (frequency < 1GHz) spectrum have favorable properties that makes long-range (10 to 100Km) communication possible. At these wavelengths a signal transmitted at a given power-level suffers lower attenuation and hence can be received intelligibly at receivers further out from transmitter. As an example: a sub-GHz TV signal at 30dBm (=1W) radiated power (EIRP) can reach 10Km whereas a 2.4GHz WiFi at 30dBm can only reach 100m in outdoor conditions.

Non Line-of-Sight propagation √
Sub Giga Hertz signals can also undergo diffraction (bending) around corners/edges of obstructing features such as buildings, trees and hilly terrain in the inner Fresnel zone. This allows Non-Line-of-Sight (N-LOS) communication, i.e. signal can be received even when there is no direct straight line path (i.e. it is obscured by objects of certain size) between transmitter and receiver.

Lower Capex costs
Rural areas are characterized by sparse population density, where small population is spread over a large area. Long distance reach of White Space technology allow a smaller number of Base Stations to cover such users, compared to shorter range technologies such as Cellular 3G/4G. Due to this it is estimated that White Space infrastructure would incur one-tenth the cost of deployment.

Lower Opex costs
Due to its lower power consumption TVWS broadband equipment could be solar-powered which would drastically reduce its operating expenses. In a detailed study a Microsoft report pegs the op-ex for WS

technologies to 10% of cellular technologies. Because it is a Wireless technology there are no issues with right-of-way or cost of digging, repair or replacement that would occur with Optical Fiber installation

From a sat-com policy perspective While we have mastered the art of Satellite launch, lot needs to be done on the ground system. Flying satellites while complex doesn't serve the purpose unless backed by good grond communication systems. Currently, most of the products are imported and adequate funds are not provided to build import substitutes.

Section G :

While there is tons of research of standard IoT networks, a new class of IoT networks called actuator based IoT needs attention. These use broadcast spectrum to wakeup or actuate thousands if not millions of devices for a specific functionality. This saves power and are cheaper to implement.

These networks need regulations and policies for the 600Mhz spectrum with a higher power TV type transmitter architecture

Section I:

For India to become a net exporter of telecom products it isn't sufficient just to manufacture in India. The telecom supply chain is global and manufacturing in India doesn't get us the maximum bang for the buck. A case in point is getting Apple to manufacture in India. It is hardly productive and only about 2-5% of the value remains in the country. On the contrary IPR business can generate local supply chains and create more value. There are no policies or systems in India to help such companies.

There is no culture of strategic thinking and IPR generation in the country to the extent that systems and people are downright hostile to building a tech industry. As an example the telecom policy of 1999 resulted in unprecedented use of the mobile phones (and indirectly paved way for indigenous e-commerce companies) , it did not address the important aspect of building a device ecosystem to the extent that not a single passive for a phone is designed or manufactured in India.

The process of definition of a broadcasting standard is instructive in this context. Usually the communications regulator (FCC in the US, OFCOM in UK) calls for proposals for defining based on the current technologies. Industry players like device manufacturers, research organizations get together formally. Even before this informally broadcast research organizations (BBC in the UK, ETRI in Korea, NERC in China, Fraunhoffer in Germany, Sinclair in the US) and device manufacturers (Samsung, LG, Philips, Qualcomm , Sony) invest in IPR build a portfolio of patents. The standard definition process then becomes a give and take between the patent holders. Once the standard is ratified the device manufacturers and in some case the broadcaster pay royalties to the patent holder. As an example BBC through its patent pool in DVB-T/T2 the European broadcasting standard has earned 100s of millions US$ if not billions. Once this process concludes organizations like ETSI, DVB appoint people who push the standards in India and other countries. This helps them earn royalties for their respective organizations countries.

It is instructive to note that China has defined its own broadcasting standard to side step the royalty issue and also help its local ecosystem.

The way forward here is to ensure that India builds organizations like ETRI or NERC which are essentially private but partly funded by the Government (in this case PB) and part by local technology giants. This organization then conducts applied research together with tech startups to build and define new standards. Once India defines its standard it will force players like Samsung and Sony to invest in local companies and build local ecosystems.

The other major issues affecting the startup ecosystem are

1. Lack of Capital and access to markets. The answer to this is to setup specific funds and even more importantly mandate local component purchases to provide market access to small technology companies. Hua Wei was built on government contracts until it achieved a critical mass.
2. Unfavorable taxation policies for indigenous manufacturing
3. Colonial mindset of the bureaucracy in Delhi. Everything European is good and Indian is low quality. Unless this changes the others points are moot.
4. Banishing the dreaded NC-NC and replacing it with the DARPA model of **ID-IQ** (Indefinite delivery, indefinite quantity) which is now in place for PSUs. This needs to be extended to innovative private companies

There should be a formal process laid down for conducting new technology trials. This can be done once every 6 months as doing it ad hoc might not be feasible. However the policy should allow for exceptions to conduct trials anytime based on the technology and its potential. The process should allow for budget and a separate team to provide deployment and logistics support. In case the technology is developed by indigenous startups , the trial should be paid for by PB. In case of foreign or large private players it can be a NC-NC trial.