



**By Email
Without Prejudice**

To,

Shri Sunil Kumar Singhal,
Advisor (Broadband & Policy Analysis),
Telecom Regulatory Authority of India

Email: jams@traigov.in ,
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Dated October 19, 2020

IFF/2020/167

Dear sir,

Re: Comments towards TRAI's Consultation Paper on Roadmap to Promote Broadband Connectivity and Enhanced Broadband Speed.

1. Internet Freedom Foundation ("IFF") is a registered charitable trust which advocates for people's rights over the internet across public institutions and the private sector. IFF's origins stem from the SaveTheInternet.in movement which enabled more than a million Indians to advocate that net neutrality be recognised as a core tenet of the public internet.
2. We laud TRAI's efforts in trying to understand stakeholder concerns by onboarding comments to the paper on promoting broadband connectivity and enhancing broadband speed. IFF has been working on this issue consistently in the past by communicating our concerns about broadband connectivity issues being faced by the people in Andaman & Nicobar Islands and Odisha. For this, we have reached out to various Central and State level government authorities and we were elated to see our efforts take fruit when the Hon'ble Prime Minister inaugurated the Chennai and Andaman & Nicobar Islands (CANI) Submarine Cable Systems Project.
3. IFF acknowledges the fact that access to fast and affordable internet is not only one of the core issues of our times but also a fundamental right. This issue has become more vital during the ongoing pandemic which has forced people to stay inside their homes and has increased their dependence on the internet for access to education, government schemes and basic necessities.



4. To achieve this, we need to ensure that broadband infrastructure caters not only to needs based on connectivity and geography but also serves to alleviate sections of the society who have traditionally not been able to enjoy the benefits of access to the internet. Focused efforts need to be made by the Authority to ensure that special measures are taken to account for social conditions which have acted as a deterrent to access such as gender, caste or economic status.
5. In our submissions, we highlight the lacuna that exists in the current framing of the definition of the term “broadband” and suggest necessary changes to ensure that it covers all of “Bharat”. Revision of the current definition is needed acutely and moving forward a process of constant revision should be put in place to ensure that the definition keeps pace with developments across the world.
6. We also highlight the need to ensure that not only policy but also the accompanying infrastructure is developed in a way that constant updation is made possible. The Authority needs to envisage a way in which the development of infrastructure is done keeping in mind a public and private sector partnership. Therefore, we submit that the government adopts the “Dig Smart” approach for broadband infrastructure creation and highlight the multiple possibilities for cross-sector infrastructure development and sharing.

In this context, please see below are substantive recommendations that are separately attached to this covering letter.

We remain at your disposal should you wish to discuss the matter any further.

Kind Regards

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Consultation Paper on Roadmap to Promote Broadband Connectivity and Enhanced Broadband Speed

Q.1: Should the existing definition of broadband be reviewed? If yes, then what should be the alternate approach to define broadband? Should the definition of broadband be:

a. Common or separate for fixed and mobile broadband?

b. Dependent or independent of speed and/or technology?

c. Based on download as well as upload threshold speed, or threshold download speed alone is sufficient?

d. Based on actual speed delivered, or on capability of the underlying medium and technology to deliver the defined threshold speed, as is being done presently?

Kindly suggest the complete text for revised definition of the broadband along with the threshold download and upload speeds, if required for defining broadband. Kindly provide the reasons and justifications for the same.

Answer: Yes, the existing definition of broadband needs to be reviewed and updated in order to provide it with more nuance.

- **Download and upload:** Presently, the definition of broadband talks only about download speed which leaves much to be desired in terms of setting adequate standards which would help India achieve the goals of the NDCP-2018. India has a large digital economy which relies on synchronous digital communication. Upload speeds are vital to economic growth, cultural production and IOT devices. We have noticed that ISPs restrict and throttle upload speeds which impedes innovation and growth. To account for a fuller, complete advancement of the rights of users our recommendations is for broadband speeds to be a definition inclusive of upload speeds as well. Additionally, the definition should include download as well as upload speed to correspond to the dynamic use of the internet in the present scenario wherein the internet is used not only to consume information (download) but also to connect with peers and share information (upload).
- **Common definition:** Broadband needs to be defined commonly for mobile and fixed networks while ensuring a certain minimum threshold requirement is met. This minimum threshold requirement should be revised regularly to ensure that ISPs and TSPs have continuous motivation to update their networks. This is necessary for India to ensure that the country has speeds comparable to other countries. This is also necessary to ensure that people who do not have access to technology other than a mobile phone do not suffer from low speeds and bad networks.
- **Network measurement:** Finally, the definition should be based on actual speed delivered instead of on capability as it would better help ascertain the reality of the network situation in the country and would also help in determining the gaps which need to be fulfilled to ensure that the actual speed matches the capability of the underlying technology.

Q.2: If you believe that the existing definition of broadband should not be reviewed, then also justify your comments.

Answer: Not applicable.

Q.3: Depending on the speed, is there a need to define different categories of broadband? If yes, then kindly suggest the categories along with the reasons and justifications for the same. If no, then also justify your comments.

Answer: TRAI may consider introduction of speed tiers which allow categorisation of different areas on the basis of broadband speed that may help form a level of standardisation across service providers:

- Normal - 512 KBp/s to 2 MBp/s download speed , 256 KBp/s to 1 MBp/s upload speed
- Good - 2 MBp/s to 20 MBp/s download speed , 1 MBp/s to 10 MBp/s upload speed
- Fast - 20 MBp/s to 50 MBp/s download speed , 10 MBp/s to 25 MBp/s upload speed
- Superfast - 50 MBp/s download speed and above, 25 MBp/s upload speed and above.

Thus, “broadband” can be defined as: “Broadband is a data connection that is able to support interactive services including Internet access and has the capability of providing download and upload speeds which fall into one of the four categories mentioned herein to an individual subscriber from the point of presence (POP) of the service provider intending to provide Broadband service. The four categories of broadband speed are:

- Normal - 512 KBp/s to 2 MBp/s download speed , 256 KBp/s to 1 MBp/s upload speed
- Good - 2 MBp/s to 20 MBp/s download speed , 1 MBp/s to 10 MBp/s upload speed
- Fast - 20 MBp/s to 50 MBp/s download speed , 10 MBp/s to 25 MBp/s upload speed
- Superfast - 50 MBp/s download speed and above, 25 MBp/s upload speed and above.

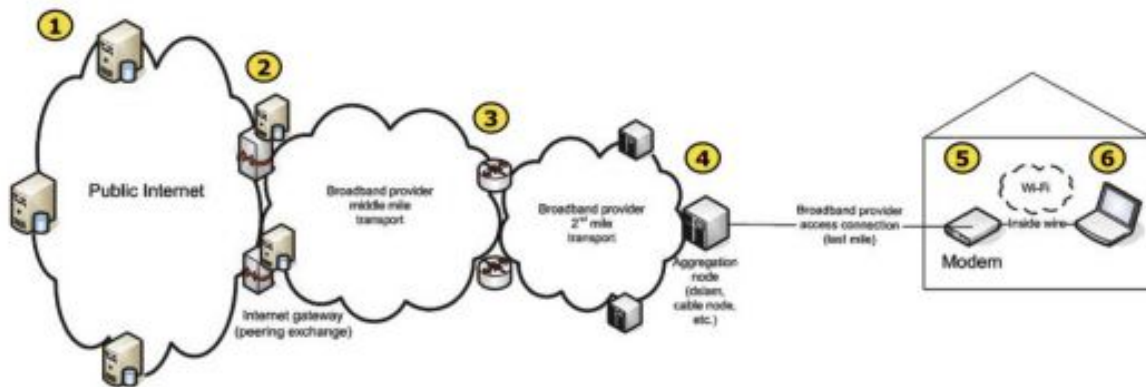
Q.4: Is there a need to introduce the speed measurement program in the country? If yes, please elaborate the methodology to be implemented for measuring the speed of a customer’s broadband connection. Please reply with respect to fixed line and mobile broadband separately.

Answer: Yes, there is a need to introduce a speed measurement program to ensure fair and equal access for all. For measuring the broadband speed, there can be two approaches; hardware and software each with their own advantages and disadvantages.

Software approaches are by far the most common and allow a very large sample to be reached relatively easily and are relatively cheap. A few of the drawbacks with the software approach are:

- Multiple machines on the same network are not accounted for.
- The software might skew measurements depending the quality and build of the machine it’s running on
- Moving the computer/laptop near/away from the router can affect performance
- The test can only run when the computer is on, hence might bias the results

In contrast, hardware approaches are expensive and logistically challenging because they involve placing a device inside the user's home which is physically connected to the consumer's internet. The methodology to be used should not collect any data that might be deemed personal to the consumer without their consent. As illustrated below¹, many factors contribute to end-to-end consumer broadband performance.



DEFINITIONS

- 1 **Public Internet content:** public Internet content that is hosted by multiple service providers, content providers and other entities in a geographically diverse (worldwide) manner
- 2 **Internet gateway:** closest peering point between broadband provider and public Internet for a given consumer connection
- 3 **Link between 2nd mile and middle mile:** broadband provider managed interconnection between middle and last mile
- 4 **Aggregation node:** First aggregation point for broadband provider (e.g. DSLAM, cable node, satellite, etc.)
- 5 **Modem:** Customer premise equipment (CPE) typically managed by a broadband provider as the last connection point to the managed network (e.g. DSL modem, cable modem, satellite modem, optical networking terminal (ONT), etc.)
- 6 **Consumer device:** consumer device connected to modem through internal wire or Wi-Fi (home networking), including hardware and software used to access the Internet and process content (customer-managed)

Not all elements of broadband performance are under the control of the consumer's ISP, and there are factors that affect a consumer's broadband experience that cannot be measured. For hardware based approaches, a device that acts as a bridge between the modem and the consumer machine can be installed to take periodic snapshots of the data profile. For the software approach, consumers can be prompted to take speed tests regularly, or a less common approach would be to execute these tests remotely.

Q.5: Whether the Indian Telegraph Right of Way (RoW) Rules 2016 have enabled grant of RoW permissions in time at reasonable prices in a non-discriminatory manner? If not, then please suggest further changes required in the Rules to make them more effective.

Answer: No comments

¹ Shaping Europe's digital future - European Commission, 'Quality of Broadband Services in the EU' (March 2012)

<https://ec.europa.eu/digital-single-market/en/news/quality-broadband-services-eu-march-2012>

Q.6: Is there any alternate way to address the issues relating to RoW? If yes, kindly elucidate.

Answer: No comments

Q.7: Whether all the appropriate authorities, as defined under the Rules, have reviewed their own procedures and align them with the Rules? If no, then kindly provide the details of such appropriate authorities.

Answer: No comments

Q.8: Whether the RoW disputes under the Rules are getting resolved objectively and in a time-bound manner? If not, then kindly suggest further changes required in the Rules to make them more effective.

Answer: No comments

Q.9: What could be the most appropriate collaborative institutional mechanism between Centre, States, and Local Bodies for common Rights of Way, standardisation of costs and timelines, and removal of barriers to approvals? Justify your comments with reasoning.

Answer: No comments

Q.10: Should this be a standing coordination-committee at Licensed Service Area (LSA) level to address the common issues relating to RoW permissions? If yes, then what should be the composition and terms of reference of this committee? Justify your comments with reasons.

Answer: According to reports, the issue to be resolved is not with ROW Rules but with the State Governments lack of implementation of the rules. As pointed out by the Towers and Infrastructure Providers Association (TAIPA), only 16 out of the 37 states/union territories in India have so far aligned with the Right of Way (RoW) rules, 2016.² It is our recommendation that State-level institutional mechanisms be put in place to ensure that States align with the Rules in a satisfactory manner. These state-level institutions should consist of the State-level representative from each appropriate authority as defined in the Rules and the telegraph authority.

Q.11: Is there a need to develop common ducts along the roads and streets for laying OFC? If yes, then justify your comments.

Answer: Yes, there is a need to develop common ducts along roads for laying OFC as it can provide nearly unlimited bandwidth potential. If the Government wants to implement its Fibre First Initiative, there

² Rajesh Kurup, 'India needs another 1 lakh telecom towers immediately: TAIPA' (July 8, 2020) <https://www.thehindubusinessline.com/info-tech/india-needs-another-1-lakh-telecom-towers-immediately-taipa/article32023504.ece>

is a need to incentivise the development of corresponding infrastructure especially owing to the fact that a barrier to adoption of OFC is the high infrastructure costs it entails. The high infrastructure costs are also a result of a failure to adopt the Right of Way Rules across the country.

Q.12: How the development of common ducts infrastructure by private sector entities for laying OFC can be encouraged? Justify your comments with reasoning.

Answer: Development of common duct infrastructure by private entities can be encouraged by ensuring that States adopt and implement the ROW Rules swiftly. Adoption and implementation of the Rules in a non-discriminatory manner would incentivize private entities to invest in the development of common duct infrastructure.

To further incentivize the private entities, they should be treated as a first preference by the State-level institutional mechanism suggested above if they wish to utilize the infrastructure as a service provider. Additionally, the Government should roll out a tiered subsidy plan for private entities to encourage them to invest in the development of common duct infrastructure in commercially non-viable areas.

Q.13: Is there a need to specify a particular model for development of common ducts infrastructure or it should be left to the landowning agencies? Should exclusive rights for the construction of common ducts be considered? Justify your comments with reasoning.

Answer: Yes, a particular model for development of common ducts infrastructure needs to be specified to ensure that uniform infrastructure which adheres to a minimum pre-specified quality level is adopted all over the country. This would help in ensuring that costs of development are similar throughout the country and would also lead to higher transparency and accountability in situations where costs are higher as reasons for high costs would have to be justified.

Q.14: How to ensure that while compensating the land-owning agencies optimally for RoW permissions, the duct implementing agency does not take advantage of the exclusivity? Justify your comments with reasoning.

Answer: No comments.

Q.15: What could be the cross-sector infrastructure development and sharing possibilities in India? Justify your comments with examples.

Answer: In India, there are multiple possibilities for cross-sector infrastructure development and sharing. One of the major benefits of cross-sector infrastructure development and sharing is that it reduces redundancy thereby optimizing the cost of network expansion by spreading it across the multiple participants.³ These participants include connectivity service providers (telecom network operators),

³ Davide Strusani and Georges V. Hounghonon, 'Accelerating Digital Connectivity Through Infrastructure Sharing' (February, 2020)

digital infrastructure providers (tower companies and wholesale fixed broadband companies), and IT infrastructure users in the wider economy (businesses, in the case of data centers). Reliance on existing railway lines, power transmission grids, and pipelines, or by coordinating with road construction can also be one way through which cost optimization can be achieved.

Q.16: Whether voluntary joint trenching or coordinated trenching is feasible in India? If yes, is any policy or regulatory support required for reaping the benefits of voluntary joint trenching and coordinated trenching? Please provide the complete details.

Answer: Neither voluntary trenching nor coordinated trenching is feasible in India. This is because while both these policies encourage more efficient excavations (and additional deployment of broadband network infrastructure) they do not guarantee it. The disadvantage of the voluntary joint trenching approach to Dig Once is that it is dependent on a broadband provider “volunteering” to jointly trench. If a broadband provider does not volunteer or fails to do so for any reason, this approach would delay the trenching itself. Additionally, if a provider does not exist in the area being trenched, then trenching would never commence. These drawbacks are also present in the coordinated trenching approach.

Instead we recommend the “Dig Smart” approach being recommended by the Fiber To The Home (FTTH) Council in the United States of America in their paper titled ‘[FTTH Council Dig Smart: Best Practices for Cities and States Adopting Dig Once Policies](#)’. The Dig Smart policy entails the “governments installing conduit whenever there is underground construction in the public right of way -- whether that construction is for installing new utility equipment, repairs, or road work. The government then has the opportunity to lease that conduit to broadband providers that are interested in deploying fiber networks to the community. This approach benefits the community by facilitating broadband entry and by giving the government an ongoing revenue source. In fact, as (they) will show, these revenues can more than make up for the initial capital expense. While some governments may be hesitant to pay for conduit themselves because of its short-term budget impact, they can recoup that investment over time while also creating significant benefits from the community.”

Q.17: Is it advisable to lay ducts for OFC networks from coordination, commercial agreement, and maintenance point of view along with any other utility networks being constructed?

Answer: No comments.

Q.18: What kind of policy or regulatory support is required to facilitate cross-sector infrastructure sharing? If yes, kindly provide the necessary details.

Answer: No comments.

Q.19: In what other ways the existing assets of the broadcasting and power sector could be leveraged to improve connectivity, affordability, and sustainability.

<https://www.ifc.org/wps/wcm/connect/2d3c4eff-12a8-4b0b-b55d-9113a950ed33/EMCompass-Note-79-Digital-Infrastructure-Sharing.pdf?MOD=AJPERES&CVID=n2dwWtn>

Answer: No comments.

Q 20. For efficient market operations, is there a need for an emarketplace supported by GIS platform for sharing, leasing, and trading of Duct space, Dark Fibre, and Mobile Towers? If yes, then who should establish, operate, and maintain the same? Also, provide the details of suitable business model for establishment, operations, and maintenance of the same. If no, then provide the alternate solution for making passive infrastructure market efficient.

Answer: Yes, there is a need for an e-marketplace for passive infrastructure. This e-marketplace can be developed by TRAI with the help of the National Informatics Centre (NIC).

Q.21: Even though mobile broadband services are easily available and accessible, what could be the probable reasons that approximately 40% of total mobile subscribers do not access data services? Kindly suggest the policy and regulatory measures, which could facilitate increase in mobile broadband penetration.

Q.22: Even though fixed broadband services are more reliable and capable of delivering higher speeds, why its subscription rate is so poor in India?

Q.23: What could be the factors attributable to the slower growth of FTTH subscribers in India? What policy measures should be taken to improve availability and affordability of fixed broadband services? Justify your comments.

Answer: The Centre for Communication and Development Studies (CCDS) released a study⁴ on Digital Exclusion in 2015, which worked on identifying the barriers to internet access. Fixed broadband access requires access to a laptop or computer which is still not a reality for most Indians, hence the lower subscription rates even though the rates are reliable. It also needs to be realised that internet access through the mobile phone is at present used primarily for social networking, messaging and entertainment. Access for educational purposes, submission of online forms, commercial online services etc requires better networks, speeds and data storage. 3G connections cannot be afforded by everyone. Qualitative interviews and field observations from the report also reveal that there is also a gender divide in access to the internet. The study reached to the conclusion that it is the men in the household who acquire smartphones, while women are handed down the older basic phones which do not allow data access, or feature phones which allow only limited internet applications. To facilitate increasing mobile broadband penetration more awareness and education around the internet is needed. English is also the de-facto language of the internet, so it needs to be ensured that English is taught to all citizens starting from the very beginning.

⁴ Srivastava A, Shinde S, Doctor H, and Kavadi S N, 'Towards Digital Inclusion: Barriers to Internet Access for Economically- and Socially-Excluded Urban Communities', Pune: Centre for Communication and Development Studies (2015)

Allowing multiple vendors to provide multiple options that can suit different consumers, regulating the prices that vendors can charge, ensuring that vendors provide a baseline broadband speed to consumers are some policy measures that can be taken.

Q.24: What is holding back Local Cable Operators (LCOs) from providing broadband services? Please suggest the policy and regulatory measures that could facilitate use of existing HFC networks for delivery of fixed broadband services.

Answer: An MSO or an LCO (local cable operator) has to apply for a license to provide broadband services over cable or fibre. There are various categories of service authorisation-wise requirements and fees, which are expensive and not insignificant. Though these license fees may not appear too high as compared to telco licence fees, they are still too prohibitive for cable operators who are small entrepreneurs, used to working with low capex and opex with low returns. Creating entry barriers viz. compulsory high license fees to provide an essential service is perhaps counter-productive.

Government needs to actively promote the concept of enabling broadband over cable by conducting nationwide awareness and skill development programmes amongst LCOs and also actively promote wi-fi and other services on cable that will enhance operator revenues and additional bouquet of new services to consumers at a cost effective price and also increase government's revenues.

Q.25: When many developing countries are using FWA technology for provisioning of fixed broadband, why this technology has not become popular in India? Please suggest the policy and regulatory measures that could facilitate the use of FWA technology for delivery of fixed broadband services in India.

Answer: While FWA technologies like LTE/WiMAX don't require extensive wired networks and expensive infrastructure investment, there are problems with both technologies with respect to 3G/4G networks. FWA based on WiMAX demands a completely new overlay infrastructure and expensive proprietary equipment. FWA based on 4G/LTE technology however is spectrally inefficient, expensive to deploy, and unable to provide the speeds needed to compete with wired broadband connections.

However, with 5G spectrum, FWA uses 3GPP architectures and common mobile components to deliver ultra-high-speed broadband services. 5G FWA can provide a competitive alternative to fixed-line DSL, Cable, and fiber across all markets.

However, there are still some caveats with FWA access.

- Radio transmission in the mm-Wave band is not only lossy, it can also be perturbed because of environmental changes. If this is taken into account, the service providers need to use components that employ small cell sizes, which increase the cost of deploying FWA. MIMO technologies can also alleviate these concerns to some extent; but again the technology is complex and expensive.



- Because of propagation losses in the mm-Wave band, stronger radiations of radio waves are needed to get an acceptable speed. New technologies are needed for ensuring adequate safety from RF exposure.
- Zoning restrictions need to be relaxed to install radio units, by both state and local regulatory bodies. Vendors, service providers, hardware manufacturers have to adopt a single 5G standard so that standardization can ensure that an ecosystem of multiple vendors exist and a healthy competition amongst the vendors can enable better consumer experience.

Q.26: What could be the probable reasons for slower fixed broadband speeds, which largely depend upon the core networks only? Is it due to the core network design and capacity? Please provide the complete details.

Answer: No comments

Q.27: Is there a need of any policy or regulatory intervention by way of mandating certain checks relating to contention ratio, latency, and bandwidth utilisation in the core network? If yes, please suggest the details. If no, then specify the reasons and other ways to increase the performance of the core networks.

Answer: No comments

Q.28: Should it be mandated for TSPs and ISPs to declare actual contention ratio, latency, and bandwidth utilisation achieved in their core networks during the previous month to their customers while communicating with them or offering tariff plans? If no, state the reasons.

Answer: The government should also mandate TSP and ISPs to not only declare actual contention ratio, latency, and bandwidth utilisation, but also mandate these to be clearly advertised so consumers can make decisions with full transparency.

Q.29: What could be the probable reasons for slower mobile broadband speeds in India, especially when the underlying technology and equipment being used for mobile networks are similar across the world? Is it due to the RAN design and capacity? Please provide the complete details.

Answer: Spectrum allocation is one of the important reasons for poor mobile broadband speeds in India. The spectrum per operator in India is low compared to other countries - which means, low spectrum per subscriber which translates into slow 4G network speeds. Mobile companies here need support from the government, as they are the ones who control the spectrum. The current infrastructure is also not equipped to handle the growing number of users, of both fixed and mobile broadband. Ensuring that spectrum owners can invest in scaling up infrastructure to provide fast broadband speeds, along with increasing the spectrum available is necessary.

Q.30: Is there a need of any policy or regulatory intervention by way of mandating certain checks relating to RAN user plane congestion? What should be such checks? If yes, then suggest the details, including the parameters and their values. If no, then specify the reasons and other ways to increase performance of RANs.

Answer: Yes there is a need for policy and regulatory intervention to mandate checks related to RAN user plane congestion.

The RCAF is a functional element which reports RAN User Plane Congestion Information (RUCI) via the Np interface to the PCRF to enable the PCRF to take the RAN user plane congestion status into account for policy decisions. RUCI includes the following information:

- The user id (e.g. IMSI) identifying the UE impacted by congestion;
- PDN ID for which congestion information is reported;
- Congestion level information (either congestion level value or congestion level set id) of the UE impacted by congestion;
- eNodeB identifier, ECGI or SAI identifying the eNodeB, E-UTRAN cell or Service Area respectively, serving the UE if a conditional restriction to restrict location reporting is not enabled.

Q.31: Should it be mandated to TSPs to declare actual congestion, average across the LSA, recorded during the previous month over the air interface (e.g., LTE Uu), in the radio nodes (e.g., eNB) and/or over the backhaul interfaces between RAN and CN (e.g., S1-u), while reaching out to or enrolling a new customer? If so, then suggest some parameters which can objectively determine such congestions. If no, then specify the reasons and other ways to increase performance of the RAN.

Answer: Mandating TSPs to declare actual congestion also enables consumers to make transparent decisions and ensures a fair market where consumer right are protected since they can make better decisions armed with more data.

Q.32: Is there a need of any policy or regulatory intervention by way of mandating certain checks relating to consumer devices? If yes, then please suggest such checks. If no, then please state the reasons.

Answer: There is a need for policy/regulatory interventions for consumer devices. Policy checks ensure that malware cannot be put on devices, or that ISPs cannot spy or sell data of their consumers without their consent.

Q.33: To improve the consumer experience, should minimum standards for consumer devices available in the open market be specified? Will any such policy or regulatory intervention have potential of affecting affordability or accessibility or both for consumers? Please justify your comments.

Answer: The minimum standards should specify that all broadband peripherals are secure by default, and can have different gradings on how they support broadband. The policy can have affordability concerns as the products can then be advertised with better support for broadband but the policy should take this into account and ensure a minimum standard for all devices that support broadband.