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There is little doubt that higher and more reliable broadband connectivity brings about a disproportionate benefit to consumers and the economy. This is even more significant, given the increased dependence on broadband connectivity for users during the COVID19 pandemic.

At this point in time, the goals of the regulator should be to create an enabling environment for ISPs and telecom operators to:

1. Improve quality of service of broadband connectivity
2. Improve speed of connectivity.

Before we share our counter comments and recommendations, we'd like to remind the regulator of the country's failures to meet certain key targets:

- The Indian government had set a target of 20 million wireline broadband connections by 2010. It failed to meet this target. As per the TRAI's own reports, the number of wired broadband connections is still only around the 20 million mark (19.82 as of June 2020, and 20.13 as of July 2020).¹
- In 2007, speaking at the India Digital Summit, the then telecom minister Dayanidhi Maran² had mentioned plans to change the definition of broadband to a minimum of 2mbps, from 256kbps. Six years later, India reclassified broadband as 512kbps³.

Firstly, we will share our counter comments on submissions made so far, and then provide our overall comments on the consultation.

Counter comments

Argument: There is no need to redefine broadband from 512Kbps. Broadband should be defined by its ability to deliver key services like video-conferencing instead.

¹ Highlights of Telecom Subscription Data as on 31st July, 2020

https://traf.gov.in/sites/default/files/PR_No.84of2020_0.pdf

²

<http://paidcontent.org/2007/01/27/digital-summit-interconnection-provocation-bandwidth-and-ecommerce-certific/>

³ India Reclassifies Broadband As 512kbps

<https://www.medianama.com/2013/12/223-india-reclassifies-broadband-as-512kbps-6-yrs-after-dayanidhi-maran-wanted-2mbps/>

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Our Response: Resisting a redefinition of broadband at a time when all providers are mostly able to provide speeds far in excess of this even on mobile networks should not be taken seriously. The authority must move to redefine broadband as having speeds far in excess of the current definition.

As TSPs and ISPs themselves have noted, the market has far outpaced the 512Kbps definition. Now, the redefinition must be put in place to protect consumers from FUPs and CUPs that render productivity impractical if not impossible. As ILL bandwidth gets cheaper and more and more content is delivered through peering arrangements and caching, we see no reason to refrain from moving to protect consumer interests by hiking the minimum speed of broadband.

Additionally, we disagree strongly with Airtel's comment that 512Kbps suffices for video-conferencing. Calls on Zoom, for instance, take up anywhere between 1–3Mbps in bandwidth with heavy compression. And that heavy compression is partly enabled by residential ISPs who continue to provide the bare minimum speeds required by law for end users. The European Union's broadband strategy envisions 100Mbps in more than 50% of households by 2020.⁴ We believe that a similar goal is attainable here, but Airtel's argument that 0.5% of that speed should satisfy the regulator and consumer requirements is unacceptable.

It is additionally disingenuous to imply that a speed-based definition precludes quality of service from being important in broadband. Quality of service regulations like Net Neutrality license conditions are in place already to assure users that their broadband is being served to them in the best possible way.

We also disagree with the submission that the definition should be as low as 2Mbps to accommodate ADSL connections. Changing the marketing around such connections is all that is required to keep them in the clear, and redefining broadband does not prevent them from continuing to provide their services, and in fact incentivises them to upgrade their technology.

Argument: There is no need for a speed test measurement program.

Our Response: Measuring speed between an end user and nearby infrastructure hosted by ISPs and TSPs themselves is not much of a technical challenge, and is something that is already facilitated by private services like Ookla. However, comprehensive speed tests across a variety of internet services is essential.

The forthcoming Net Neutrality committee should, in coordination with TRAI, survey differences between the above-mentioned speed between an ISP and its end user, and that of an end user and several third party services. While there are bound to be differences, such probes can

⁴ <https://ec.europa.eu/digital-single-market/en/broadband-strategy-policy>

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unveil systemic routing issues, and assist service providers in resolving them expeditiously. Broadband access needs to reach all endpoints of the public internet reasonably well, and this is a principle that needs to be upheld in efforts to measure internet speeds.

As such, a speed test measurement programme is very much needed, but it needs to go further than checking local access speeds, which is something the market is already capable of doing.

Argument: Disclosure of contention ratios should not be required, and there should be no cap on contention ratios.

Our Response: Contention ratios are a critical bottleneck for internet access. As residential data use per customer rises rapidly, especially on the back of work-from-home and the COVID-19 pandemic-related lockdowns, ISPs seeking to cut costs by sharing bandwidth across too many subscribers risk posing significant service quality issues, especially during peak hours or times during which heavy use of one or more users hampers access for others.

This issue is very easily resolvable by capping contention ratios at a reasonable level, and requiring ISPs to disclose this to TRAI as a part of statutory tariff disclosures. There should be no objection in sharing contention ratios in terms and conditions shared with end users, as it is not complicated information, and might actually help residential users needing more reliable connectivity to choose between highly similar providers.

Argument: Declaring congestion should not be required due to challenges in delivering fast speeds in certain areas due to a high number of users and spectrum limitations.

Our Response: Declaring congestion does not invalidate the paucity of spectrum or the features of the Indian telecom market. Doing so can in fact lead to better decision making from the government, since telecom policies will be more well informed about reliability and QoS issues when setting reserve prices for spectrum or making decisions on delicensing of spectrum bands. It is also pertinent to note that for individual consumers, there is value in knowing geographic congestion information in an easy-to-access format.

Telecom coverage maps have been around for a long time from both third party companies like Opensignal and telcos like Airtel. It is a trivial task for telcos to build on this experience and provide congestion statistics. Doing so may actually better direct the resources of the regulator in identifying QoS issues. As such, we see no legitimate reason to oppose the disclosure of congestion at a granular level. This data is likely already collected by telecom operators for internal purposes, and their disclosure appears to have no adverse consequences; the only possible impact is that customers will reward telcos that work to decongest their networks as much as possible, and demand better service from those who don't. This is a desirable outcome for a competitive telecom market.

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Argument: Handsets and consumer electronics should be regulated similarly to telecom networks.

Our Response: This is an argument frequently deployed by TSPs in response to concerns around quality of service and Net Neutrality. Consumer electronics do not hold spectrum, and are not gatekeepers to the internet — TSPs are. The consumer electronics industry is not dominated by a small number of players — the telecom market is. Consumer electronics are highly competitive with hundreds of manufacturers — the number of large telecom operators in many countries, including India, can be counted on one hand.

Electronics are already regulated for safety, and competition is enough to dissuade the proliferation of devices that frequently encounter internet access issues.

Comments on consultation

Our recommendations, based on questions put forward by the TRAI:

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?

Please 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:

1. **The definition of broadband should be the same across fixed and mobile broadband, and independent of technology in use.** Differential definitions of broadband will cause unnecessary confusion among consumers.
2. **Broadband should be defined as symmetrical speeds of at least 10Mbps,** even though quality of service may differ depending on whether it is wireline or wireless broadband connectivity.

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- 3. The current standard of 512Kbps is harmful to broadband access**, as it encourages “fair usage” plans where user speeds are reduced to 512Kbps after consuming a certain amount of data. This lets ISPs have a practical data cap (which is technically prohibited for broadband) as even non-video content online evolves to require more bandwidth to function normally. Increasing the baseline definition of broadband to at least 10mbps will ensure that ISPs offer a minimum speed of 10mbps to consumers, irrespective of data consumption. As internet leased line (ILL) costs go down, there is no reason to let ISPs advertise plans where speeds can dip below 25Mbps after a certain level of usage as “broadband”. ISPs have been observed to over-price plans with restrictive data limits. As shown by wireline ISPs’ immediate reaction to JioFiber’s 3.3TB data caps⁵ with equivalent offers of their own⁶ At previous prices, **more than enough capacity exists at current prices to conform plans to even a 25Mbps definition of broadband.**

As for ISPs in markets with low fixed line penetration, their provision of high speed internet services will rely on a mix of low cost factors such as internet exchange membership, modern infrastructure like GPON/fibre whose price has reduced in recent years, and reduced ILL tariffs for backhaul. As such, there should be no hesitation in requiring 10Mbps — even after high-speed data allowances are exhausted — for incumbent as well as small wireline ISPs.

In addition, the TRAI may consider imposing a contention ratio on low speed wireline ISP connections, to ensure a minimum high quality broadband connections. The TRAI may impose a contention ratio of 1:1 for connection speeds that are below 10Mbps.

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

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.

ISPs may find it beneficial to sell low-latency connections for applications such as gaming and telesurgery. But when allowing for such market innovations, the authority must exercise scrutiny to ensure that regular internet users do not face congestion or related issues.

⁵ <https://www.medianama.com/2020/09/223-airtel-jio-data-caps/>

⁶

<https://www.mysmartprice.com/gear/jio-fiber-effect-act-fibernet-upgrades-broadband-plans-bengaluru-offer-speed-data/>

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For instance, low latency can be achieved with an all-fiber link to an ISP's Network Operating Centre, whereas other customers can be served through a last mile that uses copper instead — this allows ISPs to balance costs and user interests. Lower contention ratios may also be considered, though a ceiling on contention needs to be set by the Authority. Such due diligence to find out how such differentiations are made would be in line with the Authority's investigation into Vodafone Idea's Priority 4G and Bharti Airtel's Platinum 4G plans.

The categories themselves should be forborne by the Authority as long as basic broadband definitions and Net Neutrality principles are strictly followed.

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.

Third party research shows that India's wireless speeds are lagging even in South Asia⁷, in no small part due to the explosion in data traffic demand since 2016. With higher speeds in major urban centres, it is observed that tier-2 and -3 towns, along with rural areas, even with significantly high data demand, are being underserved and pulling down the average. As such, speed measurements focused on these geographies may be explored to encourage greater build-out of telecom infrastructure in these areas.

We reiterate our position in the counter comments section that speed measurement programs must do more than just determine local access speeds between an end user and the nearest ISP POP.

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.

While service providers would be better positioned to answer this issue, we would like to surface an anecdotal point in this regard. In cities, many territories are controlled by Local Cable Operators who restrict access to, or illegally disrupt, service providers who do not enter into agreements with them.⁸ As demand for fixed line broadband increases, it may become necessary to examine this issue from a law enforcement perspective, along with streamlined processes to harmonise the principles of the RoW rules with on-ground reality vis-à-vis state governments and local municipalities.

⁷ <https://www.speedtest.net/global-index/india#mobile>

⁸ <https://www.medianama.com/2020/06/223-excitel-ceo-vivek-raina-interview/>

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

Service providers would be better positioned to respond to this question. However, we urge the Authority to evaluate their suggestions while upholding competition and low barriers of entry for smaller ISPs.

Based on external inputs, we recommend that TRAI look into recommending to the Ministry of Roads, Transport and Highways that all refurbished and freshly built roads require telecom ducts, and that these ducts be available to operators at cost.

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

Yes. Ducts are essential to telecom resilience⁹, as they protect infrastructure from human interference and in many cases natural disasters. As reliance on OFC infrastructure is growing, it is already essential that the bulk of OFC, including in the last mile, be in ducts.

In fact, the feasibility of exploring using existing ducts built by service providers to lay other ISPs' OFC should also be explored. As OFC infrastructure tends to provide higher speeds at lower cable diameter, ducts can be a highly perceptive investment in the future of telecom and internet infrastructure, particularly 5G..

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

The recommendations of the Authority on common ducts inside buildings¹⁰ may be suitably scaled to cover roads as well. Existing ducts should also be prohibited from being used exclusively by a single operator, especially as space requirements are low, and are unlikely to be a motivating factor for refusing to open up duct space to other operators.

In a back reference cited above, the DoT indicated that it believes forbearance should be followed in terms of telecom infrastructure and sharing thereof. We disagree with this, as the rapid build-out of telecom infrastructure is far from reality, and it is something that market forces alone have not succeeded in realising. As such, the Authority needs to explore the possibility of a greater role in the oversight and perhaps operationalisation of government authorities in the

⁹ We believe the issue of telecom resilience is a major concern that is missing from the scope of this consultation paper. We have written on the issue here:
<https://www.medianama.com/2020/10/223-why-indian-telecom-networks-should-be-regulated-for-resilience/>

¹⁰ https://www.trai.gov.in/sites/default/files/Recommendation_20_01_2017.pdf and
https://traigov.in/sites/default/files/Recommendation_IBS_0932018.pdf

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facilitation (and not just regulation) of ducts and similar infrastructure on priority to service providers.

Q.13: Is there a need to specify 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.

A Dig Once policy¹¹ should be strongly recommended to municipalities and landowning agencies. This policy reduces subsequent costs of fiber installation for decades of demand, and contributes to telecom resilience. While above-ground deployment of infrastructure saves costs in the short term, it is vulnerable to damage and subject to frequent repair costs. Dig Once policies future-proof cabling for the foreseeable future, while also reducing costs and policy challenges for municipalities.

We reiterate our above recommendation that fresh and refurbished roads require telecom ducts. This requirement would be a strong acknowledgement of the integral infrastructural role of telecom networks.

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.

Fair and non-discriminatory Right of Way for telecom is in the interest of proliferation of broadband, and landowners' rights are impacted minimally if these are offered in conjunction with a dig-once policy. As such, the regulator should recommend a regime that puts the right to connectivity above all other considerations.

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

Broadband pass-through levels for broadcast cable operators such as Den and Hathway are already encouraging, with millions of households ready to receive internet from the same cable through which they receive their TV connections. The Authority should continue its work around digitisation of cable TV operators so that such pass-through rates improve and high-speed internet connectivity is more within reach for such operators as well as their customers.

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?

¹¹ <https://broadbandnow.com/report/dig-once-digital-divide/>

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While fixed broadband is indeed less expensive (on a per-GB basis), more reliable and capable of delivering higher speeds than mobile broadband, the associated costs are not comparable. For wireless broadband services, a smartphone performs the dual role of facilitating access and displaying content. For fixed broadband services, a WiFi router is usually required in addition to a device such as a personal computer or a smartphone. While internet-enabled devices are not as expensive they were before, they remain out of reach for the majority of the population.

Another factor to consider is that fixed line broadband is a feasible proposition only for households that have a fixed address. Seasonal migrants, onsite construction workers, and people in unstable housing conditions, even if equipped with WiFi-enabled smartphones, may not be able to afford fixed line broadband.

Additionally, initiatives like BharatNet, aimed at bringing affordable fiber connectivity to villages, have been plagued with delays. As such, households in rural areas can only access mobile data or legacy non-OFC internet connections, even if their financial and housing situation would otherwise allow for fixed line adoption.

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.

Policies should firmly flow from the fact that wireless broadband is primarily for mobility purposes. As such, FTTH adoption should be combined with the goal of making public WiFi hotspots available more widely. Such a policy stance enables the wider proliferation of WiFi hotspots, reaches users who may be left behind by fixed broadband strategies focusing on residential users, and may potentially relieve congestion on wireless networks.

As such, concerns that licensed operators and small providers have around taxation and regulation of WiFi hotspots must be urgently resolved, so that FTTH demand isn't constrained by scant residential demand.

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.

Based on anecdotal evidence cited above, we are of the belief that LCOs may want to collaborate with licensed providers on a physical infrastructure maintenance basis alone so as to benefit from growing broadband adoption without having to do more than lay and maintain cables, which is how they have always operated with cable TV. With neighbourhood monopolies

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and practices such as cutting fibre belonging to competitors, the LCO market is incentivised to operate like this.

Before framing policy and regulatory measures with regard to LCOs providing broadband services, it may be necessary to perform a fact-finding mission to examine the relationships that they have with ISPs like Airtel and Excitel, in order to see if any significant concerns around exclusivity, prohibitive commissions and other associated issues crop up.

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.

FWA relies on sufficient demand on a street, neighbourhood, and building level. With demand for fixed broadband being different in terms of speed and data allowances, as well as time at which such need surfaced in different residential neighbourhoods, the strategy of ISPs to install household-level routers — which are often paid for by the customer and cost less than an FWA setup — makes more sense.

Public WiFi hotspots that reach underserved residential areas are essential to promote, and regulatory and taxation hurdles in the way of these hotspots must be removed. In building hotspots in such places, FWA and similar technologies may be considered.

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.

It may not be entirely correct to assert that fixed broadband speeds are entirely reliant on core networks. Backhaul provided by tier-1 ISPs, for instance, may be insufficiently architected to transfer data from servers and CDNs that don't have a presence in India. Deficiencies in peering and caching for services that are in high demand may also contribute to low speeds. Another factor may be related to slow upgradation of incumbent ISPs' backbone to OFC, as is the case in many places for state-owned telecom operators.

In the case of deficient peering, it is incumbent on the Internet Service Provider to make arrangements so that customers don't face unreasonable quality of service issues on any part of the internet. To this end, slow or non-existent access to certain services must be considered a disruption under the Telecom Consumers Protection and Redressal of Grievances Regulations, 2007, so as to push ISPs to do more due diligence in making sure that their network is robust enough to handle requests for more than just the most popular services on the internet. The

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work of the forthcoming Net Neutrality committee to be constituted by the Department of Telecommunications may shed more light on the work that can be done in this area.

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.

Regulating for latency is still a slippery prospect since so much of India's internet traffic continues to originate from outside the country. As such, regulating this area when factors patently out of ISPs' control is involved may not be appropriate for the moment. However, as with the issue of speeds, the work of the Net Neutrality committee is likely to shed more light to inform regulatory and policy stances.

However, regulating ISPs' contention ratios needs to be seriously examined. With gigabit-level internet speeds now being advertised by residential ISPs at low prices, incentives are lined up for ISPs to have high contention ratios in areas where demand is *usually* low. This approach is problematic, as spikes from a small number of users may lead to connectivity issues for others, and lead ISPs to make traffic management decisions that may undermine QoS assurances made to heavy users.

In the wake of COVID-19 lockdowns where residential ISPs have had to often perform the role of enterprise-grade networks, it is necessary to examine contention ratios, and place a cap on them if deemed necessary from fact-finding missions.

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, while to their customers while communicating with them or offering tariff plans? If no, state the reasons.

Such information should be included on ISPs' and the Authority's website for customers to easily access. The Authority may also consider requiring ISPs to provide this information to prospective users via email (since this information changes dynamically month-on-month, it may not be practical to include it in brochures and printed marketing material). This allows consumers to make more informed decisions when picking between fixed broadband providers, and also provides ISPs themselves with diagnostic insights on areas where reliability complaints occur frequently.

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

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networks are similar across the world? Is it due to the RAN design and capacity? Please provide the complete details.

As mentioned above, wireless broadband needs to draw demand primarily from mobile users. However, as statistics published by the Authority clearly show, data connections are enormous, but only around 20 million fixed line subscribers exist. With low mobile data prices, it is clear that data demand is primarily from mobile networks. As this question notes, the technology is similar everywhere in the world. But everywhere else in the world, mobile broadband is not relied upon as heavily as it is in India. As such, congestion and lower speeds are to be expected.

Additionally, we note from external input that technological developments that have led to an improvement in spectral efficiency may not be completely tapped in India. In this regard, we endorse two recommendations: that e-v bands and TV whitespace be liberalised for greater wireless connectivity, and that spectrum sharing in underserved areas be explored as seriously as satellite backhaul.

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.

This is a quality of service issue that is best dealt with in a separate consultation.

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.

As above.

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.

No. Unlike telecom operators, the consumer electronics industry is not a small market with a limited number of providers. Additionally, consumer electronics manufacturers are not licensed telecommunications providers. Under such conditions, competitive devices need to provide reliable and robust internet access to be successful among consumers. Indications to the contrary usually come from telecom operators when defending themselves from network-related

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complaints and regulatory consultations around issues like Net Neutrality. This false equivalence must be resisted.

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.

For the reason stated above, no. With consumer electronics, safety is a more pressing concern, and compulsory registration rules framed by the Ministry of Electronics & Information Technology suffice as a solution.