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18th October 2020

To,

Shri Sunil Kumar Singhal,
Advisor, (Broadband & Policy Analysis)
TRAI. New Delhi

Sir,

Subject:- Comments on Consultation paper on Roadmap to Promote Broadband Connectivity and Enhanced Broadband Speed

We are a registered CAG of TRAI covering the state of Karnataka.

We are pleased to enclose our comments/suggestions on the above consultation paper.

Thanking you,
Yours Sincerely

GOPAL RATNAM V
Secretary
Consumer Care Society

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

ISSUES FOR CONSULTATION

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.

Yes. The existing definition of broadband has to be reviewed.

We outline our justification for the various factors and finally provide a possible definition of the broadband.

The definition for the broadband should be Separate for fixed and mobile broadband. With the various factors of technology, topography, man made environment and ambient conditions, the mobile broadband would be subjected to constraints and there is a need to have a Separate definition for Mobile broadband. It would be flexible to account for the variability in the quality of service provided.

The definition would be Dependent on Speed. Speed is easier to understand and communicate to consumer from all strata of the society especially in a country like India, than technology. Technology is complex and requires study to understand. It also changes rapidly, requiring frequent changes. Sometimes older technology can be enhanced to provide better service leading confusion.

The definition would include BOTH upload and download threshold speeds. With changing consumer needs this is necessary. There are a number of use situations which now call for good upload speeds, like education. With 5G in the near future there would a much wider need for threshold upload speeds and other parameters.

The definition should be on speed actually delivered, especially for fixed broadband. The underlying technology or indicative speeds lead to confusion and consumer dissatisfaction. In fact most of the complaints from the consumers have been on the issue of speed, as the speed indicated by Telcos in the marketing and sales materials are NOT experienced by consumers.

Based on the reasons listed above, we suggest the following definition for the broadband.

Fixed Broadband - It is a “Services enabling always on Internet access with a download speed of 256 Kbps and above and a upload speed of 144 Kbps and above at the consumer interface point or consumer device”

Mobile Broadband - It is a “Services enabling always on Internet access with a download speed of 256 Kbps and above and a upload speed of 144 Kbps and above at the consumer interface point or consumer device, with 85 % reliability”

Kindly note the reliability factor can be altered and also additional factors of latency and jitter be added if needed at a later date and for offering different class of broadband services.

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

Not applicable, as we believe the existing definition of broadband needs to modified.

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.

Yes. There should different categories of broadband as there are customer segments with different needs.

Today, people from across the different strata in the society use Broadband and its become an essential necessity like Roti, Kapda, Makan. However, the use of broadband is quite varied, with the number of hours of use and the type of usage. Hence it is necessary to define different categories of broadband so that persons with different usage and requirement can choose what is suitable for them.

With the market becoming more widespread, different segments of the market have different needs and hence there should different products (Broadband Categories).

We suggest categories based on speed, as these are easy to communicate and easy to understand by the consumer. However we also recommend matching the speed to the different usage so that consumers can easily choose the product (Broadband Category) which ideally satisfies their needs.

The speeds are for illustrative and explanatory purposes only.

Sl no.	Category of Broadband	Speed		Usage
		Download	Upload	
1	Basic	256 Kbps to 1	256 Kbps to 512	E-Mail, Browsing, Search

		Mbps	Kbps	
2	Regular	1 Mbps to 5 Mbps	512 Kbps to 1 Mbps	TV (SD and HD), Youtube, Video Calling
3	Fast	5 Mbps to 25 Mbps	1 Mbps to 10 Mbps	TV (Ultra HD), Basic Gaming
4	Super Fast	25 Mbps to 1 Gbps	10 Mbps to 500 Mbps	
5	Ultra Fast	Above 1 Gbps	Above 500 Mbps	

Further technologies forecast for future are not feasible and whatever technologies which provides for the above upload and download speed can be adopted by the service provider.

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.

Yes, there is a compelling and urgent need to introduce the speed measurement program in the country.

Consumers have been misled with false promises of speeds and also have suffered from lack of response from the service providers to their complaints of poor speeds. Further, the service provider have their own speed test applications which invariably leads to dispute on the speed measurement data.

One needs to explore the concept of crowd sourced performance measurements in Mobile broadband (MBB) networks. First, we analyse the performance using Ookla Speed-test, OpenSignal, RTR-Nettest (including upload, download, ping, signal strength) and investigate the download ‘data rate’. MONROE-Nettest, which takes into account the effects of measurement duration, number of TCP flows, and server location, further qualifies the measured downlink data rate. The key factors are: number of concurrent active subscribers, type of application being accessed - with heavier data applications (music streaming or video, HD or 4K).

The usual factors affecting speed in fixed broadband are the link between web server and the telecom network, availability of web server, website behavior etc.. Measurement Lab (M-lab). has developed a tool to measure the network’s throughput and latency, as well as other useful network measurements like DNS lookup latency (ms), TCP uplink and downlink throughput (Kbps/Mbps), and IPv4/IPv6 compatibility.

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.

No. There has been many shortcomings of the Indian Telegraph Right of Way (RoW) Rules 2016, as the result is has resulted in Time delays and Cost overruns. There has been complaints of discriminatory practices in the grant of permissions.

Shortcomings of RoW Rules 2016

Multiplicity of Policies:

Absence of Single Window Clearance:

Multiple Fees/Levies leading to Exorbitant charges

Non implementation of Notified Policies in some parts of the country

Non-availability of Government Land and Building:

Security of Telecom Infrastructure

Non-availability of Power:

Coercive action by State / Local authorities

Restriction on Location of towers in selected places like schools,etc

EMF Exposure Concerns:

Suggested changes on RoW Rules 2016

- Alignment of State Telecom Infrastructure Policy with RoW Rules 2016
- Comprehensive Policy covering Underground (Fiber) and Overground (Tower) Infrastructure both
- One-time Nominal Fee to cover only Administrative expenses
- Single-window Online Clearance in a time-bound manner (deemed approval)
- No restriction to be imposed on locations of mobile towers
- Availability of Government Land & Buildings for installation of Mobile towers
- Electricity connections to be provided on priority at industrial tariffs
- Strict penal norms in State Telecom Policies for security and safety of telecom infrastructure
- No coercive action without prior intimation to the affected party
- Grievance redressal mechanism by formation of STC/DTC
- Common Duct policy under Dig Once umbrella
- Bank Account details - District Wise for submitting the requisite permission charges.
- Annual Charges from Private land & buildings, in states like Nagaland and Tamil Nadu need to be waived.
- EMF certification for radiation compliance has to be given to proceed with the tower construction. Existing BSNL tower itself may be used instead of newer constructions.

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

In locations where erection of towers is not feasible it will be appropriate to plan for laying optical fibre. Vice versa should also hold good. Grant of RoW permissions has not been fair with a few companies. The policy fails to include tower companies such as Bharti Infratel, Indus Towers from seeking benefits under the rules as the policy stated that only a 'telecom service licensee' could avail the benefits. Therefore, the telecom regulator asked DoT to revisit RoW rules for the inclusion of tower companies (IP-1 license holders) under the ambit of the Right of Way Rules, since their exclusion could affect quality of services by not providing incentives to tower rollout in the country.

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.

In order to align with the new rules under the Indian Telegraph Act, local and state authorities have appointed nodal officers for implementing the rules and to improve coordination between companies and authorities. State government at its discretion have established a single electronic application process for all appropriate authorities under its control. Suggestions by responsible body such as National Digital Communications Policy (NDCP) to overhaul the current licensing regime, needs to be accepted.

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.

No. RoW disputes are NOT getting resolved in a time-bound manner. This is one of the major causes for delay in penetration of broadband and its operations.

Service providers or tower companies would have to pay a one-time fee of Rs 10,000 with its application, for meeting administrative expenses. Companies that lay fibre will have to pay Rs 1,000 per kilometre. For removing or altering a tower or underground fibre on the request of a local authority, companies would have to submit a plan within 30 days and bear the entire cost. A minimum of 90 days will be granted for the removal or change to be done.

In order to resolve disputes on right of way, the central government will have to designate officers with jurisdiction for referring a dispute, within 60 days. The rules are expected to help companies get land from state governments and local bodies within a stipulated time frame, as they set standard procedures for telecom companies and government authorities to follow.

For setting up fibre that is underground, the authority may seek a bank guarantee for an amount in lieu of expenses for restoration of damage, as security from the telecom companies. Local authority can forfeit the bank guarantee if it finds that a licensee has willfully violated terms and conditions.

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.

Yes. A collective body consisting representation from Centre, States, and Local Bodies for common Rights of Way, standardization of costs and timelines needs to be formed and this would reduce these barriers.

Under a single regulatory authority the appropriate collaborative institutional mechanism can be formed and under it regime a single window Online Clearance needs to be created. A one-time nominal but uniform fee to cover only administrative expenses needs to be collected. A checklist will help approve the RoW without hassles.

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.

Yes. There is a need for a standing coordination committee at LSA.

A standing coordination-committee at Licensed Service Area (LSA) level to address the common issues relating to RoW permissions should have representations from the National Highways Authority of India (NHAI), Railways as well as Forest & Wildlife departments and other Land owning entities. Disputes, if any, can then be resolved in a time-bound manner. The planned infrastructure can be rolled out with a single-window clearance and a single nominal fee. With no blame game involved, the common issues can be resolved.

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. There are valid and strong reasons for developing common ducts along the roads and streets for laying OFC. We elaborate them.

With micro-ducts laid in trenches there is no need for frequent RoW permissions, digging of roads. Availability of common duct would increase public safety. Additionally, decreased road re-construction will reduce traffic congestion as well as increase the infrastructure life spans, which are often diminished by frequent digging. When development of common ducts is coordinated with construction of new roads or other utility projects, there is substantial time and cost savings. For newer locality/ area developments in metropolitan cities like Bangalore, common ducts along the roads can be planned in advance. These broadband expansion plans for laying ducts can be based on survey and data gathered, with respect to

- Demand assessment for citizen/business/govt/ smart cities/ surveillance etc.
- Interaction with various TSP's to understand their requirements for cable laying
- Interaction with various stakeholders (like Municipal Corporation etc) to assess the present infrastructure of ducts/OFC available

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

Sharing of infrastructure by private service providers will lessen the cost burden. Bureaucracy prevalent in government can be avoided and by charging heavy penalties on the private parties for not keeping the deadline will hasten the duct laying project completion.

The following steps are necessary for the encouraging private sector entities,

- 1. The Government provide tax breaks and benefits for the investment in common ducts infrastructure.**
- 2. With the development of an e-platform for sharing, leasing of these resources, additional revenues are assured for the developers.**
- 3. The Government can mandate that the TSPs and ISPs commit to the private sector developer to the usage of the duct infrastructure for a specified period of time.**

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

Yes. There is a need to specify a particular model.

The justification for this suggestion are as follows,

- 1. A single model would ensure uniformity and hence clarity across the country, which will reduce time delays, disputes and policy confusion.**
- 2. With different land-owning agencies in every state, there would be a large number of models leading to difficulty of doing business and customer dissatisfaction**

Common ducts infrastructure which are already built with necessary specifications can serve as a prototype model. Specifications of such models could include duct route alignment and minimum requirements for the laying, joining and testing of HDPE (High Density Polyethylene) duct for Optical Fibre Cable (OFC) either by open cut methods or by trenchless techniques. Land-owning agencies may generally decide the duct path based on cheaper land (such as terrains) costs rather than shorter but economically costlier routes. Infrastructure developed by the land-owning agencies may not be able to deliver planned Man Holes (MH) and Hand Holes (HH) designs to assist blowing of OFC through ducts and joining different segments of the OFC. With the aid of developed models it is easier to deploy networks based on specific standards such as GIS mapping, fiber deployment of 1.65 mts. below the ground, duct/conduit size, inner duct installation standards, method of installation, route definition and bends, and usage of defined tools and materials. OFC should be laid below ground in a flatbed trench to reduce attenuation losses due to undulations and sharp bends. Wherever the depth is not achieved due to strata conditions or any other terrain challenges, well-engineered physical protection should be given to the duct/cable. These standards (models) will ensure increased life span of the assets and hence are recommended.

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

Initially, considerable amount of investment and one-time RoW permission from land owning agencies would be required for developing the common ducts consisting of multiple micro-ducts. These micro-ducts at a later date could be leased/sold to service providers. Generally, the developer of the common duct infrastructure maintains and manages the same.

The National Highways Authority of India (NHAI), as an example, can develop common ducts for OFC along the highways along with the construction of the highway itself. This would optimise the cost of construction for common duct, and it could be another source of revenue for NHAI. Alternatively, the land-owning agency can grant one-time, long term RoW against a one-time fee to a utility company, and the utility company can develop and maintain the common ducts infrastructure. In order to prevent monopoly, the land-owning agency can make public its intent to grant one-time, long term RoW and utility companies can participate in the bidding process for development of this infrastructure. As different states and local bodies may adopt different models, TRAI should participate as a common telecommunication regulator.

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

An innovative idea for infrastructure creation is cross-sector collaboration through 'Dig once policy'. Such collaboration could either be in the beginning of the infrastructure development itself or at later stage by leveraging the existing assets of other sectors. The 'Fibre First Initiative' emphasises on leveraging existing assets of the broadcasting and power sector to improve connectivity, affordability, and sustainability. In the broadcasting sector, the RoW permissions available with cable operators for establishing coaxial cable network could be used for laying aerial fiber network. Similarly, the transmission and distribution networks of power sector could be effectively utilized to roll-out wireless broadband networks. For collaboration in the beginning of the infrastructure development itself, voluntary joint trenching or coordinated trenching seems to be a feasible option.

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.

Empirical evidence recommends a coordinated or supervisory trenching effort for cross-sector infrastructure sharing, for, this lowers deployment costs and increases market entry, thereby, making markets more competitive. Each active sector can keep a check on the specification compliance/non-compliance of the other participating sector. Voluntary joint trenching may not allow frequent interactions between the sectors and trenching efforts may go waste in case of specification non-compliance or non-cooperation.

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?

Yes. It is advisable and makes economic sense from coordination, operation and maintenance point of view.

One should encourage use of utility corridors. For the establishment of utility corridors, players such as NHA may be asked to provide ducting for all new road projects. Specific standards must be set by the Government in concurrence with NHA and other authorities responsible for State highways, piped natural gas, water, sewage and electricity as well. These must be enforced with penalties for non-compliance. Policy should be laid down to secure fiber network by defining guidelines such as 'call before you dig'. Under Hybrid Annuity Model (HAM), the Government contributes 40% of the project cost in the first five years through annual payments. The remaining 60% is paid as variable annuity amount after the completion of the project, depending upon the value of assets created. The toll rights rest with the Government and the revenue collection would be the responsibility of the National Highways Authority of India (NHA). A new approach to implement BharatNet, to address its dynamic nature and its focus on multiple facets of deployment, maintenance of rural infrastructure and service delivery has been developed.

It is suggested to strengthen the existing network from SHQ to DHQ and de-risk the network through ring architecture. Network redundancy can be increased by ensuring that we have an optimal mix of ring topology and linear topology. Ring topology introduces alternate paths in the domestic network for routing internet traffic in the event of link failures. The largely linear topology of network connecting blocks to Gram Panchayats(GPs) can be transformed to ring topology by adding ring closure links, in a phased manner to form large rings initially, and progressively smaller rings going forward. Additionally, 'mesh' architecture could also be considered for select locations as a long run solution for increasing reliability, security and future proofing networks.

Another suggestion is to start laying fresh fiber across linear lines especially from DHQ to BHQ (Block headquarters), as well as BHQ to FPO, where fiber life is dated. In order to ensure faster roll-out across the country, Central Public Sector Undertakings (CPSUs) can be complemented through end-to-end deployment by private partners through an EPC(engineering, procurement and construction) model.

Dig-Once to Co-deploy Multiple Utilities including Broadband Utilities such as roadways, water, gas lines and deployments of broadband do not follow a synchronized digging policy, which leads to significant cost from activities such as digging, trenching, RoW and other reinstatement fees. The risks in this methodology are numerous, of which disruptions to public life and utilities are the highest. One of the key measures taken by governments across the world is the development of a dig once policy in conjunction with laying new roads and widening some as well.

Cost Savings Limiting the number of times public utilities and transportation channels such as roads, railways are dug helps reduce the costs significantly, than adding infrastructure while they are being built. These savings are primarily observed in urban environments.

Public Benefits Dig once led to the reduction in resistive digging in areas which have other utilities installed. This leads to the reduced risk of damages to existing utilities already serving the populace, thus reducing public inconvenience. Also, road traffic is not affected repeatedly reducing times.

Economic Benefits Laying down or fiber using the dig-once methodology enhances the speed at which broadband is rolled out. This adds to the overall economic benefit that the society draws from connectivity in education, business and health-care.

Increased Rate of Deployment of Fiber since the duct/conduit for fiber is already present at the time of initial deployment, the additional fiber to be deployed can be done without much of a challenge. However, this is dependent on the overall health of the conduit system.

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

The following policy, regulatory and governmental initiatives are needed for cross-sector infrastructure sharing.,

- 1. There should a common template/model across the entire country for the construction and operation of the cross-sector infrastructure.**
- 2. The should be policy mandate about for the compulsory development of such infrastructure and financial incentives to encourage them.**

Honourable Prime Minister Shri Narendra Modi quoted, “Cities in the past were built on riverbanks. They are now built along highways. But in the future, they will be built based on availability of optical fiber networks and next-generation infrastructure.”

The need of the hour is to help realize the vision of Digital India with the objective of providing technology enabled services to empower citizens, including those in the villages. Accordingly, the strategy and timeline of BharatNet was redrawn in April 2016.

This modified approach entails connectivity to Gram Panchayats(GPs) by all media (underground OFC, overhead OFC, Radio and Satellite), replacement of lossy fiber before FPol(Fiber Point of Interconnect) to pave way for seamless provision of services in villages in on a nondiscriminatory basis, operation and maintenance mechanism, and setting up of minimal last mile architecture to provide initial fillip to the service provision in rural areas. Underground OFC as the preferred media, due to its durability and longevity, overhead OFC preferably on existing power lines in hilly areas and in such terrains where laying underground OFC is difficult and expensive, can be provided in addition to radio and Satellite connectivity in sparsely populated, distant and difficult areas. RoW permits, in case of NHAI, Railways as well as Forest & Wildlife departments are difficult to obtain and cause delays in the rollout of planned infrastructure. During BharatNet planning, most states have given free RoW permits for the deployment of fiber. A concept of ‘Broadband Champion’ can be

considered, wherein an identified individual within each Ministry would be the single point of contact for all broadband related matters. In Karnataka, the Ministry of Energy, for example, has permitted the Bangalore Electricity Supply Company (BESCOM) to lay an optical fibre communication cable network spanning over 3,500km in the city. It will simultaneously replace nearly 6,900km of overhead lines with underground cables. The optical fiber can transmit optical power for switching current transducer relay in a high-voltage transmission line.

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

The sharing of the infrastructure of the broadcasting and power sectors would enable the spread of broadband to remote areas as these two sectors have reached remote corners of the country.

Remote areas such as Leh and Kargil, two of India's most difficult and inhospitable terrains are now connected to the national power grid. The power grids can monetize its transmission line towers by offering it to mobile telecom service providers on commercial basis under section 41 of the Electricity Act, 2003, which allows for effective utilization of assets to benefit the society at large. This can help government of India's flagship "Digital India" program.

In the broadcasting sector, the RoW permissions which are available with cable operators for establishing coaxial cable network could be used for laying aerial fiber network.

As an initiative to explore the possibility to offer a cost-effective solution, the National Digital Communications Policy-2018 recommends reduction of the carbon footprint by deploying solar power in place of running of diesel genset for more than 12 hours/day. Leveraging of existing assets of the broadcasting and power sector is possible by promoting and incentivizing deployment of solar and green energy for telecom towers. to roll-out wireless broadband networks.

Q.20: For efficient market operations, is there a need of e- marketplace 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.

Yes. For efficient market operations, an e-marketplace has to be set up. This will ensure transparent transactions and price discovery in sharing, leasing, and trading of Duct space, Dark Fibre, and Mobile Towers by infrastructure providers, can bring down operating and capital expenditure substantially.

Tower sharing has proved economically viable for the TSPs and have advantages such as increased connectivity, faster roll-out of towers and energy efficiency.

GIS (Geographic Information Systems) are generally used to create very detailed maps of the routes and documentation for the network in the design phase. For example the type of ground along the route can determine the methods of underground installation, with deep soil permitting direct burial, other soils requiring trenching and conduit and rocky areas precluding underground installation of any type. Aerial installations must be based on knowledge of the owners of the poles and the processes necessary to gain permission to use the poles and make ready for new cable installations.

In a basic business model, GIS as a network Infrastructure Management tool is used as network inventory and as an infrastructure management tool in the access network. It can give ready reference to Fault localization. Report generation is possible in managing network resources planning for network expansion. With the help of GIS one can minimize downtime resulting from cable damage and equipment failure.

The e-marketplace should be established, operated and maintained either by the Central Government department or in a PPP mode with a Private sector entity which does not have any interest in Telecom Sector.

We recommend this approach for the following reasons,

- a) **Telecom Infrastructure is Critical and Essential for the Country and Citizens and hence is a PUBLIC good.**
- b) **An e-marketplace to ensure transparency and fairplay should not be operated by a Private player with interest in Telecom Sector.**
- c) **The e-marketplace should be operated as a service for the Telecom sector and not on a pure profit objective.**

We suggest a model like GeM under the DGS&D be considered.

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.

Mobile broadband users are generally high-frequency subscribers who require low data volume but cause high signaling overhead and are extremely resource-inefficient. For subscribers who activate more than 5 sessions per hour, they only account for 2% of the total subscribers and generate about 4% data traffic but consume roughly 20% of the signaling resources, resulting in the inconsistent signaling-data bandwidth consumption. This results in the unfairness of resource allocation, loss of network operators and decrease the network performance.

Consumers will continue to use mobiles to access internet for short-burst data requirement but for operational convenience will prefer fixed broadband services with OTT content for two-three hours per day of television viewing. Data such as usage of Email, SMS chats, alerts and accessing news online is more prevalent with more than 40% Internet users accessing it. Even where Wi-Fi is available at public venues, hotels and other transit points,

users find it more convenient to use their existing GPRS or CDMA services rather than struggle with configuring to use the local Wi-Fi network. The biggest bugbear while opting for dial-up connectivity has been the expensive pulse charges.

To facilitate increase in mobile broadband penetration, cellular phone service providers should offer low affordable ore-paid dongles and introduce flat tariffs where one pays extra only if one exceeds a bandwidth limit, usually 5GB. A mobile user can then even stream realtime video, even watch cricket matches.

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?

Our survey among our members and public indicates that the following are the possible reasons for lower subscription for fixed broadband services.

- 1. There is no perceived need or there is low need for some segments of the population. This includes the people who do not generally stay in a single location for a long time. Younger adults on the go prefer mobile broadband.**
- 2. For many who could possible use the fixed broadband like Senior Citizens who do not move around, their needs for entertainment and communication is met by other options like cable which after the new tariff plan is available at a lower rate. Watching TV on broadband is very costly as the data consumption is high for long usage of 10 hours per day. So data cost are high.**
- 3. Availability is a still a factor, with many service provider not willing to provide fixed broadband services to locations like Single Villa or Distant location due to high installation cost of cables.**
- 4. Awareness of the Fixed Broadband services are still low as the TSP especially are focusing on Mobile Broadband Services which has a higher awareness among the population. Also heavy advertisements by Mobile Manufacturers has heightened the awareness and triggered a higher penetration of mobile services.**

Some of these factors have

Due to the corona virus outbreak in India, Prime Minister Narendra Modi announced a three-week nationwide lockdown from March 25 to April 14. With this in effect, all commercial activities, corporate companies, and schools were shut down. However, certain private companies and government employees are obliged to work from home to complete projects that need urgent attention. Also, school and college students have been asked to join online classes to complete the syllabus for the academic year. All of them are dependent on fixed-line broadband connections and mobiles for access to the internet. This apparently has caused huge stress on the telecommunications network.

As per the latest Ookla's Speedtest Global Index report, the mean download speeds on fixed broadband have decreased from 39.65 Mbps in February to 35.98 Mbps in March. The mean

fixed broadband speed in India has been declining since the beginning of 2020 - from 41.48 Mbps in January to 35.98 Mbps in March, a drop by 5.5 Mbps. Similarly, there is also a slight dip in mean mobile download speed, from 11.83 Mbps in February to 10.15 Mbps in March 2020. India also dropped two spots on fixed broadband and is now ranked 71st globally in that category. During lockdown, it is important to note that while the internet itself should handle elevated usage, there may be impacts to speed as people continue to move their daily activities increasingly online. While the core of the internet remains stable, some ISP networks may struggle to keep up. The report comes two weeks after Over-The-Top (OTT) players such as Amazon Prime Video, Netflix, Disney+Hotstar, ALTBalaji, and others announced to decrease the HD streaming to SD in India for a month.

Due to the aggressive play by the telcos, which started giving the fast 4G connectivity at low rates, the number of subscribers has stagnated at 19 million since 2016. Till now, the lower speed 4G served the purpose for people due to affordable smart phones. The ongoing lockdown, wherein many people are forced to work from home, has resulted, on a contrary, in a surge in subscribers, especially in the urban areas, and also data usage, research has shown. The lockdown to control corona virus infection has come as a "godsend" to the fixed line broadband sector, which was struggling with stagnancy in subscribers for four years.

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.

Indian home broadband market remained underdeveloped in the past, due to absence of organised cable industry, which still remains fragmented and undercapitalised. With FTTH , globally fixed broadband services have evolved to become fast and reliable, with speeds ranging from 100 Mbps-1Gbps.

While demand for enhanced home broadband network and OTT services is not in doubt, the business case for next-generation Indian FTTH services remain unconvincing. **As per an E&Y study, India's construction cost to reach a FTTH household is among the highest in the world. The reasons for high FTTH rollout cost in India include exorbitant cost of RoW, high lead time for approval, uncooperative building societies, unorganised/expensive fibre construction services, high fibre maintenance cost, etc.**

The following are some of the policy measures, in addition to those outlined earlier like Speedier RoW approvals etc., that we suggest for improving the penetration of FTTH services in India.

- 1. The Government should provide for one-time subsidy to consumers to install FTTH in their homes. This subsidy would be motivate consumers to switch from others options.**
- 2. The Government should provide for tax reliefs for students in the purchase of Consumer devices to connected broadband services including FTTH. This would also**

aid students who are losing out on their education as it being delivered on-line to join the mainstream.

3. Government should consider the possibility of tax changes and other measures to reduce the Optical Fibre cost so that with lower cost of laying cables there would greater shift to FTTH.

There are only few serious players trying to address the fibre supply challenge. However, the need for FTTH broadband services is being felt throughout the country. It is not possible for one or two players to allocate scarce financial capital to address this large demand while meeting capex requirements for India's future 5G technology rollout. The existing high-cost business model for fixed broadband services supply will not yield the desired 100 million FTTH households anytime soon.

Key to home broadband market success is availability of fibre infrastructure that can encourage multiple players to serve this large FTTH market. The FTTH provider itself does it, making end-to-end fibre available across 1,000+ towns in each residential and commercial complex. This model is expensive, with payback period of over eight years even at an annual ARPU of Rs. 12,000, and involves duplication of resources in large markets.

By converging multiple fibre-based networks onto a single- or two-network footprint, independently financed by private investors, this 'National Fibre Infrastructure' can ensure fibre availability across the country. Indian telecom operators have already built over 22 lakh km of fibre. Passive Optical Network architecture already provides fibre sharing between many service providers through either Time Division Multiplexing or Wavelength Division Multiplexing. The current 22 lakh km of fibre, once transferred to a common pool managed by independent fibre infrastructure providers, will help support 1,500 petabytes of India's daily data needs, i.e., 7.5 times the current traffic.

Unless the DoT and TRAI formulate regulatory policies to support growth of an independent fibre infrastructure company, this vision will not be realised. The challenge is to get multiple tenancies so that the infrastructure cost can be spread over a large number of operators. The DoT and TRAI need to push central, state and municipal legislation encourage fibre deployment. Policy could accord telecom optic fibre cable the status of public utility, offer a 10-year tax holiday to independent fibre companies, and encourage banks to leverage such companies to enable fibreisation of at least 60% towers to reach 100 million households with FTTH. The National Building Code of India could be amended to make telecom installations and associated cabling mandatory for all commercial and residential buildings. A National Fibre Regulatory Authority overseeing setting up of common service ducts and utility corridors in all cities, apart from collaboration between states, the Centre and ULBs, will also need to be created.

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.

Data-intensive gaming, virtual reality and OTT HD video, combined with today's digital TV services will consume the entire capacity of today's HFC networks in just a few years. At present, however, the local cable operators (LCOs) are not able to provide broadband service at higher speeds. The limited speed is due to the design and capacity of core network and equipment such as RAN. The 10G broadband platform is being developed to deliver speeds 10 times faster than what it's today. As the nature of the services that telecoms provide is changing, and data flow through their networks is growing at an unprecedented rate, we can see that the market demands some enormous changes from operators.

Hence the Local Cable Operators (LCO) need to upgrade their technologies. This calls for investments of high magnitude without an assurance of a commensurate returns.

Some of the policy changes that may be necessary are'

- 1. Treating the LCO as a infrastructural provider and extending special funding schemes with low interest rates.**
- 2. Ensure that LCO are considered as a important stakeholder and ensure their participation, by monetizing their assets.**

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 service deployment in a 4G (LTE) network can pave the way for a successful 5G FWA market introduction. As Europe and China witness the rollout of 5G, India sits back, as the Cellular Operators Association of India (COAI), which includes Airtel, Reliance Jio, Vodafone-Idea face adjusted gross revenue (AGR) dues. The lack of any debt relief has added to the existing problem of lack of spectrum quantum. India's telecom operators are planning to push back 5G network deployments to as late as 2025 due to high base price, lack of spectrum, and absence of any new bands for auction.

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.

In fixed networks, the main factor affecting the broadband speed is the technology used for data transfer. Fibre-optic and cable networks enable high-speed connections, whereas traditional xDSL connections provided over a telephone network have limited maximum transfer speeds. The connection speed also depends on the distance between the terminal device and the network centralizer. The further the operator's broadband centralizer, the more it affects the speed. Multiple services hooked on the internet and more than one user of the network can cause the connection to slow down or cut out.

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.

Yes. There is a critical and compelling need for interventions in establishment of checks for the core networks.

Regulation on “Quality of service of Broadband Service” stipulates benchmarks for several parameters for provisioning of Broadband service. The main purpose of this Regulation is to protect the interests of consumers of Broadband service and enhance customer satisfaction. By way of mandating certain checks on parameters relating to broadband service such as contention ratio, latency, and bandwidth utilisation in the core network, QoS can be regulated. A proactive action is needed to ensure availability of adequate bandwidth to support good broadband speed.

If a line has to access 100Mb, one can easily get average speeds of around 35Mb or 63Mb on a good day. But if the contention ratio is 50:1, with 50 people connected to it, a single user can only get speeds of about 2Mb. That means that if one is in an area with a high contention ratio, one will probably get slower speeds when more people are online. It's like a road. A small road can easily handle 20 cars cruising up and down it at various points throughout the day, but if all 20 cars try and pull out onto the same section of the road at once, they won't be able to go very fast and might cause a jam. This is why some providers practice web traffic management. By prioritizing data for certain online tasks, like video streaming, one is assured to get a stable connection on the line regardless of the contention ratio. It's like opening an exclusive fast lane for the cars.

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.

Yes. The TSPs and ISPs should be mandated to declare the various metrics to consumers through various media including website, stores, etc in their communications especially when offering tariff plans.

We have found in our various interactions with consumers - Complaints, Consumer Education Workshops (CEW), Survey among our members and public the following

- 1. TSPs and ISPs mostly indulge in mis-selling their services especially with regards speed, coverage and consumers are mislead in subscribing to their services.**
- 2. Consumer complaints about poor quality of service is usually not registered or attended to and there is huge dissatisfaction among consumers.**
- 3. Consumers are subject to harassment as switching Service Providers involves KYC procedures and accounts settlements.**

We recommend that for ease of understanding among consumers that the Regulator specify a typical Broadband QoS parameters' threshold. An example is provided below. If the standard is meet, then the TSPs and ISPs would just declare their adherence. In the event ,there is a deviation from the specified standard either upward or downward, then the details should be declared.

Typical Broadband QoS Parameters and Threshold Specified by the Regulator

Network Availability	> 95%
Latency (Local)	< 150ms
Latency (Int'l)	< 350ms(terrestrial); < 800ms(satellite)
Bandwidth Utilisation	<80% during peak time (@TCBH -
Time Consistent Busy Hour)	
Packet Drop Ratio	<10 ⁻⁶

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.

Probable reasons for slower mobile broadband speeds in India

- **Poor Router Position:** One of the main reasons the phone Wi-Fi is slow is that router has been positioned in the wrong place.
One simple yet overlooked reason why WiFi-connected phone may be experiencing internet lag is because of router's location. Although WiFi has a range of up to 230 feet, the farther away the device from the router, the weaker the WiFi signal. Large objects like doors and walls situated in between phone and the router can also weaken the WiFi signal. It is recommended to place router in a central location, preferably away from concrete and masonry walls or other big objects like a chimney. As the router signal radiates from all four sides, blocking any side with big objects will impact WiFi's signal quality and as a result the phone's internet speed.
- **Congested Wi-Fi:** Home electronic appliances emit wireless signals at a frequency similar to router's (2.4 GHz)? So before deciding on router's location, it's necessary to determine whether there are any wireless devices nearby, as they emit signals that can interfere with the router's signal. For example, even if the ideal location for router is at the center of house, one shouldn't place it there if there's a cordless phone nearby. Router can be set on a 5.0-GHz band, as this frequency is less prone to interference from other appliances
- **Wi-Fi Noise**

- One is connected to a Slow Network: another reason for the phone's slow internet is because of fluctuating network speed. It depends on how many people are connecting to the router and what are they doing over the internet. One should increase router's internet bandwidth speed if many users and all of them are either streaming movies, or downloading computer games or software updates.
- Too much cache: One should check phone's cache if fixing router, network, and positioning doesn't improve phone's internet speed. Cache is a component in the phone that saves data from earlier searches in order to increase the speed of similar searches in the future. You can clear out your cache manually or use a cache cleaner app to thoroughly get rid of useless cache and optimize your phone's internet speed.
- One is using a Slow VPN
- Poor 4G Coverage
- Phone is Slow
- Running too many apps or programs
- Having too little storage space.
- Using an out-of-date operating system.

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.

Yes. Interventions that we suggest are as follows.

Quality of Experience (QoE) is a measure of the delight or annoyance of a customer's experiences with a service (e.g., web browsing, phone call, TV broadcast). QoE focuses on the entire service experience; it is a holistic concept, similar to the field of user experience. A consistent QoE to subscribers is not possible because of RAN user plane congestion. Regulatory intervention by way of mandating certain checks helps to detect and solve this congestion.

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.

Machine Learning Technology based RAN congestion manager scores network congestion status by analyzing trends and variations in multiple user plane metrics on a per-traffic flow and session basis. This process is transparent to both the RAN and the user equipment and it does not require real-time integration with any element in the RAN or packet core. It correlates subscriber, session, location, network and per-flow congestion scores to

dynamically determine the level of congestion for a network location. In order to improve the performance of RANs, checks should include video optimization, inferring congestion from metrics such as video buffering and packet loss. And some are pitched between real-time and historic data approaches, for example providing a read on congestion every 15 minutes. A RAN congestion control system needs to feed information to policy servers to provide operators and the new customers with the widest possible set of options for handling the congestion event.

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.

Yes. We feel that there is a need for interventions by way of mandating checks and certification of consumer devices.

In order to protect consumers and families from products that pose a fire, electrical, chemical, or mechanical hazard, a consumer product safety commission(CPSC) may be set whose work is to ensure the safety of consumer products which includes telecom equipment, routers, mobile phones, chargers etc.. To ensure that these are safe, manufacturers are required to certify that their products comply with the strict radiation safety standard created and enforced by CPSC. Specific limits for human exposure to RF emissions from hand-held mobile phones in terms of Specific Absorption Rate (SAR), a measure of the rate of absorption of RF energy by the body, need to be checked. The safe limit for a mobile phone user is an SAR of 1.6 watts per kg (1.6 W/kg), averaged over one gram of tissue, and compliance with this limit must be demonstrated before the approval by authorities is granted for marketing of a phone.

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.

Yes. Minimum standards for consumer devices available in the open market should be stipulated. We believe this is necessary due to,

- 1. A wide range of hardware available with a plethora of specifications and standards which makes it impossible for the consumer to make a informed decision which especially future-proof.**
- 2. With asymmetrical power the consumer are a disadvantage when it comes to obtaining information about the devices from the manufacturers and resellers. With on-line shopping expanding the consumer have no recourse to obtaining relevant information on the product specifications other than those revealed by the manufacturers/resellers which is sparse.**

3. There is a significant amount of mis-selling as the result of consumers' lack of information on specifications and standards. There is large financial loss to consumer and his welfare.

We believe such interventions would increase the affordability to the consumer and also increase customer satisfaction. Also these initiatives would protect the interest of the consumers who know are left to the mercy of the unscrupulous sellers.

Further, the consumer experience may be improved by involving consumers themselves in framing specifications. A regulatory body comprising of manufacturers, trade associations, government officials, and consumers may come together to develop standards that aim to assure quality and consumer safety while keeping the prices at bay. Complying with regulations is costly for firms, and these higher costs may in turn drive up prices for consumers. Higher prices caused by regulatory growth are unlikely to affect all consumers equally. High-income and low-income households tend to have different spending patterns, and regulations may have a larger impact on one group than on another. While the trust with the consumers builds, the openness, transparency and collaboration from manufacturers allows feedback from the consumers. Such feedback can help add features to the product, improve the quality and keep the prices consistent. The regulatory body can keep a check on price gouging and take anti-hoarding measures when a seller increases the prices of goods, services or commodities to a level much higher than is considered reasonable or fair.

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CONSUMER CARE SOCIETY