Subject: Response to Consultation Paper on *Roadmap to Promote Broadband Connectivity and Enhanced Broadband Speed*

To,
TRAI

Sir,
Please find my response below on consultation paper

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.

Consultation paper has highlighted an important key trend 'Demand for high speed and reliable broadband has been growing, and, in the post pandemic scenario, it will grow much faster'. Even before pandemic, there were visible offshoots of high growth for fast broadband looking at launches of streaming content players, online gaming, self-promotion content video apps along with social media becoming mainstream consumption platform. Broadband usage has in fact become direct enabler of economic growth due to creation of new business models over data centric platform.

Indian market still has high mobile broadband subscribers compared to fixed line, due to factors such as ease of connectivity/activation, economical mobile phones, use case variance (content creation, professional usage, web surfing, online gaming, education, social interactions, SME/SOHO usage, enterprise usage etc).
Looking at patterns from developed broadband markets like Korea, Singapore, US, UK, broadband definition has variation depending on market structure along with some commonalities. Based on Indian market consumption & demographic needs, revision of broadband definition is much required.
Broadband for Indian market should be defined as an internet connection that delivers at least 10 mbps downstream and 3 mbps upload speed.

a. Common or separate for fixed and mobile broadband? : Broadband definition should be common for fixed and mobile broadband
b. Dependent or independent of speed and/or technology? : There has been active launch and adoption of 4G/LTE and Fiber connectivity over past 3 years leading to availability of technology which can deliver higher speeds. There are practical

challenges in data loss over mobile broadband, however there are technology options to mitigate the same.

With telecom infrastructure growth by both private players and Govt. led enterprises, focus for Indian broadband should be for enabling commercialization of higher speeds, independent of technology/speed

c. Based on download as well as upload threshold speed, or threshold download speed alone is sufficient? : Content consumption has drastically changed in past 3 years with add-on acceleration during pandemic and consumption today is not dependent only on download speed. Remote work, online education, content creation through apps, m-commerce and many other use cases requires stronger upload speeds of atleast 3-5 mbps, if not less. Therefore, threshold should be based on both download and upload speed.

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? This is always going to an area where variation will come into play due to factors such as technology, connectivity/coverage, content type, etc. It will take sometime to normalize QoS on this parameter, looking at existing network congestion in Tier 1 cities. However for fixed broadband, QoS can surely be defined based on actual speed delivered. Mobile broadband requires monitoring of QoS to really ensure that operators are putting their best to deliver broadband standards.

Q.2: If you believe that the existing definition of broadband should not be reviewed, then also justify your comments.
Response provided in Q1

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.

Indian Broadband market has reached a point where introduction of broadband categories will help in improving customer centricity and also help operators to focus their investments and product planning.

Currently, mobile broadband has data usage driven plans with default speed depending on network. Many families with limited budget for their communication needs, prefer using mobile hotspots for data access depending on use cases. Average trend for mobile broadband will be use cases requiring upto 25mbps and second bucket of 25-100mbps. Looking at an individual consumption over mobile device with type of single type data usage at a time, data usage driven categories with two speed options can be defined for product planning.

However, consumer usage patterns for fixed broadband, FWA is different approach. Single fixed broadband connection has multiple users/devices logged in with different use cases. For ex, single household using fixed broadband can have children doing online education through both live and offline content, streaming TV being

used for watching content, members conducting video conference for professional work besides social media access.

On an average, following is recommended speed:
- 25mbps: 1-2 Devices – Social, HD videos, online videos
- Above 50 and upto 100mbps: 3-5 Devices- 4K video streaming, limited live conferences
- More than 100mbps: 5+ devices- Above and live streaming & conferences with videos, online gaming

If we look at other markets, FCC also recommends internet speeds of 12-25 Mbps for families with multiple internet users or for frequent online streaming

Moreover, there will be new trend expected in fixed broadband consumption based on time of the day. Ex, peak load is expected during 10am- 6pm after which there will be offset in terms of parallel access being reduced to almost 1/3 after 9pm

Currently, operators provide plans based on speed and data usage limits, however realized limits are less than what is being committed. This is also due to stretched out plan options which are in close range in terms of speed limit and have vague overlap. For ex, there are two plans claiming upto 25mbps and upto 100mbps wherein 25mbps one provides avg 12-15mbps download and upto 100 mbps provides merely 30-40mbps defeating the purpose of providing higher speeds.

Fixed broadband should be classified into:
- Normal(upto 25mbps with 500GB FUP)
- Fast (25-100 mbps with 1TB FUP)
- Superfast (100-500 mbps with 1TB FUP)
- Ultrafast (500 mbps or 1gbp which maybe possible in future due to 5G, 5TB FUP)
- Upload speed should be atleast 10% of lowest download speed of that category.

This classification based on speed as primary variable will help in providing minimum QoS as per defined parameters in each option. Consumer opting for Superfast should be committed with min 100 mbps with an average of 250 mbps.

This will help consumers in selecting their desired buckets based on usage use cases and also the operators in catering to high ARPU consumers through superfast and ultrafast consumers. Well defined buckets in terms of usage, demographics and consumer spread in a region will help operators to rationalize their investment planning based on expected broadband categories.

For ex, operators don't need to spend upfront on provisioning for superfast speed if larger demand is for Normal speed based on demographic and ARPU spent. Operators can work out their network economics for ultrafast BB in areas which is at 'Normal' speed today, over next 5-10 years when use cases for ultrafast speed will be in high demand.

Therefore, re-iterating the proposed categories:

Fixed broadband should be categorized into:
- Normal(upto 25mbps with 500GB FUP)
- Fast (25-100 mbps with 1TB FUP)
- Superfast (100-500 mbps with 1TB FUP)
- Ultrafast (500 mbps or 1gbp which maybe possible in future due to 5G, 5TB FUP)
- Upload speed should be atleast 10% of lowest download speed of respective category

Mobile broadband should be categorized into:
- Normal (upto 25mbps)
- Fast (25-100mbps)
- Superfast (100mbps +)
- Multiple Data usage options such as 10GB, 20GB, 50GB, 100GB, 250GB, 500GB can be provided along with speed options. Mobile usage has high variance of data usage, hence operators can provide more modular options on data limits
- Upload speed should be atleast 10% of lowest download speed of respective category

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.

Speed measurement program will be good initiative for ensuring QoS being delivered to customers. Today, there is lot of ambiguity in committed versus delivered speed over both fixed and mobile broadband.
While there maybe constraints for operators, customers need to get fair service based on payment made for committed speeds and these constraints need to be addressed.
Mobile broadband speed will definitely vary due to variable location of user and will heavily depend on level of network congestion. This point has high significance to ongoing discussion of network traffic management. While there is need to define categories for mobile broadband, regulations also need to ensure that operators do not use traffic management policies for throttling speed for higher segment users.
Network spatial analytics can be used for analyzing speed performance across network and identify bottleneck or scope for network investment for improving QoS. Operators can use GIS approach for involving consumers to submit bad experience or network performance either through random sampling or through refreshed set of users over defined timelines.
Fixed broadband speed performance can be done through random sampling.

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 Comments

Q.6: Is there any alternate way to address the issues relating to RoW? If yes, kindly elucidate.
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.
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.
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.
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.
No Comment

Q.11: Is there a need to develop common ducts along the roads and streets for laying OFC? If yes, then justify your comments.
Planned infrastructure is much desired for any 'Smart City' in true sense.
There need to be a planned approach on how infrastructure modernization work is executed. Lack of such planned approach lead to wastage of nation's resources and capital, increases traffic problems due to continuous work, poor street/sidewalk conditions and time/effort of both private and govt enterprises.
OFC is an important medium of data transmission and multiple rounds of laying fibre by different players through same route exposes unproductive processes.
Most of the cities are anyways going through road/street expansion along with Metro rail construction. India should use this opportunity to plan for common ducts as part of master planning for reducing any impact on created infrastructure to be disrupted constantly due to multiple OFC work.
Common duct will provide systematic way for players to lay out OFC, will ease approvals and design along with expedited execution of OFC layouts. With steep OFC expansion targets, any constructive change in process/design will help in realizing broadband mission for 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.

Governing bodies like NHAI, GAIL, Railways, Urban Planning has to design an inclusive design and planning by incorporating approach for private player to be part of common ducts infrastructure. Commercial models of BTO or BOO can be explored with private players to incentivize them of providing intial capex on setting up common ducts. Even utilities players are laying underground power distribution last mile, something oprators can utilize through alliances
Many times, operators are interested in working out managed services deals for such OFC infrastructure rollout and maintenance.

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.
Common ducts should be default design as part of any infrastructure expansion. While this be good business model to monetize the opportunity by land owning agencies, exclusive rights will not solve core purpose of common duct.
Exclusive rights often land up in commercial gain approach leading to end-user enterprises trying to by-pass common ducts and utilize cost saving means for laying out telecom network.
Like telecom is backbone for country's GDP growth, common duct is going to enabler in rapid expansion of broadband and telecom network. Hence, this should be included in default design during tender phase with incentives given to common duct owning enterprises and early adopters from telecom operator fraternity. Incentives provided by Central govt. will bring in more tangible gains on this funding by broadband led country growth.

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.
Comments as per above answer

Q.15: What could be the cross-sector infrastructure development and sharing possibilities in India? Justify your comments with examples.
Infrastructure definition which was often seen as definition for only roads a decade back has expanded to overall development of energy & power distribution, airports, railways, telecom, roads, public transportation like metro, Solar electricity generation, water distribution, planned commercial and residential establishments.
There is lot of common incentives which can be derived through an integrated planning for infrastructure expansion currently being witnessed in India.
As 'smart cities' are rolled out, telecom & broadband connectivity can sit in core of basic infrastructure along with roads, utilities and cities expansion. While laying out expanded highways through NHAI, common ducts and future ready OFC network can be rolled out. Today, railways and metro construction often include laying out OFC network as they expand the reach. Public transport zones like Airport and Railways

can act as key nodal points for regional distribution of broadband connectivity with ample amount of space and resources. Similarly, Indian topographic also gets constraints for reach of power supply to remote areas for enabling broadband network. Existing focus on power generation through solar can be utilized for solving such challenges and lead to mutual gain. This approach can help in creating future ready and sharable plug and play telecom infrastructure, with easing burden on operators for investing on basic enabling infrastructure.

This will also foster innovation & new business models for broadband growth through VNOs, LCOs and other new entities.

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.
No Comments

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?
As mentioned in response to Q15, there are ample areas for synergy with other utility networks being constructed. Passive infrastructure eventually becomes non-core asset for operators from operational management, for which they often sign managed services or outsource the services. While some operators with strong healthy balance sheet can still continue owning whole commercialization and maintenence, in many cases managing passive infrastructure through outsourcing model often make a profitable case for operators in long run. Hence such Buuid-Operate-Operate- BOO or sharing infrastructure approach will help in making much stronger case for continued broadband investment

Q.18: What kind of policy or regulatory support is required to facilitate cross-sector infrastructure sharing? If yes, kindly provide the necessary details.
Growth of Telecom infrastructure including broadband can be expedited through cross-sector infrastructure sharing. This will require strong inter-agencies governance model to be governed at cabinet level for quick decision making and identify use-cases for establishing roles and responsibilities for each agency. Such charter of responsibilities should also be updated with defined timeline approach and escalation mechanism & governance for quick decision at leadership & cabinet level.

Q.19: In what other ways the existing assets of the broadcasting and power sector could be leveraged to improve connectivity, affordability, and sustainability.
There are new business models which are shaping in various markets. For ex, Coast Electric is to provide broadband to local unserved areas through grant provided by govt in US. Similarly, there are many last mile opportunities in India which can be fulfilled through existing providers in other sectors.

We can also learn from success of Udaan initiative in Indian domestic Airlines industry which has expanded lot of last mile coverage. Udaan has ensured availability of economical fare options on one hand and at the same time provided access to new markets for airlines. There can be similar affordable win-win model which can be explored in broadband market.

There are global industry initiatives over 5G for looking at utilizing existing infrastructure for rolling out FWA driven broadband services. However, there is still sometime for Indian market and operator to prepare for 5G roll-outs.

Growing solar industry is another area where new business models can be explored. Solar industry has an active presence in last mile areas and with electricity solving 50% of required need for broadband access and coverage including BB usage, rural consumers can be provided with fixed broadband service through FWA technology.
This will also help in monetizing solar investment and assets, sustainability and for beneficial gains for all stakeholders

In UK, Rural broadband developer Broadway Partners (aka – ISP Broadway Broadband) has reached an interesting new agreement that will enable them to harness Western Power's low voltage poles. The deal will be used to support their on-going deployment of gigabit-capable "full fibre" (FTTP) infrastructure to homes. Such initiatives can be studied for its feasibility in India.

Elon Musk led SpaceX is also testing superfast or ultrafast speed through satellite communications using LEO satellites. SpaceX has so far been able to demonstrate in automobile sector that new age technology can be scaled and made affordable. This can be seen as a little long term plan, however Indian space leaders like ISRO and other labs with strong space technology capabilities can explore alliances by using sheer volume of Indian broadband market to convert satellite communication for larger connectivity at economical price.

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.

Telecom broadband market in India has huge scope for commercial innovation. While we are witnessing slower than expected increase of fixed broadband, there is ample capacity lying unused or infrastructure which can be utilized or planned for improving reach.
While MVNO model maybe debatable one in terms of success, it does help in effective utilization and commercialization of minutes/data. MVNOs were launched in era of voice dominated market, today whole focus has moved to data consumption. It is important to open up unutilized passive infrastructure through marketplace concept for mutual gains of all stakeholders especially consumers.

Highway and transport agencies make huge investment with long term break-even/IRR and own assets such common ducts, OFCs, etc available for monetization. Similarly, mobile towers growth is getting capped due to health safety factors, lack of available location or high rental costs, etc which can be better utilized through shared approach. Leading players like BSNL has huge dark fiber bank available which can be backbone for broadband growth and also helping reducing its debt.

Marketplace should be led by entities owning different type of infrastructure using Govt. agenda of 'Minimum Government, Maximum Governance'

Various entities today are expert owner of their assets and well equipped to host marketplace. Government need to provide guiding & operating principles for setting up such marketplace. Instead of creating operational maintenance capability from scratch, operators can directly onboard maintenance capability through such marketplace. Demand and Supply will eventually follow market driven path for forging of alliance and partnerships. These passive infrastructure assets have been completed with huge capex investment and marketplace will help in value monetization.

Open trade will lead to entities proactive planning common duct, network or other infra as part of design and planning. Such approach will also innovate new business models for more inclusive growth of broadband market.

For ex. If there is a need for power supply in remote area for running passive infra hub, instead of setting up new solar plant by govt or operator, third party entities may start providing such services through marketplace leading to lower upfront capex by main agencies/operators. This will lead to growth of broadband network at lower capex, while giving boost to solar market in India.

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.

Indian mobile broadband usage has some interesting trends, with avg consumption of 11GB/month which is higher than other markets like China, UK, US, South Korea as per latest study by Nokia Mobile Broadband index 2020.

Similarly, with an average cost /GB at Rs.7, India still has lower price per GB especially if we compare this data of higher consumption per month.

India's data use has shown growth rate of 93% per annum between 2015-19 as per Nokia study.

If we look at key trends, 2015-2019 witnessed active increase in streaming OTT players, content generation, launch and migration to 4G services and 4K content.

There was a constraint during past 3 years with higher price of data enabled smartphone, which still continues to some extent. Availability of 4G smartphones at much lower price point will be key enabler in growth of mobile broadband consumption by more subscribers.

I am not sure if there is any regulatory constraint behind this factor or introduction of one will make strong change here. Indian consumers are getting interested in more data content and with more smartphones and bundling options, mobile

broadband will start showing higher growth and reach. Pandemic will also act an accelerator for mobile broadband adoption this year through various daily use cases of education, digital payments, contactless transactions, etc.

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?
Answer for this point lies somewhere in existing Postpaid-prepaid ratio trend which is ~5: 95%

India has vast demographic layout including in big cities. With large section still living in smaller houses, temp. accommodation and large mobile workforce, connection feasibility along with qualification criteria itself becomes a deterrent to begin with. It is far easy to obtain prepaid mobile connection and use mobile hotspot feature for streaming than obtaining whole broadband setup.

There is also initial cost of broadband CPE which is often high cost for many middle and lower earning segments. Average cost of router is INR 1500-2000 and discounted offers by operators requires 6months-1 year commitment and upfront payment. However, consumer behavior of this segment is very different with lack of interest in options where higher financial commitment is required.

Fixed broadband requires post paid approach and regular commitment, whereas prepaid mobile broadband is non-committal and can be varied based on actual usage need.

Using design thinking approach, if we create an empathy map of average internet consumer, there are some interesting observations:

- Important segment of 'Bottom of the pyramid' which empower volumes but focus on spending in smaller sachet-based approach. Due to lower earning amount or temporary/volatile jobs prefer to opt for reasonable smaller usage. Average family has individual mobile phones and have variance of their availability at house which deters them for opting fixed broadband service
- Desire of higher speed but at lower cost of activation
- Perceived image of fixed broadband services as a premium service which is required only for high-end usage and cost more
- Single/millennials who are highly mobile and hence prefer mobile broadband with complimentary usage of Wi-fi (hostels, PGs, shared accommodation etc) wherever available. Hence new fixed BB acquisition is not high for this segment
- Provisioning challenges in reaching to remote places including many areas in larger cities, by-lanes. Such areas are prone to outages/faults, hence lower customer experience
- CAF and verification require matching address proof for installation address from applicant, which is often a challenge for large segment
- Lack of last mile approach for fixed broadband. Even if few residents are willing to opt for broadband, operators expect minimum threshold of subscribers for investing in last mile network equipment installation for an area/location. This is even true for new housing complex in cities where

operators provide services only after break-in number of subscriber applications
- Portability also plays an important factor. It is easier to switch mobile broadband services by porting to another operator provided better campaign, offers and QoS. Mobile prepaid market is very competitive with active data offers provided to customers which makes it more lucrative for 'bottom of the pyramid' and hence fixed broadband is not actively pursued by this segment. Switching between fixed broadband is a cumbersome process with longer deactivation and activation cycle.
- Lack of stand-by power for such customer segment houses even in Tier-1 cities, and very often a challenge in Tier-3/4 cities. Power outages disable home wi-fi router and disconnect broadband services. Compared to this, mobile broadband has 'Always-On' broadband connection, with mobile having 3-4 hours of running battery
- Based on data consumption trends, large amount of past use cases was around social medio, videos, surfing, emails for which mobile broadband was sufficing the purpose. It is during last 2 years that streaming apps has witnessed exponential demand including large entertainment content along with lot of online interactive conferencing and education due to pandemic. Due to long usage of such content and battery consumption of mobile, fixed broadband may be seen as better alternative provided lead to order lifecycle constraints are addressed as mentioned above.

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.

Last mile has been main challenge area for slower growth of FTTH subscribers, such as challenging approach for providing FTTH in very densely populated/congested area with limited scope for laying fibre.

Even if fibre if laid till OLTs, taking them till ONTs has been often challenging due to lack of space in old buildings to take fibre till installation house. Ducts are often non-operational or defunct and many times overloaded with power or cable wires leading to even operational challenges and disputes.

There are approvals required from housing societies and often there is monetary investment linked to these approvals as one-time cost. Operators need to focus strongly on cost of acquisition in such cases and avoid extending FTTH for non-viable societies.

Common ducts policy and defined forward looking regulations will definitely be positive step in enabling FTTH growth. Moreover, there has been an active investment from operators including greenfield ones on laying OFC till last mile. With Indian market at cusp of data adoption uptrend, there is strong multi-play services case which will be spur FTTH growth if launched at affordable price point and covering important elements like ease of activation and CPE device cost adjustments.

Any regulatory support in enabling Lead to Order lifecycle will be helpful in FTTH growth.

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.

Broadband is capital intensive business with high capex involved during launch phase. Beside this, Indian market has already witnessed highly competitive market with multiple mobile players to today with limited few.

Stakes are very high and there is huge investment which India is attracting due to sheer size of market opportunity. With such high stakes from big players and backed up with strong investments, it is getting tough for LCO to survive in such competition. LCOs has limited reach of network and customer segment and don't have deep pockets to remain technological refreshed as per latest digital driven trends. It requires high investments to remain competitive and ensure low churn and increasing ARPU.

Moreover, whole cable operator services which was driven on TV content is fast getting eaten up by streaming players, thereby impacting topline growth.

While there maybe regulatory policies defined to help them sustain, however market forces will flow as per demand which is going to tilt towards Multi-play operators in future.

Consumers today want converged set of services, ease of provisioning across their mobile, data and video platforms through high customer experience and attractive plans. Such transformation can only be driven by players who can build such umbrella of services together through customer experience.

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.

In whole race of fixed & mobile broadband, FWA was not able to find right sweet spot for its growth. Broadband needs of retail consumers largely got addressed through mobile and for enterprises through fixed broadband, therefore FWA got left behind due to factors such as connectivity, QoS of 4G speed, coverage/availability and marketing focus.

There was same market segment which all three were eyeing and mobile broadband lead the race due to ease of usage by end-consumer through mobile hotspot feature. Its expected customer segment often opted for more stable and faster fixed broadband or switched to one once service where made available in particular area.

Advent of 5G could bring change in technology landscape and higher adoption of FWA. There are industry initiatives like Telecom Infrastructure Project (TIP) wherein global operators are working together to utilize mmWave spectrum to address growing bandwidth demand and delivering capacities faster as an alternative to deploying fibre. TIP is also focusing on utilizing existing infrastructure for laying out the network. It does have some limitation due to line of sight driven network, however initiatives are ongoing to create non-LOS driven network.

There is another point to be highlighted which might not be directly related to FWA but fits in same category. There has been lot of funding which has been spent by both central and state govt on Mobile Hotspot / Wi-Fi using FWA.

Most of such initiatives over past decade has been a failure due to lack of use case or services being defunct due to poor QoS. Looking at broadband adoption by mobile subscribers and fixed broadband growth, funding such initiatives should be stopped since it not solving any purpose and only wastage of taxpayer's money.

Today, most of mobile subscribers have data enabled on their phone and a smaller percentage who may not have data will be mostly from a background who will rarely even be aware of such FWA services at public places. For ex, setting up Mobile wifi in public market or railway station is rarely of help since by the time subscriber struggles through whole information gathering and onboarding process, she has already spent close to 15-20 mins of time and in all high probability will be in rush to move on.

Even public wi-fi services on Airports have poor QoS and most airport users already having 3G/4G connection on their mobile. Such initiatives are not helping any broadband consumption increase and same amount can be channelized in some other broadband initiatives.

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.
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.
Regulation should ensure that network traffic management policies are utilized properly and not for sole benefit of operators. There is already active consultation paper by TRAI in this regard.

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.
No Comments

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.
There have been exponential growth in data applications at consumer end and there are no set standard or definition for network consumption. Apps are focusing more on attracting new consumer onboardings and therefore many time end up with faster development which may not be always network friendly. There are many use

cases wherein network congestion is caused due to single app throttling network capacity leading to decrease in experience for other apps.

There are network traffic management solutions through which network can be monitored and controlled better, however this area falls under already open consultation of network traffic management.

Other technical parameters should also be analysed for root cause analysis of this problem.

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.
No Comments

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.
No Comments

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.
Consumer device are on auto-path of getting refreshed due to their operating system version updates both on Android and iOS, along with Applications also mandating minimum version control for app usage. This approach is in larger alignment to growing broadband use cases, required network compatibility and customer experience. Even for fixed broadband, consumers are installing latest routers to attain maximum benefits from their services. Operators are also rolling updated CPE for cases where upgradation to FTTH is being provided.

Therefore, there is no apparent need to open up any policy or regulatory intervention at this point of time.

Network traffic management will also play an important role for broadband consumption growth. There are use cases wherein network faces high congestion due to certain type of apps or consumer devices which due to their sheer design consume lot of bandwidth.

Within network traffic management framework, such processes may be simplified to help operators with their network traffic management and conducting or mandating certain checks related to apps if those are often becoming reason for network congestion.

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.

Indian Broadband market today require better product & plans, customer experience, network & last mile reach, faster broadband plan, QoS and therefore consumer device is not key constraint in whole eco-system.

Data usage itself is going through tremendous change towards new avatar. Consumers are proactively investing for latest CPE for both mobile and fixed broadband depending on their need, affordability and use cases. As of today, any minimum standards definition for consumer devices is not a necessity , on the contrary setting up regulations will only affect affordability and accessibility due to need for device refresh, putting a gentle brake on broadband uptrend.

From:
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Disclaimer: Views expressed are my personal opinion