Counter Comments

CP[1,2.3]

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Introduction:

There are many key words in CP but pivotal word is '50mbits'. This occurs only once both in Ref[4(a)] & Ref[4(b)]. But the same occurs in different contexts.

In 4(a)

"To provide infrastructure capable of delivering higher speeds of broadband upto 50 Mbps in a phased manner at par with those of emerging and developed countries and with availability **across the country, wherever necessary."**

In 4(b)

"Provide Universal broadband connectivity at 50Mbps to **every citizen"**.

The difference is obvious and significant not trivial.

Noting above **Q & Ans**. follow.

Q & Ans.

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.

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

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.

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

Ans.Q1., Q2., Q3., Q4.

Defining a speed applicable across the board is not advisable. Customer should get the speed wanted according to his need and not invented needs. Simply G signifies 'generation' and the various generations like 1G,2G,3G,4G,5G signify not only generation but technology used and speeds achieved, various type of services broadly that can be supported also [5,6]. This information is not of much help to the customer unless some corelation is available between speed and the services. Good guides like [7,8] will be quite handy. Accordingly, for consideration:

a) Customer may be able to get speed according to his/her choice at premises.
b) He should be able to measure the speed at his/her own premises (mobile/fixed).
c) The TSP/Regulator may devise their own methods to monitor speed at suitable points according to operating/monitoring requirements w.r.t benchmarks.
d) The emphasis should not be on removing **digital divide** but removing **have and have-nots** divide[9,10,11.]
e) Emphasis should be on perceived needs of customer and not on invented needs by TSP's/Regulator.

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.

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

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.

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.

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.

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.

Ans.Q5, Q6, Q7, Q8, Q9, Q10

RoW rules 2016 [12] issued by the DOT have been framed in exercise of the powers conferred by sub-section (1) and clause (e) of sub-section (2) of section 7 read with sections 10, 12 and 15 of **the Indian Telegraph Act, 1885(13 of 1885).** In addition, there is a **National Broad Band Mission** Document [13]**.** To achieve the objectives there are various committees at various levels. For some state committees refer [14,15,16]. The issues raised in Q5, Q6, Q7, Q8, Q9, Q10 need to be discussed at state/UT level committee where associations are also invited as special guests. The agreed issues/views arrived at state levels need to be discussed at National Level committee/committees not limited to operational issues of roll out but including suggestions regarding changes in provisions in relevant Acts and Rules made under such Acts where associations are also represented as special invitees. The issue of non-formation of committees at state level if any could also be discussed at national level committee.

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

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

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

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.

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

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

. 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?

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

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

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

Ans.Q11, Q12, Q13, Q14, Q15, Q16, Q17, Q18, Q19, Q20:

Probably better results will be achieved by more coordination between the licensees in various areas within the existing legal, regulatory, licensing framework at their own level and through their respective associations. Outstanding issues arrived at by consensus can be brought to the notice of respective authorities addressing the same within the existing legal, regulatory, licensing framework. Amendments after due diligence could be issued in the matter accordingly where and when needed. Otherwise any changes even with good intentions can lead to litigation leading to a situation like AGR case where even SUPREME COURT of INDIA lamented while deciding the case after '20' long years of litigation as under:

"1. In the appeals, the question involved is with respect to the definition of gross revenue as defined in clause 19.1 of the licence agreement granted by the Government of India to the Telecom Service Providers. The case has a chequered history and the scenario projected is that even after the licensees agreeing with the revenue sharing regime under the Telecom Policy of 1999 for the last two decades, definition of gross revenue has been litigated upon, though the intendment was to keep it free from the same and various disputes."

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

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

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

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.

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.

Ans.21,22,23,24,25 [17,18,19,20 21].

The availability of a specific bitrate does not guarantee per-se that all the services supported by that bitrate will be availed by a customer. Perhaps that could be the reason that in handheld mobile phones choice is available to keep data on or off. For promoting DATA use the need of customer for the same should be ascertained before making provisions available for a specific bitrate. Policy making irrespective regulatory or otherwise for promoting of DATA use should be based on strong market survey. Such investments will not come from TSPs'/manufacturers unless these are in the category of charity or CSR. To utilise **USFO** funds might help removing **DIGITAL DIVIDE** but will deny public funds for meeting the requirement of other pressing problems like removing **HAVES and HAVE-NOTS DIVIDE**. Accordingly, to tap private funds incentives may be given like providing funds to remove DIGITAL DIVIDE may be classified as charity, CSR. These options are only suggestive in nature and are in no way exclusive leaving doors wide open for other options.

The evolving technologies may be mandated to be backward compatible with previous generations. If not possible then previous generation technology/technologies may also be sustained where working, available and needed like 2G. The slogans like 2G free INDIA are ill conceived and anti-customer.

Enabling regulatory/policy/legal framework to promote utilise existing/forthcoming all types of infrastructure created by any agency including private barring some exceptions where the same is not advisable/possible to achieve Digital India Dream may be put in place sooner than yesterday. Some indicative examples are vast underground copper network of BSNL, MTNL, Towers throughout the length and breadth of the country, CaTV cables. Th Other likely additional options may also be explored. May be after incremental/substantial investments to make them more useful in addition to current use.

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.

Ans.26.

The way question is framed divides the network between two end customers intuitively into 'two' vertical partitions viz: core network and access network. It is well known fact that access network is a weak link. And end to end QoS service is dependent on the weakest link in the chain. Keeping in view that core networks are well cared for and keeping the same in view to divide nomenclature of licenses for various kinds of services the following is for consideration:

a) Various names of service licenses may be prefixed by either 'core network', 'access network', or 'hybrid work' depending on various constituting parts of two main vertical partitions of network between end consumers.

b) The following definition of 'core network' and 'access network' may be handy while working on item **Ans.26**(a) above:
"The access network is the network or the part of a telecommunications network that gives the user access to the telecommunications service. The access network can be made up out of different parts. The different parts of the access network are connected through backbones.
These backbones form the so-called core network. The core network (or backbone) is the part of a network that connects the different parts of the access network. The core network also provides the gateway for other networks." (**Source-Internet)**
Note: No definition for 'Core Network"', 'Access Network' could not be found on TRAI or DoT sites.

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.

Ans.27

Any bench marking relating to contention ratio, latency and bandwidth utilisation or any other parameter may be avoided. Prescribing the same will open floodgates for TSP's responsible for connecting networks to core networks for finding excuses to blame the core network providers for their short comings. Accordingly:

a) The performance of core network and connecting networks to the same may be left to commercial agreement provisions signed between the two.
b) Focus should on monitoring performance of services between end to end customers.

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.

Ans.28.

No. Customers may not make any head or tale of such data. Defining 'Core Network' and 'Access Network' without ambiguity may be more helpful as customer is interested in end to end service quality.

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.

Ans.29.

RAN networks per-se are not responsible for throughput. There are many interconnecting networks between two end-to-end customers including CPE equipment. The real remedy lies in identifying and quantifying causing performance degradation in RAN. Probably PARETO law will also work here.20% causes may be responsible for 80% effect. Focus on eliminating those causes may result in appreciable improvement.

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.

Ans.30.

There is no need for policy, regulatory measures for mandating checks. This may be left to TSP's and provisions in commercial agreements among the concerned entities**.**

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.

Ans.31.

RAN is part of access network without any ambiguity. However, the way the questions has been framed the customer appears to mean the end 'consumer'. In reality this need to apply to RAN operator as he himself is a customer to someone up the chain of network reaching out to the core network. So, such information if mandated shall provide him an alibi to camouflage some problems in his own domain. In any case such information is of no solace/use to end consumer. If needed such information may be built into QoS service parameters receivable through AUDIT by the Regulator and as the same is not of any use to the end customer alias customer at the time of enrolling.

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.

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.

Ans.32., Anss.33.

Notwithstanding the source of CPE/Mobile equipment connected to registered jack/hand held supplied by service provider/procured from open market it must have following characteristics:

a) Must be compatible to services asked/provided according to affordable plan chosen
b) Have ability for interoperability for ease of change of plans/ of service provider (may/may not exist for equipment fixed or mobile given by the service provided).
c) The connected equipment may not adversely affect the network of the service provider (this may not arise in service provider given equipment) but it may not affect the other networks connected to the service provider network.
d) The security and related issues may not arise in National/International domain.
2. Considering the huge amount of variety of equipment involved a separate CP on the subject is welcome.

Conclusions:

In addition to Answers the following is for consideration as the same is relevant to CP:

1. The networks like the one provided by **BBNL** [22] are middle mile networks having NLDO license. These can probably meet some needs of both the core network and access network license holders. While considering the issue of maximising the existing resources to meet the policy objectives some mandatory regulatory/legal provision may be considered for middle mile entity/entities. The trade-off achieved will be in the form using existing assets available resulting in early timely service to deprived areas including remote areas even at the cost of competition and ease of business issues not likely to arise.

2.INDIA NFAP 2018 (based on ITU Table of Frequency Allocation 2016) needs to be revised ASAP basing them on the latest ITU Table of Frequency Allocation 2020 provided in Article 5 WRC-19 Final Acts).[23].

3. Core networks and access networks may be defined and names of licences may be suffixed accordingly.

References:

1. https://www.trai.gov.in/sites/default/files/PR_No.72of2020.pdf

2. https://www.trai.gov.in/sites/default/files/Broadband_CP_20082020.pdf

3. https://www.trai.gov.in/sites/default/files/PR_No.86of2020.pdf

4(a). https://dot.gov.in/sites/default/files/National%20Broadband%20Mission%20-%20Booklet_0.pdf?download=1

&(b).https://dot.gov.in/sites/default/files/Final%20NDCP-2018.pdf?download=1

5. Simply, the **"G"** stands for **"GENERATION".** While you connected to internet, the speed of your internet is depending upon the signal strength that has been shown in alphabets like 2G, 3G, 4G etc. right next to the signal bar on your home screen. Each Generation is defined as a set of telephone **network standards**, which detail the technological implementation of a particular mobile phone system. The speed increases and the technology used to achieve that speed also changes. For e.g., 1G offers 2.4 kbps, 2G offers 64 Kbps and is based on GSM, 3G offers 144 kbps-2 mbps whereas 4G offers 100 Mbps - 1 Gbps and is based on **LTE technology**.

Features	1G	2G	3G	4G	5G
Start/Devlopment	1970/1984	1980/1999	1990/2002	2000/2010	2010/2015
Technology	AMPS, NMT, TACS	GSM	WCDMA	LTE, WiMax	MIMO, mm Waves
Frequency	30 KHz	1.8 Ghz	1.6 - 2 GHz	2 - 8 GHz	3 - 30 Ghz
Bandwidth	2 kbps	14.4 - 64 kbps	2 Mbps	2000 Mbps to 1 Gbps	1 Gbps and higher
AccessSystem	FDMA	TDMA/CDMA	CDMA	CDMA	OFDM/BDMA
Core Network	PSTN	PSTN	Packet Network	Internet	Internet

The aim of wireless communication is to provide high quality, reliable communication just like wired communication (optical fibre) and each **new generation** of services represents a big step (a leap rather) in that direction. This evolution journey was started in **1979** from 1G and it is still continuing to 5G. Each of the Generations has standards that must be met to officially use the G terminology. There are institutions in charge of standardizing each generation of mobile technology. Each generation has requirements that specify things like throughput, delay, etc. that need to be met to be considered part of that generation. Each generation built upon the research and development which happened since the last generation. 1G was not used to identify **wireless technology** until 2G, or the second generation, was released. That was a major jump in the technology when the wireless networks went from **analog to digital**.

6.

1G - First Generation

This was the first generation of **cell phone technology**. The very first generation of commercial cellular network was introduced in the late 70's with fully implemented standards being established throughout the 80's. It was introduced in 1987 by Telecom (known today as Telstra), Australia received its first cellular mobile phone network utilising a 1G analog system. 1G is an analog technology and the phones generally had poor battery life and voice quality was large without much security, and would sometimes experience **dropped calls**. These are the analog telecommunications standards that were introduced in the 1980s and continued until being replaced by 2G digital telecommunications. The maximum speed of 1G is **2.4 Kbps**.

2G - Second Generation

Cell phones received their first major **upgrade** when they went from 1G to 2G. The main difference between the two mobile telephone systems (1G and 2G), is that the **radio signals** used by 1G network are analog, while 2G networks are **digital**. Main motive of this generation was to provide secure and reliable communication channel. It implemented the concept of **CDMA** and **GSM**. Provided small data service like SMS and mms. Second generation 2G cellular telecom networks were commercially launched on the GSM standard in Finland by Radiolinja (now part of Elisa Oyj) in 1991. 2G capabilities are achieved by allowing multiple users on a single channel via multiplexing. During 2G Cellular phones are used for data also along with voice. The advance in technology from 1G to 2G introduced many of the fundamental services that we still use today, such as SMS, **internal roaming**, conference calls, call hold and billing based on services e.g. charges based on long distance calls and real time billing. The max speed of 2G with General Packet Radio Service (GPRS) is 50 Kbps or 1 Mbps with Enhanced Data Rates for GSM Evolution (EDGE). Before making the major leap from 2G to 3G wireless networks, the lesser-known 2.5G and 2.75G was an interim standard that bridged the gap.

3G - Third Generation

This generation set the standards for most of the wireless technology we have come to know and love. Web browsing, email, video downloading, picture sharing and another **Smartphone technology** were introduced in the third generation. Introduced commercially in 2001, the goals set out for third generation mobile communication were to facilitate greater voice and data capacity, support a wider range of applications, and increase data transmission at a **lower cost**.

The 3G standard utilises a new technology called **UMTS** as its core network architecture - Universal Mobile Telecommunications System. This network combines aspects of the 2G network with some new technology and protocols to deliver a significantly faster data rate. Based on a set of standards used for mobile devices and mobile telecommunications use services and networks that comply with the International Mobile Telecommunications-2000 (IMT-**2000**) specifications by the International Telecommunication Union. One of requirements set by IMT-2000 was that speed should be at least 200Kbps to call it as 3G service.

3G has Multimedia services support along with **streaming** are more popular. In 3G, Universal access and portability across different device types are made possible (Telephones, PDA's, etc.). 3G increased the efficiency of frequency spectrum by improving how audio is **compressed** during a call, so more simultaneous calls can happen in the same frequency range. The UN's International Telecommunications Union **IMT-2000** standard requires stationary speeds of 2Mbps and mobile speeds of 384kbps for a "true" 3G. The theoretical max speed for **HSPA+** is 21.6 Mbps.

Like 2G, 3G evolved into 3.5G and 3.75G as more features were introduced in order to bring about 4G. A 3G phone cannot communicate through a **4G network**, but newer generations of phones are practically always designed to be backward compatible, so a 4G phone can communicate through a 3G or even **2G network**.

4G - Fourth Generation

4G is a very different technology as compared to **3G** and was made possible practically only because of the advancements in the technology in the last 10 years. Its purpose is to provide **high speed**, high quality and high capacity to users while improving security and lower the cost of voice and data services, multimedia and internet over IP. Potential and current applications include amended mobile web access, **IP telephony**, gaming services, high-definition mobile TV, video conferencing, 3D television, and cloud computing.

The key technologies that have made this possible are **MIMO** (Multiple Input Multiple Output) and **OFDM** (Orthogonal Frequency Division Multiplexing). The two important 4G standards are WiMAX (has now fizzled out) and **LTE** (has seen widespread deployment). LTE (Long Term Evolution) is a series of upgrades to existing UMTS technology and will be rolled out on Telstra's existing 1800MHz frequency band. The max speed of a 4G network when the device is moving is 100 Mbps or **1 Gbps** for low mobility communication like when stationary or walking, latency reduced from around 300ms to less than 100ms, and significantly lower congestion. When 4G first became available, it was simply a little faster than 3G. 4G is not the same as **4G LTE** which is very close to meeting the criteria of the standards. To download a new game or stream a TV show in HD, you can do it **without buffering**.

Newer generations of phones are usually designed to be **backward-compatible**, so a 4G phone can communicate through a 3G or even 2G network. All carriers seem to agree that **OFDM** is one of the chief indicators that a service can be legitimately marketed as being 4G. OFDM is a type of digital modulation in which a signal is split into several narrowband channels at different frequencies. There are a significant amount of infrastructure changes needed to be implemented by service providers in order to supply because voice calls in **GSM**, **UMTS** and **CDMA2000** are circuit switched, so with the adoption of LTE, carriers will have to re-engineer their voice call network. And again, we have the fractional parts: **4.5G** and **4.9G** marking the transition of LTE (in the stage called LTE-Advanced Pro) getting us more MIMO, more D2D on the way to IMT-2020 and the requirements of **5G**.

5G - Fifth Generation

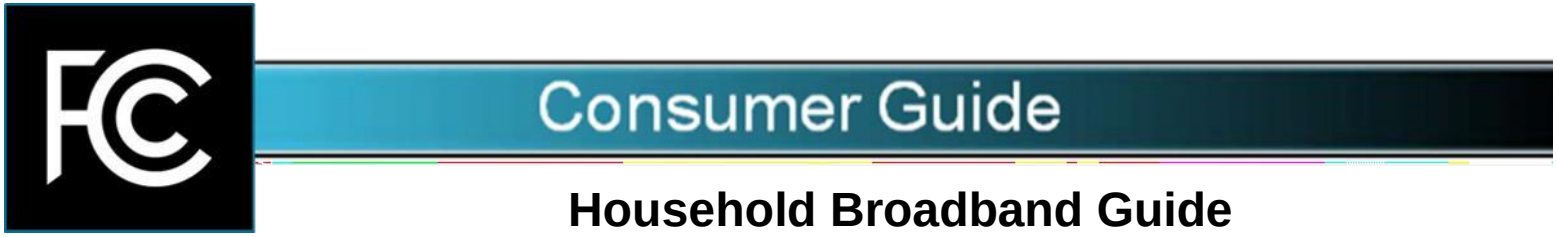
5G is a generation currently **under development**, that's intended to improve on 4G. **5G** promises significantly faster data rates, higher connection density, much lower latency, among other improvements. Some of the plans for 5G include **device-to-device** communication, better battery

consumption, and improved overall wireless coverage. The max speed of 5G is aimed at being as fast as **35.46 Gbps**, which is over 35 times faster than 4G.

Key technologies to look out for: **Massive MIMO**, Millimetre Wave Mobile Communications etc. Massive MIMO, millimetre wave, small cells, **Li-Fi** all the new technologies from the previous decade could be used to give 10Gb/s to a user, with an unseen low latency, and allow connections for at least **100 billion devices**. Different estimations have been made for the date of commercial introduction of 5G networks. Next generation Mobile Networks Alliance feel that 5G should be rolled out by **2020** to meet business and consumer demands.

7. **https://www.fcc.gov/sites/default/files/broadband_speed_guide.pdf**

8.



Household Broadband Guide

Use the chart below to compare minimum download speed (Mbps) needs for light, moderate and high household use with one, two, three or four devices at a time (such as a laptop, tablet or game console).

You can also compare typical online activities with the minimum Mbps needed for adequate performance for each application by using our Broadband Speed Guide.

For more information on broadband speeds, see our Measuring Broadband America report.

These numbers are rough guidelines and are not based on surveys or experiments conducted by the FCC. You should use

your best judgment when choosing your broadband service.

		Moderate Use	

	Light Use (Basic functions: email, browsing, basic video, VoIP, Internet radio)	(Basic functions plus *one* high-demand application: streaming HD video, multiparty video conferencing, online gaming, telecommuting)	**High Use** (Basic functions plus *more than one* high-demand application running at the same time)
1 user on 1 device	Basic	Basic	Medium
2 users or devices at a time	Basic	Medium	Medium/Advanced
3 users or devices at a time	Medium	Medium	Advanced
4 users or devices at a time	Medium	Advanced	Advanced

Basic Service = 3 to 8 Mbps*

Medium Service = 12 to 25 Mbps Advanced Service = More than 25 Mbps

*Mbps (Megabits per second) is the standard measure of broadband speed. It refers to the speed with which information packets are downloaded from, or uploaded to, the internet.

Consumer Help Center

For more information on consumer issues, visit the FCC's Consumer Help Center at www.fcc.gov/consumers.

Alternate formats

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Last Reviewed 02/05/20

9. 4(supra)

10.https://www.itu.int/en/ITU-D/Technology/Documents/RuralCommunications/20200120%20-%20ITU%20Last-Mile%20Internet%20Connectivity%20Toolkit%20-%20DraftContent.pdf

11. https://beta.novascotia.ca/sites/default/files/documents/1-1066/middle-mile-strategy-en.pdf

12. https://dot.gov.in/sites/default/files/ROW_2016.pdf?download=1

13. 4(supra)

14. https://meghalaya.gov.in/sites/default/files/circulars/Notification_29.pdf

15. https://www.maharashtra.gov.in/Site/Upload/Government%20Resolutions/Marathi/202007301546438111.pdf

16. https://kashmirobserver.net/2020/07/10/govt-forms-panel-for-realizing-national-broadband-mission-in-jk/

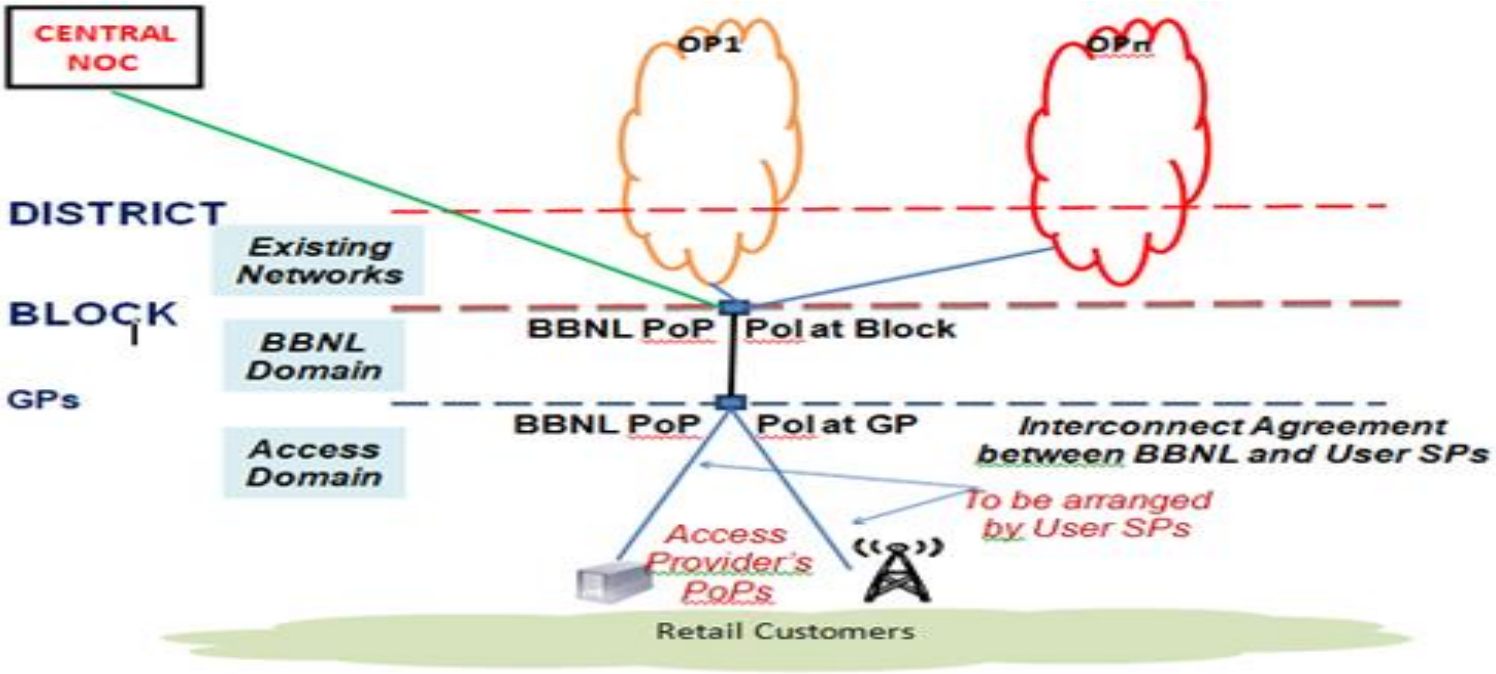
17.4(supra)

18.4(supra)

19.6(supra)

20.7(supra)

21.8(supra)



22.(Source: BBNL)

23. https://www.itu.int/dms_pub/itu-r/opb/act/R-ACT-WRC.14-2019-PDF-E.pdf

Signatories INDIA page XXIV,

Final Protocol declarations and reservations INDIA page -XXXVI-.

'2' Page -XLI-, For the Republic of India: In signing the Final Acts of the World Radiocommunication Conference (Sharm el-Sheikh, 2019), the delegation of the Republic of India reserves for its Government, the right to take such actions, as may be considered necessary, to safeguard its interests, should any administration make reservations and/or not accept the provisions of the Final Acts or fails to comply with one or more provisions of the Final Acts, including those which form a part of the Radio Regulations.

’107’ page XCIV, For the Republic of India: Having taken note of the declarations and reservations made at the World Radiocommunication Conference (Sharm el-Sheikh, 2019), the Republic of India reserves for its Government, the right to enter additional reservations and declarations as well as amend its previous reservations and declarations **prior to Ratification of the Final Acts** of the World Radiocommunication Conference (Sharm el-Sheikh, 2019) of the International Telecommunication Union.

Frequency allocations ARTICLE 5

My note: Not known whether **INDIA** has finally ratified or not the Final Acts 0f the WRC-19 (Sharm el-Sheikh,2019) of the ITU.

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