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Telecom Regulatory Authority of India

Consultation Paper

on

Regulating Converged Digital Technologies and Services –

Enabling Convergence of Carriage of Broadcasting and Telecommunication services

New Delhi, India

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Stakeholders are requested to furnish their comments to Advisor (BB&PA), TRAI, by 27th February 2023 and counter-comments, if any by 13th March, 2023.

Comments and counter-comments would be posted on TRAI's website: www.trai.gov.in. The comments/counter-comments may be sent, preferably in electronic form, to Shri Sanjeev Kumar Sharma, Advisor (Broadband and Policy Analysis), Telecom Regulatory Authority of India, on the email id: advbbpa@trai.gov.in with a copy to jtadv-bbpa@trai.gov.in.

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Introduction to Convergence

I. Background

1.1. Convergence has been defined and interpreted in many ways. In the media and telecommunications business, it may mean the tendency for services to merge into one offering that combines the features of the original services. In a transmission context, it may mean integrated delivery, via a single delivery channel, of voice and other services. From the perspective of a Regulator, convergence may mean integration into a single regulatory framework of formerly separate responsibilities or the creation of explicit means of coordination among regulators concerned with similar sectors, issues, etc. From a user perspective, convergence is the ability to obtain multiple services on a single platform or device and obtain any given service on multiple platforms or devices.

1.2. Convergence has been defined by the ITU in its publication *"Trends in Telecommunications Reform - 2004-05: Ch 5: licensing approaches in an era of convergence" (ITU; 2004).* The paper has defined various aspects of convergence:

i) Integration of customer end terminal equipment/ access devices such as the telephone, television and personal computer.

ii) Provision of various communication services like text, data, image, multimedia and video over the existing infrastructure or over a single transmission medium.

iii) Capability of the same technology to offer various services.

iv) Different services under converged licensing regime.

v) *Fixed – mobile substitution/ convergence.*

1.3. Over the period of time, various technological developments in digital markets have resulted in the convergence of devices, services, and networks:

i. *Device Convergence* – Convergent devices share three primary attributes. Firstly, they can perform multiple functions to serve a blended purpose. Secondly, can collect and use data in various formats and implement machine learning techniques to deliver enhanced user experience. Thirdly, converged devices are connected to a network directly or are interconnected with other devices to offer universal access to users. Technological convergence includes devices and systems that interface with end users, and those devices are called "smart" devices, which often include IoT devices. For example, a user interacts with converged devices, such as a smart television (TV), to access the contents that are distributed over a network. A smart TV has combined the functions of a traditional TV, a computer, and several other devices that used to have one specific purpose. In addition to displaying over-the-air broadcast TV channels, smart TVs interface with users to surf the internet, view photos taken from smartphones and stored in the "cloud," display feeds from home security cameras connected to a network, play music, notify users of incoming calls and messages, and allow video teleconferencing.

ii. *Service convergence* – In the media and telecommunications business, it may mean the tendency for services to merge into one offering that combines the features of the original services. Convergence of services allows operators to offer bundles of services to the end-users. Converged services include at least two different types of services, for example, double-play, triple-play, quadruple play bundled services.

- Double-play combines two of the following services: fixed-line telephone voice services, mobile telephone voice services, fixed television and radio services, mobile television and radio services, fixed-line broadband access and mobile broadband access services.

- Triple-play bundles comprise three types of basic services (voice, TV and radio, broadband), with data transfer services being tied to broadband access.
- Quadruple-play/Quad-play service is the triple-play bundles with at least one mobile component added, represents fixed-mobile convergence, i.e., [broadband, TV, voice] with wireless provisions.

iii. *Network convergence* – In a transmission context, it may mean the integrated delivery, via a single delivery channel, of voice and other services, through a single network infrastructure that handles and distributes multiple types of media. Network convergence became prominent when telecommunications and information networks were integrated; it became prevalent when mobile cellular communications incorporated access to the internet and made it widespread. For example, today's cable companies process information in the form of voice, video, and data on a single network and often offer their services as a bundle package (e.g., phone, television, and internet services). Similarly, cellular networks, which distribute information to and from mobile devices and fixed platforms, process voice, video, and data. IPTV is one example of network convergence where same IP enabled broadband network carries internet and TV broadcast traffic simultaneously.

1.4. Efficient utilization of resources, increased level of competition, more innovative user applications and technological developments are the main drivers of convergence. Convergence has been intensified by the emerging use of digital technologies across the sectors. The convergence of digital and physical products through the use of Machine to Machine (M2M), Internet of Things (IoT) Artificial Intelligence, Internet of Things (IoT) and other technologies is paving the way for Fourth Industrial Revolution (Industry 4.0). It represents a transition to a new set of

systems that brings together digital, biological, and physical technologies in new and powerful combinations. Moreover, convergence is taking place in the entire value chain of service delivery to end-users. Earlier, a user was required to purchase a specific device and seek specific subscriptions from different service providers for consuming each type of content/ service, but now multiple services can be subscribed from a single service provider and consumed over a single device.

1.5. During the last three decades, the use of Information and Communication Technologies (ICTs) in the delivery and consumption of these services has considerably increased. Over this period, there has been a massive increase in the storing, processing, and functional capabilities of the network systems and consumer devices. Digitalization of these services has resulted in the convergence of individual delivery networks as well as consumer devices. Digital transformation has drastically increased the computing and information delivery capabilities of communication networks. This has resulted in the development of global-scale digital platforms which are generally hosted in the Cloud and can deliver virtually any service to any person and at any place through the Internet. Now, instead of having vertically separate networks for each service, the digital platforms and networks have horizontal layers. Accordingly, there may be a need to reorient the applicable policies, laws, rules, regulations, and procedures from vertical to horizontal.

1.6. When discrete things start converging into one integrated unit, the *whole is greater than the sum of its parts.* A camera and Mobile phone as distinct units have some values which can be attributed to each. But once a camera is integrated into a mobile phone it creates additional value i.e., now one can edit and upload photos instantly without first downloading it on the desktop, need to carry only one device, reduced cost and many more which were not possible when Camera and mobile phone were working as distinct devices. Similarly, a converged system creates more

value than the sum of earlier individual units. Convergence has brought several benefits to stakeholders. But at the same time, it has posed several challenges as well.

1.7. Convergence plays an important role in society from the economic, social, and development perspective. It can influence the way in which governments develop appropriate policies while looking for social welfare; enterprises compete in the market; and individuals communicate with each other and benefit from efficient, lower-cost, innovative, and new value-added products and services. In this sense, technological convergence brings new opportunities to meet development goals and bridge the digital divide; a single service provider can offer different products and services. Technological convergence along with standardization enable transparent and modular communication between different products over the network and the possibility of delivering a broader set of products. Other benefits are lower entrance barriers, promotion of competition, lower cost equipment, quicker market response, and new business opportunities[1].

1.8. Today many App developers provide services like internet calling, video chats, messaging, music, video on demand, etc. Previously, such services could not have been provided by anyone other than licensed service providers. Convergence has resulted in the development of innovative products and new services. It has given rise to new players in the market. With the advent of digital media and Over-the-top (OTT) services, the boundaries among providers of different services are also blurring. While on one hand, convergence is resulting in the introduction of new OTT services, on the other hand, new OTT services are pushing convergence further. In India, technological convergence is leading to a hazy space

[1] https://www.sjpub.org/sjp/sjp-221.pdf

where both licensed telecom service providers and other players are operating.

1.9. Technological convergence brings with it peculiar issues of policy, regulation, data privacy, and data security, hence it is important that policy and regulations evolve on a continuous basis to keep pace with the developments. From a policy perspective, in the converged era, important areas may be standards and technical license conditions that may be relevant from various perspectives including safety, interoperability and quality of service. Technological convergence poses the challenge of protecting public interests. National Regulators are required to respond to technological innovations and deal with changes in their regulatory frameworks, policies, and legislation. Participating stakeholders need to be increasingly competitive. They need to deliver value-added products and services, and to provide services, applications, and content which fit the needs, location, and preferences of users at reasonable and competing prices. The other challenge involved is the need to work on initiatives aimed at lowering barriers for adoption of technological convergence and infrastructure facilitation[2].

1.10. Regulating a converging technology, which is a result of blending or integrating multiple technologies, can be challenging. In some situations, as technologies converge, the outcome may yield a completely new technology for which a regulatory category did not previously exist. Examples include OTT services, IoTs, AR/VR, and virtual assistants. Augmented Reality (AR), Virtual Reality (VR), Artificial Intelligence (AI), Internet of Things (IoT), blockchain, and edge computing are some of the technologies that will contribute to development and penetration of Metaverse in the coming years. As it develops and get deployed, Metaverse would progressively start impacting the Indian socio-economic

[2] https://www.sjpub.org/sjp/sjp-221.pdf

scene in a substantial manner. Without a clear regulatory and oversight framework in place, Metaverse may be left unregulated or partially regulated. Administration and governance structure for the metaverse would be needed. Such structure may mirror the governance structure of the physical world.

1.11. Absence of institutional mechanism for coordination among multiple administrative units/government departments that are responsible to govern converged services, leads to confusion and uncertainty amongst stakeholders. It is necessary that the institutions that handle these activities from the perspectives of policy, regulatory, licensing and supervision, also converge. In India, technological evolution has led to overlapping functions such as IPTV services, the permission for which is granted by DoT as well as MIB. Within communications space, another department i.e., the Department of Space (DoS) deals with the issue of communication satellites. Further, the Ministry of Electronics and Information Technology (MeitY) looks after issues relating to electronics and information technology. Due to the convergence of technologies, many new-age services like Over-the-top (OTT) Communication Services, online video streaming, etc. are operating at the intersection of these compartmentalized functions of the departments and many times , remains out of the required policy and regulatory oversight of the Government.

1.12. Regulating a converging technology, which is a result of blending or integrating of multiple technologies, can be challenging because the one-to-one relationship between a converging technology and a regulatory entity is no longer clear. The distribution of similar functions across the multiple Ministries/ Government Departments not only leads to inconsistencies in the development of the policy approach but it also increases the regulatory burden and cost on the business and Industry. This adversely affects Ease of Doing Business (EoDB) as the Industry is

not clear as to who will prepare policies , give permissions and who will decide the regulatory framework . This in turn impacts innovation as the response time to exploit new technologies increases. Thus, ambiguous regulatory environment will negatively impact the investment sentiment.

1.13. Converged regulatory framework may need to address these issues and also consider other aspects such as investment enabling policies, R&D, innovation etc. As the boundaries disappear between network and usage of services, the old administrative/ licensing and oversight structure needs to be reviewed and realigned with the way networks operate. Convergence is a continuous process as technology also keeps on evolving and developing. For enabling convergence of the technologies across the sectors, it is therefore necessary that old institutional structure of the Government departments/ ministries and allocation of business rules are reviewed and revisited.

1.14. The growth of convergence in the form of products and services at ground level has in turn resulted in a convergence of regulation in different parts of the world. Countries like the United States of America, Singapore, Australia, South Korea and many more have long ago merged their regulatory bodies into one for regulation of telecom and broadcasting industries. In India too, in 2004, TRAI was entrusted regulation of broadcasting sector, in addition to telecom sector. However, the actual benefits of convergence could not be realized, as most functions were with ministries that did not converge. Areas that may be of concern for a regulator may be market access, pricing, investment, and merger approval, etc. motivated by a broad range of market failure concerns.

II. Convergence in Telecom and Broadcasting services

1.15. In 2021, India had 1.2 billion mobile subscribers of which about 750 million were Smartphone users. The number of Smartphone users is predicted to reach 1 billion users by 2026 as per Deloitte's 2022 Global

TMT (Technology, Media and Entertainment, Telecom) report. More than 80% of internet users access the internet on their mobile phones. With 1.1 million minutes of video streamed or downloaded every second, 82% of Internet traffic is video traffic. This estimates to 240.2 EB (Exabyte) of data per month. Live Internet video traffic has increased 15-fold between 2017 and 2022 which is more than predicted.[3]

1.16. In the broadcasting sector, as on March 2021, there were about 210 million TV households out of which around 72 million households have Cable TV, 70 million household Direct to Home Service, and around 40 million households have Door darshan either through Free Dish or Terrestrial.

1.17. In the past, telecommunications and broadcasting services were based on different technologies, had distinct governance and had clearly separate markets. Their regulatory and licensing frameworks were also different. Telecommunication transmits information between individual specified persons and its purpose was to provide two-way communication. On the other hand, the primary function of broadcasting has been to provide one-way communication, though to many unspecified people. Telecommunication had a private nature of communication. Telecommunications markets were ruled by economic and technical issues, including network access. Regulators' role, inter-alia, included ensuring affordable communication services to everyone. The broadcasting sector had a public nature and main concerns were free speech, decency, programming of cultural content, sports, major events, advertisements, etc. Broadcasters were supervised by content boards or similar institutions ensuring that the content services complied with the desired societal objectives and prevalent norms/ laws.

[3] https://home.iitk.ac.in/~adrish/DTM/WP.pdf

Media ownership restrictions and other rules were also extended to commercial broadcasting services.

1.18. The evolution of connectivity is having a more expanding look as digital connectivity does not just include radio access technologies or fiber, but also satellites, Wi-Fi, and short-range technologies. Digital connectivity, which is used to provide telecom and internet services, has also acquired capabilities to provide services which were provided by the broadcasting services. Today's evolving digital technologies and ongoing deregulation are beginning to blur the boundaries that once separated these two functions, at least from the perspective of carriage of these services. With the progress of technology and entrepreneurial activities, these differences will further become more obscure. The increase of processing speed, storage capacity, transmission speed, compression techniques and standardization have allowed for a single or similar set of services to be offered over different networks e.g., over cable, satellite, telecom networks. Conversely, different services which were earlier being carried over different networks started to be carried by one converged network. This allows bundling of distinct services onto a single platform such as triple and quadrupling play.

1.19. Shared use of networks not only makes possible provision of a wider variety of services, but also stimulates the entry of telecommunications operators and broadcasters into each other's territory, thus making the regulation of market much more complex. The convergence introduced new forms of competition and disrupted long-term governance relations. New services and new entrants are emerging, whilst established players are vertically integrating or even exiting the market. Providers are actively working to meet changing user needs, make effective use of business resources, and exploit synergies among various business activities by developing activities that transcend the barriers between telecommunications and broadcasting. Convergence may be disruptive

as the changes in the market structure, competition, mergers and acquisitions are not to be seen much in individual markets but rather in a consolidated market. Horizontal integration of infrastructure, market and services may strengthen market power.

1.20. Convergence of telecom services and broadcast service platforms is facilitating efficient utilization of the underlying infrastructure used for carriage of these services. These platforms are increasingly complementing each other with the growing adoption of high-speed broadband networks, both wired and wireless, and consumers are demanding the same content experience and other broadcasting and telecommunication services across multiple form-factor devices. Many of these services are being provided by the service providers as bundled services with each service(s) under different provisions of the license under which they operate.

1.21. Further, with convergence of devices and services and reach of fast delivering converged networks, the distinction between broadcaster and consumer is blurring. Now the same device can be used to consume, produce, and share content. Accordingly, regulation of content in converged era is becoming extremely difficult.

1.22. The recent increase in OTT media consumption has challenged telecom service providers (TSPs) to support more content, more devices, and more users with limited infrastructure resources. Traditional unicast delivery methods would require a significantly large investment. The exponentially growing availability of 4K and even higher quality content with new technologies require a large amount of bandwidth to be streamed and appears as a new issue to be handled for network operators. Non-linear TV applications such as time-shifting, start-over, catch-up TV and cloud-PVR, may impact on the global design of the video delivery solution, in particular for the content caching aspects and for the switching between unicast and multicast streaming modes that they

may induce. There is a growing demand from operators to deploy converged video delivery solutions across all their networks, fixed and mobile, and across all the screens, to save on operational costs and on equipment costs. But it requires dealing with latency from the live edge and scalability for peak events.

1.23. Due to advancement of technologies, today communication as well as broadcasting services can be carried as data on networks supporting transmission of data. IP has become a common transport layer to carry all services (telecommunication, broadcasting, and data services). With the emergence and growing popularity of IP delivered content, there is a shift towards convergence of delivery platforms, with telecom networks being increasingly used for distribution of broadcast content. Smart-TVs have enabled front end integration of linear and non-linear television services. With Smart-TV, it is possible to surf seamlessly between satellite-based television channels and OTT services-based channel seven as consumer remains oblivious to such transition. Converged service delivery is giving multiple benefits to service providers like lower CAPEX and OPEX, ease of maintenance, economy of scale etc.

1.24. In the converged era, regulatory and licensing frameworks need to be revisited to enable industry players to offer new services in a converged era and provide it in a ubiquitous and cost-efficient manner. This is also needed to ensure that growth of telecommunication and broadcasting sectors are in sync with global reforms. New framework should be defined in such a way that it provides sufficient flexibility and opportunities to connectivity providers, media providers and technology providers for adopting new business models. While looking at converged telecom and broadcasting sectors, OTT world may also be required to be factored-in while carrying out required reforms. Other aspects such as new entry, interconnection, consumer protection, sharing of infrastructure, and QoS are also to be handled in the new market structure. Policy objective,

in an era of convergence, should be to create an environment which enables maximization of benefits and helps in addressing challenges of convergence.

1.25. As discussed above, convergence of telecom and broadcasting networks and services can ensure efficient utilization of the available resources. The convergence of these services is creating vast new capabilities that are benefiting individuals, businesses, and society as a whole. However, the administrative government units responsible for overseeing these functions have still not been converged/ restructured. Disparate policy structures for telecom and broadcasting cause governance challenges like multiple license/permission authorities for same converged service (e.g., IPTV), lack of regulatory clarity on the outcomes of converged technologies (e.g., OTT), demarcated administration of the converged digital services (e.g., converged cloud platforms) etc.

III. Convergence with IT sector due to convergence in IP based networks

1.26. Convergence has not only created policy, regulatory and administrative overlaps of telecom sector with broadcasting sector, but also with IT sector. Services offered by telecom service providers to end customers are heavily dependent upon the performance of IT infrastructure. With introduction of 4G (later versions) and 5G networks, Telecom Service Providers are also using cloud infrastructure for their own purposes, such as to build and operate their core and radio networks/ functionalities. At the same time, end customers are using services offered by Information Technology enabled Service (ITeS) Providers, which in turn is heavily dependent upon the performance of TSP's networks. From an end user's perspective, what matters is the end-to-end performance of service delivery infrastructure. To improve performance and build adequate capacity to serve the customer with

good quality of experience, TSPs and ITeS Providers may require collaborating, co-designing, and co-developing the service delivery networks. As traffic of cloud services is growing rapidly, the requirement of cloud infrastructure is increasing day by day, and it requires not only expansion of capacity but to be geographically more pervasive, i.e., spread across the country, which earlier used to be limited to few points in the country. Functionalities such as Cloud-based Radio Access Networks, Software Defined Networking (SDN), Network Function Virtualization (NFV), Mobile Edge Computing (MEC), etc., are also being introduced by TSPs in their networks. Convergence is happening not only at the infrastructure level but also at the level of protocols used in the networks by IT and the telecom world. User agents are also converging, and same or similar user agents are being used by IT applications and the telecom world.

1.27. Telecom space has traditionally been regulated and hence is bound to comply with certain regulations. With the blurring of boundaries, services may either move from telecom space to cloud space or maybe a mix of both. Currently, telecom is monitored for its performance as a part of the regulations, while cloud services are not subjected to the same or similar regulations. The un-noticed transition of services from regulated to unregulated domain and that too without appropriate considerations of impact of such transitions on the protection of the interest of the customers may be a matter of concern for the telecom sector.

1.28. The blurred boundaries due to convergence are also resulting into overlapping of administrative jurisdictions. While DoT has been entrusted with the function of licensing of internet services, all other matters related to Internet (other than licensing of Internet Service Provider) including promotion of internet, IT and IT enabled services have been entrusted to MeitY. Similarly, policy, licensing and coordination matters relating to data services and other like forms of communications

have been allocated to DoT in allocation of business rules. The policy related to Data Centers, policy on Open Application Programming Interfaces, policy on Open Government Data (OGD) Platform etc. have been framed by MeitY. Similarly, IT content regulation function which was under MeitY has now been bifurcated and the OTT broadcasting content regulation has been given to MIB. Blocking of websites is under the purview of MeitY, and the same is done through DoT.

1.29. The Information Technology Act 2000 was passed by the parliament to provide legal recognition to electronic commerce. It essentially emphasizes the following areas:

- Legal Recognition of Electronic Documents
- Justice Dispensation Systems for cyber crimes
- Legal Recognition of Digital Signatures
- Offenses and Contraventions

Section 6(A) of this Act is about Delivery of Services by Service Provider, which is as follows:

The appropriate Government may, for the purposes of this Chapter and for efficient delivery of services to the public through electronic means, authorize, by order, any service provider to set up, maintain and upgrade the computerized facilities and perform such other services as it may specify, by notification in the Official Gazette.

[Explanation: For the purposes of this section, service providers so authorized includes any individual, private agency, private company, partnership firm, sole proprietor form or any such other body or agency which has been granted permission by the appropriate Government to offer services through electronic means in accordance with the policy governing such service sector.]

1.30. As it appears from the plain reading of this provision in the Information Technology Act 2000, the service providers using electronic means to deliver services must have the permission of the appropriate Government

in accordance with the policy governing such service sector. However, the policy and legal framework for delivering such services over the electronic means (Internet) seems to be ambiguous. In view of the above, it can be inferred that for the emerging and converging information and communication technologies, there is an urgent need to review the existing policy/institutional framework in the country.

1.31. The Cable Television Networks (Regulation) Act, 1995 regulates the operation of cable television networks in the country and matters connected therewith or incidental thereto. This act covers aspects such as Registration of cable TV operators, Programme code, and Advertisement code. However, this Act does not govern the issue of DTH, HITS, and IPTV licenses. These licenses are issued under the Indian Telegraph Act 1885 by MIB. Streaming of content over the internet is also not covered under this Act and accordingly, it is claimed to be regulated under the Information Technology Act 2000. In 2021, while notifying Information Technology (Intermediary Guidelines and Digital Media Ethics Code) Rules 2021, a conscious decision was taken that issues relating to digital media and OTT and other creative programmes on Internet shall be administered by MIB, but the overall architecture shall be under the Information Technology Act, which governs digital platforms[4].

1.32. There is a need to have an oversight and an institutional mechanism that keeps an eye on the latest developments happening in the cloud space as well as in the telecom and broadcasting space to continually take adequate and timely measures to protect the interests of the customers. This will ensure the orderly growth of the sector so as to exploit the new opportunities and attract new investments and protect the public interests in the form of security and privacy. There is a need to recognize that performance of service delivery is now a mixture of performance of

[4] https://www.pib.gov.in/PressReleseDetailm.aspx?PRID=1700749

the infrastructure deployed by ITeS and Service Providers (SPs). It is difficult to differentiate the responsibilities of ITeS and SPs, which may create serious issues in achieving the performance objectives or other regulatory provisions already laid out for the consumers. In the coming years, it would be almost impossible to demarcate and assign responsibilities between cloud and telecom service providers from a regulatory perspective. It is necessary to examine issues related to cloud services and come up with the measures which will help the Government to respond appropriately as and when required to do so.

1.33. A converged service delivery digital platform, hosted in the Cloud, can deliver Telecommunication services such as voice and video telephony, rich Multi-Messaging Services, and audio and video conferencing services; Broadcasting services such as audio and video streaming, and social media applications; financial services such as e-payments; and e-commerce services, etc. The technological distinction or demarcation among various such e-services (electronic services) has blurred. It is pertinent to note here that, the convergence of services, networks and devices, and development of converged service delivery digital platforms have increased the risks relating to market concentration and winner takes all approach. This further necessitates the review of the Government Institutions/ Departments functions and the applicable policies, laws, rules, regulations, and procedures for the ICT sector. The modernization of laws and regulations, to reflect this central technological paradigm i.e., convergence of Information and Communication Technologies, is an immediate need. The objective of promoting innovation, competition and growth of India's Digital Economy may not be fully achieved by just amending the India's Information Technology Act, 2000, which primarily provide legal recognition for transactions carried out using electronic data interchange and other

means of electronic communication, commonly referred to as “electronic commerce”.

IV. Convergence of telecom with space sector

1.34. Presently, providing any satellite-based communication service to the public or setting up a satellite-based network is a multi-stakeholder process that requires close coordination among the Department of Space (DoS), Ministry of Information and Broadcasting (MIB), Department of Telecommunications (DoT) Satellite Licensing Division, Wireless Planning & Coordination (WPC) Wing, Network Operations & Control Centre (NOCC). Various separate authorizations/permissions broadly indicated below are required by an investor:

(i) Service license or appropriate authorization from DoT under the Indian Telegraph Act as described in previous chapter.

(ii) Space segment assignment to render the services through DoS/NSIL or space segment provider duly authorized by DoS/IN-SPACe.

(iii) Frequency assignment (Decision Letter (DL), SACFA clearance and Wireless Operating Licence) from WPC.

(iv) Carrier plan approval and up-linking permission from NOCC.

(v) security clearance (wherever applicable).

In addition, Telecommunication Engineering Centre (TEC) issues/ modifies the relevant standards including the Interface Requirements from time to time. NOCC is responsible for monitoring satellite systems and resolving interference issues.

1.35. Satellite communication networks have been playing very critical role like providing mobile coverage in remote places of the country where it is not economical to have terrestrial networks, providing services during sea and air travel and providing services in case of disaster when terrestrial

networks fail. The ecosystem of satellite communication has developed independent of terrestrial mobile networks. Currently, mobile networks dependance on satellite networks is limited to use of satellite backhaul connectivity in remote and inaccessible areas. However, with advancement of technologies, the linkages between satellite and mobile network communication are growing. Satellite networks have their own end consumer devices which are sometimes incompatible with even other satellite network e.g., an Inmarsat based satellite phone doesn't work with Iridium network and vice versa. Till now, the scale and openness of Satellite communication was far less than their terrestrial peers. However, with the advent of 6G broadband technologies, the possibility of convergence of Non-Terrestrial Networks (NTN) like Satellite communication networks with Terrestrial Mobile networks has emerged. While 5G networks solely depend upon terrestrial mobile networks for radio coverage, 6G networks are being designed to provide services using various access technologies like fixed, mobile and satellite. 3GPP is already working on developing 5G NR for satellite communications to merge hitherto two disparate ecosystems into one. This will address the challenges of reachability and service continuity in unserved/ under-served areas for terrestrial networks, enhance reliability through connectivity between various access technologies, and improve network resilience and dependability in responding to natural and man-made disasters. Due to this convergence, non-terrestrial networks (NTNs) could also take advantage of well-developed device ecosystem of terrestrial networks and dedicated satellite phones may be a thing of past. This convergence is expected to be a harbinger of a new growth trajectory for satellite industry and expected to play a greater role in reduction of digital divide in the country.

1.36. Though, technological convergence is being led by 3GPP, India needs to prepare itself to redraw boundaries of administrative and regulatory

functions so as to take maximum advantage of this convergence. This convergence will pose similar types of regulatory, policy and administrative challenges as being posed by convergence of telecom and broadcasting. Space domain was earlier being controlled and managed solely by the Department of Space and its entities. However, recently the government has separated regulatory and commercial functions from DoS. The Union Cabinet took the decision in June 2020 to open up the Space sector and enable the participation of Indian private sector in the entire gamut of space activities. To facilitate private sector participation, the government has created the Indian National Space Promotion and Authorization Centre (IN-SPACe), as a single-window, independent, nodal agency which functions as an autonomous agency in Department of Space (DOS). Established as a single window agency for all space sector activities of private entities, IN-SPACe is expected to play an important role in boosting the private space sector economy in India. However, this change doesn't address the issues of converging telecom, space, and broadcasting sectors and associated administrative, regulatory and policy concerns. Considering the increasing importance of Satellite Communications with advent of LEO/MEO technologies which can provide broadband with almost terrestrial like quality, these issues will gain prominence especially from the perspective of using satellite communication to bridge Digital Divide.

V. Status of convergence in India and issues thereof

1.37. Presently, at technology level, convergence has already happened as one general purpose network can serve all types of services - Telecom, Broadcasting and ITeS. At service level also, it has converged as services are becoming network agnostic and media types and formats and signaling protocols to establish sessions and deliver payloads are becoming the same. And at device level also, it has converged as all types of digital devices may be used to consume different types of services.

1.38. However, this technological convergence at network, service and device level is facing challenges due to absence of convergence at statutory, licensing, regulatory and administrative level as discussed below.

A) At Statutory level

1.39. At statutory level, presently there are different Acts and Guidelines, Indian Telegraph Act 1885, Indian Wireless Telegraphy Act (IWT Act) Information Technology Act (IT Act 2000), Cable Television Networks (Regulation) Act, 1995 (CTNR Act), Prasar Bharati (Broadcasting Corporation of India) Act, 1990, and on regulation side, TRAI Act,1997 (as amended) that govern the converged Information and communication technologies and services. On the content side, in addition to some of the aforementioned Acts, there are several Acts that govern regulation of content, copyrights, and patents. These include The Cinematograph Act of 1952, Press and Registration of Books Act 1867, The Patent Act of 1970, The Copyright Act of 1957.

1.40. These Acts are inadequate to address regulatory concerns in a converged era. For example, the IT Act 2000 provides for some regulation of OTT platforms but is limited to their liabilities as an intermediary only and not communications service providers. It is also to note that though the administration and oversight of IT Act 2000 is with MeitY, the government, in exercise of the powers conferred by sub-section (1), clauses (z) and (zg) of sub-section (2) of section 87 of the Information Technology Act, 2000 (21 of 2000), has on 25th February 2021 enabled MIB to oversee content regulation for OTT based content providers. However, there is no oversight/ regulatory mechanism for the issues related to tariff and quality of service for such players. Moreover, there is an inconsistency in these acts, for example, two of these Acts, namely, CTNR Act and IT Act 2000 also lay down statutory provisions for content regulation, whereas other Acts are broadly content agnostics.

1.41. As has been discussed above, while DoT deals with the issues relating to communications which include voice, video, and data communication, MIB deals with information and broadcasting technologies. With the evolution of technologies, this has led to overlapping of functions. For example, as mentioned earlier, IPTV permission is granted by DoT as well as MIB. Within communications space, the third department i.e., DoS deals with the issues relating to communication satellites. Further, MeitY is looking into issues relating to electronics and information technology. Now, due to the convergence of technologies, many new-age services including social media, OTT communication, broadcasting services, online video streaming etc. are operating at the intersection of these compartmentalized functions of the departments and may remain out of the necessary oversight and policy frame of the Government. This distribution of similar functions of regulating content across the multiple Ministries/ Government Departments can lead to inconsistencies in policy approach, increased regulatory compliance costs to businesses, and burden on consumers in the end. The content regulations and issues involved have been discussed in detail in next section.

1.42. In summary, all the above statutes co-exist, work in silos, sometime overlap in their scope/mandate, and still do not cover all types of existing or future tech-based communications. Further, convergence of technologies warrant permissions from different ministries and oversight from different regulators. Coordinating with ministries and regulators across the sectors is not only a challenge for service providers, but it also increases their costs and infuses delays. It is absolutely necessary to revisit the governance structure so as to respond timely to new opportunities and challenges arising out of convergence from new technologies, new products, and new services.

B) At Licensing level

1.43. At licensing level, there is hardly any convergence. Unified Licenses given by DoT include many communication services such as access, Internet, NLD, ILD, satellite-based services under Indian Telegraphy Act 1885.

1.44. DoT gives license for IPTV services under Indian Telegraph Act 1885 and MIB permits IPTV services through registration as IPTV service provider under CTNR Act. The TV distribution services, such as satellite based DTH, MSO and Cable TV Services, are not included in the scope of authorizations under UL but DTH licence is issued by MIB under Indian Telegraph Act 1885. TV Channel broadcasters are given permission under D/L and U/L guidelines issued by MIB (As of now broadcasters use services of teleport operators for Uplinking/ downlinking of services. Permission for Teleport operators is issued with reference to the Telegraph Act 1885). In the context of new market structure, the role of Market players such as TSPs, Infrastructure Providers, MSOs, LCOs etc. would be required to be redefined.

1.45. In the past, technology-specific regulation was sufficient, as content, services and applications were tightly coupled to their respective networks/ platforms. As convergence involves content, services and applications being offered on any platform, technology-specific regulation is no longer relevant. The technology-specific approach would be too detailed in the converging environment, would lead to a slow licensing process, and would restrict competition in the industry and growth of the industry in the form of new investments, new technologies, products, and services.

C) At Regulatory level

1.46. The Telecom Regulatory Authority of India (TRAI) was established in the year 1997 by an Act of Parliament viz. Telecom Regulatory Authority of India Act, 1997, to regulate the telecommunication services and to

protect the interests of service providers and consumers of telecom services. The TRAI (Amendment) Act, 2000 revised the definition of "telecommunication service" to add that the Central Government may notify other services to be telecommunication service, including broadcasting services. In exercise of this power, the Government, vide a Notification dated 9th January 2004, added broadcasting and cable services within the definition of telecommunication service in terms of Section 2(k) of the TRAI Act. Thus from 2004 onwards, TRAI was also vested with the powers to regulate broadcasting & cable TV services in the country.

1.47. At the Regulatory level, the regulation of the Space sector is completely separated from the Telecom and Broadcasting sectors. Broadly speaking, the Department of Space (DoS) performs all regulatory functions of the space sector. However, to facilitate private sector participation, the government has now created the Indian National Space Promotion and Authorization Centre (IN-SPACe), as a single-window, independent, nodal agency which functions as an autonomous agency in DoS. Established as a single window agency for all space sector activities of private entities, role of IN-SPACe includes boosting the private space sector economy in India.

1.48. Globally, the governments around the world have moved towards convergence as many countries have put in place a regulatory mechanism in which the providers of transmission infrastructures of broadcasting services and telecom services are governed by a single entity of the government under a single Act of legislature. FCC in USA, OFCOM in UK and ACMA in Australia are few examples of converged international bodies for telecom and Broadcasting sector. The chapter on international experience in this CP looks into details about the regime that some of the nations have in this area. Though TRAI is already a unified regulator for regulating carriage of Telecom as well as

Broadcasting sectors, its regulatory powers, however, are limited in comparison to the other regulators in many major countries. Broadly speaking, TRAI regulation powers are limited to prescribing and monitoring of quality benchmarks, Interconnect rules and pricing of services only. In other critical areas like licensing administration, spectrum management etc., TRAI has only got recommendatory powers. Many areas like content regulation have been kept out of TRAI's preview. So, it needs to be critically examined how the role of TRAI as a unified regulator can be redefined to meet the objectives of regulatory convergence of Telecom and Broadcasting in line with the of role of regulators of other developed countries. Due to the increasing popularity of OTT streaming platforms, content has become more important today. Therefore, content regulation is one of the areas which needs detailed examination and consultation.

1.49. **Content regulation:** In several leading nationalities, there is convergence as far as regulation of carriage as well as content is concerned. In the USA, FCC regulates providers of telecommunication services, broadcasting services, cable services and its content. In UK, the principal code for regulating content is the OFCOM Broadcasting Code, however, media content regulation is carried out by different regulators based on the type of media. Australia has an inter-related framework comprising of funding and regulatory mechanisms to secure Australian content. The Government and ACMA are responsible for regulating the screen industry and publishing information for compliance purpose.

In India, Cable Networks Television (Regulation) Act, 1995 and the rules laid down under it regulate Television broadcasting in India. The 1994 Rules lay down a Programme Code ('Code') which regulates the content on TV. Television, both news, and entertainment is regulated by the Cable Networks Regulation Act (2005). Print media is regulated by the Press Council of India. Advertisements are regulated by the Advertising

Standards Council of India. News regulation is also done by self-regulation by the News Broadcasters Association (NBA). Films are regulated by the Central Board of Film Certification (CBFC) established under the Cinematograph Act, 1952. The Cinematograph Act, 1952 is provides for the certification of cinematograph films for exhibition and regulating exhibitions. As per this act, the Film Certification Appellate Tribunal (FCAT) is the statutory body constituted under the MIB that hears appeals filed by applicants aggrieved by any order of the CBFC. However, it is to be noted that the Cinematography act is applicable only to movies or videos released in theatres for exhibition. The movies/TV shows/web-series etc., released in OTT platforms online remain outside its jurisdiction.

As far as regulation of content in the broadcasting sector is concerned, the situation has become increasingly complex due to the onset of a large number of OTT streaming providers. The OTT revolution has led to many gaps in the policy space of content regulation. In India, OTT content oversight policy is still evolving and a work in progress. The government, however, by way of notification has brought OTT platforms, under the ambit of the MIB. As per the current regulatory framework, the OTT content is regulated by the provisions of the Information Technology Act, 2000 and many other acts. The OTT content oversight policy has led to many gaps in the policy space of content regulation. The use of digital media has increased tremendously during the last few years. On the internet, many new players have emerged, including OTT platforms and online news portals. Information Technology (Intermediary Guidelines and Digital Media Ethics Code) Rules, 2021 is one of the significant rules framed under Information Technology Act, 2000 which applies to publishers of news and current affairs, publishers of online curated content (commonly called OTT platforms) and intermediaries. Part II of the rules which relates to intermediaries, is administered by the Ministry

of Electronics & Information Technology whereas Part III which is related to digital news publishers and OTT platforms, is administered by the Ministry of Information & Broadcasting. The main features of these rules are:

(i) Due diligence by intermediaries

(ii) Three tier Grievance redressal mechanism

(iii) Code of Ethics for Publishers

(iv) Self-Regulation Architecture

(v) Disclosure of Information

Presently, the content on television is regulated in multiple ways which range from statutory regulation to self-regulation. The content on TV is broadly classified as follows:

i. Non-news and Current affairs(entertainment)- The content or "programs" on these channels are regulated by the Cable Television Networks (Regulation) Act, 1995 which consists of a program code and the advertising code. The Program and the advertising codes are collectively called "codes" and are mentioned in the Cable Television Networks (Rules), 1994.

ii. News and Current affairs- There is no statutory regulatory body to regulate content for the News channels in India. News and the Current Affairs TV channels in India are regulated by a self-regulatory body known as the News Broadcasters Association (NBA).

iii. Advertisements- There is no statutory provision or body to regulate the ad content in India. A self-governing body called the Advertising standards council of India (ASCI) has been formed to regulate the ad content in India.

iv. Films on Television- The Cinematograph Act,1952 provides for the establishment of a central Board for Film Certification (CBFC) which must certify films for public exhibition.

A summary of Departments, Statutory Bodies, Acts and Rules which govern the content distribution in India is as follows:

S.No.	**Type of Content**	**Rules/Guidelines**	**Act**	**Administrative and Regulatory Authority**
1	OTT- News and Current Affairs	Information Technology (Intermediary Guidelines and Digital Media Ethics Code) Rules, 2021	Information Technology Act, 2000	Digital news publishers and OTT platforms- MIB Intermediaries- MeitY
2	Private FM Radio channels and Community Radio Stations	GOPA guidelines and AIR Broadcast Code	Telecom Regulatory Authority of India Act, 1997, the Indian Telegraph Act, 1885 and the Indian Wireless Telegraphy Act, 1933	MIB
3	Non-news and Current affairs (entertainment) TV channels	Program Code defined in Cable Television Networks (Rules), 1994	Cable Television Networks (Regulation) Act, 1995	MIB The Inter-Ministerial Committee (IMC)
4	Advertisement on TV	Advertisement Code defined in Cable Television Networks (Rules), 1994	Cable Television Networks (Regulation) Act, 1995	MIB Self-governing body called the Advertising standards council of India (ASCI)

5	News and Current Affairs TV channels	Self-regulatory body News Broadcasters Association (NBA) News Broadcasting Standards Authority (NBSA)	Cable Television Networks (Regulation) Act 1995	MIB
7	Films on TV	Cinematograph (Certification) Rules 1983	The Cinematograph Act,1952	MIB Central Board for Film Certification (CBFC)
8	State Broadcasting Network-Doordarshan	Prashar Bharthi	Prashar Bharthi (PB) Act, 1990	MIB
9	Newsprint	Registration of Newspapers (Central) Rules 1956	Press and Registration of Books Act 1867	MIB

Internet Services in India are provisioned through licenses obtained by telecom sector players from DoT. Internet content in India is regulated through censorship. The Information Technology (IT) Act, 2000 provides a legal framework to regulate Internet use and commerce, including digital signatures, security, and hacking. The act contains criminal provisions for publishing obscene content electronically. A 2008 amendment added to the government's power to block Internet sites and content hosted over it and criminalized sending of messages deemed inflammatory or offensive. Internet filtering can also be done by ISPs in compliance with licensing norms. License agreements also require ISPs to prevent the transmission of obscene or otherwise objectionable material.

It may be argued that this fragmented regulatory approach for regulating content may not be conducive enough to promote growth of the fast-changing content sector with huge employment and export potential and

needs comprehensive consultations considering the criticality and complexity of the issue. The existing regulatory oversight framework for content regulation, which is patchy and inadequate at its best, may need a complete overhaul in a converged era in line with many other nations, where a converged regulator regulates carriage and content. For details the international experience chapter of this paper may be referred.

1.50. The definition of "telecommunication services", given under the TRAI Act, covers a range of sectors, including basic and cellular telecom services, provision of Internet access and broadcasting services. TRAI, as a converged regulator has already been working for orderly growth of the ICT sector which include telecommunication, broadcasting, broadband, satellite communication, cloud computing and communications, M2M communications, Net Neutrality, OTT services, smart city networks, data ownership and privacy, manufacturing of telecom equipment, content delivery networks, international data centers etc., and can continue to lead stakeholder's consultations for formulating the policies relating to converged ICT sector. However, there is a need to further expand the definition "telecommunication services" and clearly bring the ITeS services also under its ambit. Also, many of the regulatory powers are with various ministries thereby bringing convergence in governance all the more challenging.

1.51. Large scale changes in the telecom, information technology, satellite services and broadcasting sector have taken place due to convergence. Without a converged regulatory framework, any attempt to regulate these sectors may result in bottlenecks, imperfect competition, uncertainties and disputes. The regulatory regime has to be such that the consumers and service providers should benefit from technological advances. The regime should not create any hindrance in the deployment of any technology for offering any type of new services. At the same time, due to technological developments, no service providers should be able to

disturb the level playing field by taking advantage of regulatory gap or vacuum. It can be argued that to achieve these objectives, it is necessary that a converged regulatory regime for telecom, broadcasting, information technology and satellite services should be in place. Having a fully converged regulator for ICT sector which includes the data privacy and cyber-security functions also would help in increasing the confidence of the international investors and facilitate faster rollout of the digital services in the country.

D) At Administrative/ Functional level

1.52. At the administrative/ functional level, there is a lack of integration or convergence among concerned ministries/ departments. DoT is the nodal ministry for issuance of various licenses/permissions/ registrations/approvals to telecom service providers (TSPs). The nodal ministry for the issuance of all broadcasting and cable services related licenses/ permissions/ registrations of broadcasters and Distribution Platform Operators (DPOs) is the Ministry of Information and Broadcasting (MIB). While MeitY is the overseeing Ministry for IT Act 2000, there is no process of registration/ licensing or regulatory oversight over the OTT service providers providing communication or subscription-based video on demand services (some platforms do provide integrated front-end for linear channels and other content-based services). The process for granting various licenses requires further approval from several other Ministries and Departments (DoS/MHA/WPC/NOCC) for necessary clearance. In the context of the new market structure, there is a need to revisit existing administrative and functional arrangements.

E) Convergence/integration at institutional level

1.53. Merging and integrating multiple technologies from distinct functional categories into one converged technology not only faces challenges

because of segmented administrative setup, but also from multiplicity of jurisdictions of supporting institutions under various ministries. Determining authority of multiple supporting institutions like testing and certifying agencies, standard framing bodies, R&D and training institutes for converged technologies becomes a challenge as the boundaries that once separated single-function technologies blend and blur together. A challenge for policymakers may be in delineating which government institution and which standards would best serve certain technologies or certain industries. Where there were once clear lines of authority by industry or media type (e.g., IT, Telecom, broadcasting), they are no longer simple and straightforward for technologies where these functionalities have converged. As a result, the alignment of converged technologies to institutional authorities may also shift as technologies evolve. For illustration, the following paragraphs discuss some of the institutions under different ministries which can have overlapping functions in a converged era.

(i) **Standardization, testing and certification institutions/bodies -** Telecommunication Engineering Centre (TEC) is an attached office and technical arm of DoT primarily responsible for standardization, testing, certification in telecom and related IT domain, apart from advising Government in technological matters. TEC has formulated more than 600 standards and 56 Essential Requirements (ERs) in the field of telecom & related ICT domain covering mobile, radio-communication, satellite communication, fixed networks, switching, telecom security, transmission, IoT, smart network, ICT and broadcasting systems/ interfaces/ services etc.[5]. TEC tests and certifies various telecom products for conformance to standards, specifications, and its capability to inter-work/ inter-operate in the

[5] https://dot.gov.in/sites/default/files/Final%20Eng%20AR%20Min%20of%20Tele%20for%20Net%2009-02-22.pdf

existing network. Government has notified Indian Telegraph (Amendment) Rules, 2017, which, inter-alia, prescribes for mandatory testing and certification of all telecom equipment before its sale, import or use in India. TEC is implementing it and has formulated "Procedure for Mandatory Testing and Certification of Telecom Equipment (MTCTE)" document. The main objectives of MTCTE framework are to ensure that any telecom equipment does not degrade the performance of existing network; safety of the end–users; RF emissions from equipment is within safe limits; and telecom equipment complies with the relevant national and international regulatory standards & regulations. Technical Regulations in the form of ERs, which are mandatory to be complied with under MTCTE framework, have been formulated for various telecom and related IT equipment. Testing under this framework is envisaged through TEC labs, TEC designated domestic Conformity Assessment Bodies (CABs) or TEC recognized foreign CABs of MRA partner countries. TEC has also come out with a framework for certification of energy efficient green equipment for telecom sector. Setting up state-of-art Green Passport (GP) Lab in TEC is a significant step in Government's endeavor for Green Telecom and reducing carbon footprint in the sector. The GP Lab has the facility to carry out Energy Efficiency Testing of various equipment in accordance with the energy consumption rating standards prescribed by TEC.

Parallelly, MeitY too has bodies namely Standardization, Testing and Quality Certification (STQC), Directorate and Controller of Certifying Authorities (CCA) which provides Testing, Calibration, IT & e-Governance, Training and Certification in the area of Electronics and IT through countrywide network of laboratories and centers.

The Bureau of Indian Standards (BIS) has been setup for the harmonious development of activities of standardization, marking

and quality certification of goods. The new areas identified in standardization include Digital Technologies (e.g., Industry 4.0, Artificial Intelligence, Block Chain etc.) besides Smart Cities, Alternate fuels, E-mobility, Medical Devices, New and Renewable energy[6].

Initially, the standards, testing, and certification oversight policies for a specific technology were established independently. They were not necessarily developed with merging or interoperability in mind. For example, telephony (when providing voice), cable TV (when providing video), and mobile cellular technologies each follow their respective standards, and these services were regulated by policies specific to each type. When a converged technology utilizes differing communications technologies, it may be required to adhere to multiple standards and regulations. In such cases, multiple overlapping agencies may be setting up standards for a single converged technology. These standards may be at cross purpose with one another, and the industry will have to incur additional costs to meet standards and reporting requirements for converged technologies. In converged era where same equipment is being used to provide service in several sectors, having different setups for setting standards, testing and certification creates confusion. It can be argued that these institutions should either converge/integrate or should have some mechanisms to follow a collaborative approach.

(ii) **Training and Skilling Centers -** DoT has 2 training institutes namely National Telecommunications Institute for Policy Research Innovation Training (NTIPRIT) and National Institute of Communication Finance (NICF). Whereas, MIB has Film and Television Institute of India and Satyajit Ray Film and Television Institute as its training and skilling centers. Under DoS, all the ISRO

[6] https://pib.gov.in/Pressreleaseshare.aspx?PRID=1578906

centres offer training to industries, professionals, government officials, teachers, students and general public in the space applications, satellite building etc. Some of the specialized training centers include National Remote Sensing Centre, Space application center and Indian Institute of Remote Sensing (IIRS) focusing on training in Geospatial applications. MeitY has several autonomous societies like Bhaskaracharya National Institute for Space Applications and Geo-informatics (BISAG-N), Centre for Development of Advanced Computing (C-DAC), Centre for Materials for Electronics Technology (C-MET), National Institute of Electronics and Information Technology (NIELIT - Formerly DOEACC Society) etc., which are engaged in Capacity Building and Skill Development in the areas of IT; Electronics; Communication Technologies; Hardware; Cyber Law; Cyber Security; GIS; Cloud Computing etc.

It can be argued that in a converged era, these different institutions need to develop synergies so that the training and skilling of human resources can be done by framing courses and policies in a holistic manner rather than following a departmentalized approach.

(iii) **R&D Establishments-** Indian Space Research Organisation (ISRO) is the primary research and development arm of the DoS which has 12 centres across the country. Other research institutions include Physical Research Laboratory (PRL) premier institute engaged in basic research in experimental and theoretical physics, astronomy and astrophysics, earth, planetary and atmospheric sciences. National Atmospheric Research Laboratory (NARL) for atmospheric research and Indian Institute of Space Science and Technology (IIST) that offers UG, PG and doctoral programmes. MeitY has ERNET (Education & Research in Computer Networking) to meet the entire needs of the academic and research institutions by providing consultancy, project management, training and other value-added

services. MIB has Indian Institute of Mass Communication (IIMC) with the objective of teaching, training and undertaking research in the areas of journalism, media and mass communication. DoT's National Telecommunications Institute for Policy Research, Innovations & Training (NTIPRIT) carries out activities related to Policy Research, while Centre for Development of Telematics (C-DOT) is a telecom organization engaged in the research and development of state-of-the-art Telecom R&D activities as well as in the field implementation of its developed technologies. It is a registered 'public funded research institution' with the Department of Scientific and Industrial Research (DSIR), Ministry of Science & Technology, Government of India.

(iv) **Institutions for promotion of Industry/Sector –**

Various institutions have been setup by different ministries with an objective of promoting their sectors. These institutions for promoting startups, manufacturing, consultancy services etc., though envisaged to be sector-specific at the time of their establishment, now operate in blurred boundaries in an era of convergence.

For promoting startup ecosystem, different ministries have different programs and establishments. Software Technology Parks of India (STPI) is a premier S&T organization under Ministry of Electronics and Information Technology (MeitY) engaged in promoting IT/ITES Industry, innovation, R&D, start-ups, product/IP creation in the field of emerging technologies like IoT, Blockchain, Artificial Intelligence (AI) etc. Ironically, in MietY itself, there is another entity that has been entrusted with the work of promoting start-up ecosystem. A nodal entity called 'MeitY Start-up Hub' (MSH) has been set up under its aegis to facilitate MeitY's vision of promoting technology innovation, start-ups and creation of Intellectual Properties. MSH is envisaged to act as a national coordination, facilitation and

monitoring center that will integrate all the incubation centres, start-ups and innovation related activities of MeitY[7]. Under MeitY, a cohort-based Accelerator Programmes has also been initiated to bring-in seed investment, mentorship, industry connect and relevant components[8]. Under DoS, Indian Space Promotion and Authorisation Centre (In-Space) is also working to promote start-up ecosystem.

For taking up project and related consultancy works within India and abroad, there are organizations working under different ministries. TCIL, a PSU under DoT was set up for providing Indian telecom expertise in all fields of telecom, Civil and IT to developing countries around the world. Similarly, BECIL, a PSU under MIB, provides project consultancy services and turnkey solutions encompassing the entire gamut of radio and television broadcast engineering viz, content production facilities, terrestrial transmission facilities, satellite and cable broadcasting facilities in India and abroad.

Similarly on manufacturing side there are organizations under different ministries that work for promotion of ICT equipment manufacturing. Telecom Equipment and Services Export Promotion Council (TEPC) has been set up by the Government of India to promote and develop export of Telecom Equipment and Services.

Telecom Centers of Excellence India (TCOE India) have been set up in PPP mode under DoT, with the objective that the Government, the Academia, and the industry can work together for the sustained growth and progress of the country in the Telecom sector. Several Centres for Excellence have also been established by MeitY. Domain specific Centres of Excellence (CoEs) are made operational with the

[7] https://dic.gov.in/index.php/divisions/meity-startup-hub
[8] https://www.meity.gov.in/content/innovation-promotion

participation of MeitY, STPI, State Governments, Industries and VCs[9].

It can be argued that in a converged era, mechanisms are needed to build synergies amongst all these sectoral institutes and bodies either by merger of some of the related institutes or by developing a collaborative approach on various interrelated issues so that the research and development of converged equipment and platforms do not suffer from myopic segmented approach.

VI. Communications Convergence Bill, 2001

1.54. The first move to harness the benefits of the converged technologies to meet the growing social and commercial needs in India was made when The Communication Convergence Bill, 2001 was introduced in Lok Sabha on 31st August 2001. The Bill was introduced to promote, facilitate and develop in an orderly manner the carriage and content of communications (including broadcasting, telecommunications, and multimedia), for the establishment of an autonomous Commission to regulate the carriage of all forms of communications, and for the establishment of an Appellate Tribunal and to provide for matters connected therewith or incidental thereto.

1.55. This bill was introduced to:

i. facilitate the development of a national infrastructure for an information-based society, and to enable access thereto;
ii. provide a choice of services to the people with a view to promoting the plurality of news, views, and information;
iii. establish a regulatory framework for carriage and content of communications in the scenario of convergence of telecommunications, broadcasting, data-communication, multimedia, and other related technologies and services; and

[9] https://www.meity.gov.in/content/centres-excellence-coe-projects

iv. provide for the powers, procedures, and functions of a single regulatory and licensing authority and of the Appellate Tribunal.

1.56. The Bill proposed to set up a Communication Commission of India (CCI) with wide-ranging powers to deal with the carriage and content. The head office of the Commission was to be located in Delhi with regional offices at Kolkata, Chennai, and Mumbai.

1.57. The Bill proposed to combine and bring under the purview of the Commission the licensing and registration powers and the regulatory mechanisms for the telecom, information technology and broadcasting sectors. However, the bill could not attain finality.

VII. TRAI's past initiative on Convergence

1.58. Convergence is a powerful force in bringing about greater competition. A well-designed scheme of regulation that helps convergence can vastly increase competitiveness and hence the efficiency of the economy. Accordingly, in January 2006, the Authority initiated a consultation process[10] on 'Convergence and Competition in Broadcasting and Telecommunications' that focused on the need to bring about convergence in all aspects of regulation of the telecom and broadcasting industries. The issues related to the need for a comprehensive legal framework for promoting convergence; approach to unified licensing; and technology and service neutral spectrum licensing were dealt in the consultation process. The paper also covered impact of convergence on markets, consumers, and regulation; international regulatory developments; and regulatory challenges for India.

1.59. After the consultation process, in March 2006, TRAI released its recommendations[11] titled **'Issues relating to Convergence and Competition in Broadcasting and Telecommunications'** which aimed

[10] https://trai.gov.in/sites/default/files/Convergence.pdf
[11] https://trai.gov.in/sites/default/files/recome20mar06.pdf

at knitting together the prior recommendations in a holistic conceptual framework. The Authority, through these recommendations, suggested some measures to deal with the rapidly growing convergence trends and had also tried to fill the gaps due to lack of comprehensive legislation to deal with the rapidly converging telecommunication and broadcasting carriage issues.

1.60. The Authority recommended that the regulation of carriage and content should be separated, as the skill sets required for the two are significantly different. With respect to licensing of all modes of carriage of telecommunications and broadcasting services, the said Recommendations included adoption of 'the Unified Licensing Regime' as recommended by the TRAI vide its recommendations dated 13th January 2005. Flexibility in spectrum allocation to take full advantage of new services and new technologies for existing services was also recommended. The Authority also recommended the following:

i. *A converged regulatory regime is essential to deal with various issues arising out of the convergence of technologies and services. However, the division of powers/roles/functions between the regulator, the Government and the Appellate Tribunal should be broadly along the existing lines. The Communications Convergence Bill of 2001 would be the logical starting point but several changes would be required in the draft to reflect the existing division of powers as well as to take into account the experience of regulation in the last five years.*

ii. *The converged regulator should have powers of tariff regulation, interconnection as well as laying down the quality of service standards for broadcasting and telecommunication sectors.*

iii. *The power of issuing unified (converged) licenses should remain with the Government.*

iv. *Spectrum management should continue with the Government.*

v. *There is no need to have a Communications Appellate Tribunal in place of TDSAT.*

vi. *Regulation of carriage and content should be separated.*

1.61. Since the publication of these recommendations, TRAI has not been made aware of any efforts on part of Government to draft or introduce another bill on convergence. While TRAI is the regulator that deals with both the telecommunications and broadcast sectors, the licensing is still dealt with separately with different Government Ministries/Departments.

1.62. In 2011, pursuant to TRAI recommendations dated 5th August 2010 on Digital Addressable Systems (DAS), Ministry of Information & Broadcasting issued notification dated 11th November 2011, laying down the roadmap for implementation of digitization in cable television sector. Digitalization of the broadcasting services can be considered a watershed moment in the growth of the sector. It propelled the industry from a hitherto unorganized, unregulated sector to a structured, technology driven sector. The adoption of digital addressable regime not only provided the consumers with a vastly improved quality of service, but it also opened a host of opportunities for the sector by reaping the benefits of convergence.

VIII. NDCP–2018 Objective and convergence

1.63. The NDCP 2018 also recognizes the importance of convergence in the telecom and broadcast services by stressing upon the importance of enabling infrastructure convergence of IT, telecom, and broadcasting, establishing a unified policy framework for broadcast and broadband technologies, and restructuring of legal, licensing and regulatory frameworks for reaping the benefits of convergence. The strategy 1.1 (g) is laid out under Connect India Mission for Creating a Robust Digital Communication Infrastructure. Same is reproduced below:

Strategy 1.1 (g) Enabling Infrastructure Convergence of IT, telecom, and broadcasting:

i. *Amending the Indian Telegraph Act, 1885 and other relevant acts for the purpose of convergence in coordination with respective ministries*
ii. *Establishing a unified policy framework and spectrum management regime for broadcast and broadband technologies*
iii. *Restructuring of legal, licensing and regulatory frameworks for reaping the benefits of convergence*
iv. *Allowing benefits of convergence in areas such as IP-PSTN switching*

IX. Other efforts on convergence – Parliament Standing Committee and Niti Aayog

1.64. The Parliament of India's Standing Committee on Information Technology examines the policies, programs, and regulations related to the telecom and broadcasting sector by the Ministry of Electronics and Information Technology (MeitY) and the Department of Telecommunications (DoT) and makes recommendations to the government on how to address the challenges and opportunities facing the sector. The Parliamentary Standing Committee on IT called TRAI and DOT to depose before it and give their opinion on the subject matter 'Inter-Sectoral review of challenges of emerging and converging technologies, entities and practices'. Parliament Standing Committee in its report on “India Preparedness for 5G” observed that 5G will lead to the convergence of multiple sectors and critical sectors will no longer work in silos. This calls for convergence between various regulatory bodies/authorities so as to arrive at a consensus on multiple regulatory frameworks and different laws applicable to them[12].

[12] https://eparlib.nic.in/bitstream/123456789/799780/1/17_Information_Technology_21.pdf

1.65. The National Institution for Transforming India (NITI) Aayog had convened a meeting of representatives from various ministries and organizations, inter-alia, including TRAI, DOT, MeitY and DPIIT in December 2020 to discuss the 'Principles for India's Digital Economy'. It was deliberated that the foundation or the base for the digital economy has already been established in India. The way forward for approaching this would be through the establishment of an interdependent, integrated, and inter-connected digital ecosystem, which is not in silos, but one which leverages various aspects of the digital ecosystem. To serve the needs of the digital economy, urgent necessity to implement regulatory reforms was felt. Based on the detailed discussions and deliberations held at the meeting, it was summarized that a number of legislations will need to be rationalized and harmonized (including but not limited to the IT Act and the Telegraph Act), along with the establishment of a digital charter. Given that the matter is in an inter-ministerial space – there is a need for a single body to bring all ministries on to one platform for consistent, focused and time bound discussions for framing of the law in a mission mode approach (similar to medical education and PM JAY etc.). It may be decided either by the Cabinet Secretariat or the PMO regarding the way forward and the institutional mechanism to lead this exercise.

X. Reference received from DoT.

1.66. DoT has first sent a reference to TRAI on Convergence of Carriage of Broadcasting Services and Telecommunication Services on 20th October 2021 to TRAI stating that taking note of the technological developments and policy evolution across the world, TRAI is requested to furnish recommendations on the following items under the terms of Section 11 of the TRAI Act, 1997 (as amended):

a. Amending the licensing regime to enable the convergence of carriage of broadcasting services and telecommunication services; and

b. Establishing a unified policy framework and spectrum management regime for the carriage of broadcasting services and telecommunication services.

1.67. Subsequently, DoT through another letter No. AS-25/1/2021-AS-V dated 12th August 2022 ***(Annexure I)***, stated that the matter related to Convergence of Carriage of Broadcasting Services and Telecommunication Services was deliberated in DoT, and accordingly they have sought TRAI's consolidated recommendations on the following items as well under the terms of Section 11 of the TRAI Act, 1997 (as amended):

a. Restructuring of legal, licensing, and regulatory frameworks for reaping the benefits of convergence of carriage of broadcasting services and telecommunication services; and

b. Revising regulatory regime in respect of DTH and Cable TV services holistically addressing all Institutional, regulatory and legal aspects.

XI. Present Consultation process

1.68. In line with the National Digital Communications Policy (NDCP), 2018 objective under its Connect India Mission and the abovementioned DoT reference, the Authority has decided to issue a Consultation Paper (CP) on *'Regulating Converged Digital Technologies and Services – Enabling Convergence of Carriage of Broadcasting and Telecommunication services*'. The scope of this consultation paper is to seek comments from stakeholders on the aspects referred to by the DoT and also to seek comments on various other aspects relating to convergence.

1.69. This consultation paper is composed of five chapters.

Chapter 1 introduces the idea of convergence, technological trends leading towards convergence, types of convergence as well as background to the need for this Consultation.

Chapter 2 gives an overview of the existing authorization framework of telecommunication and broadcasting services and the challenges, constraints with the current licensing regimes of telecom and broadcasting services in enabling convergence. It also deliberates the possible ways for amending/restructuring the licensing/legal/ regulatory frameworks for the purpose of convergence.

Chapter 3 deals with the issue(s) regarding establishing a unified policy framework and spectrum management regime for the carriage of broadcasting services and telecommunication services.

Chapter 4 discusses the developments taking place in the rest of the world in bringing about convergence in telecom and broadcasting sectors.

Chapter 5 summarizes the issues for consultation.

CHAPTER 2

Challenges in enabling Convergence of carriage of Broadcasting and Telecommunication services.

2.1. Discussions in the previous chapter bring out the need to revisit regulatory and licensing frameworks for enabling convergence of the technologies across the sectors. This is needed to ensure that orderly growth of the telecommunication and broadcasting sector is in sync with global reforms and trends. This is also crucial for enabling and facilitating industry players to offer new services in a ubiquitous and cost-effective manner in a converged era. New frameworks should be able to provide further flexibility and opportunities to connectivity providers, media providers and technology providers to adopt new business models in wake of convergence.

2.2. Policy objective in an era of convergence should be to enable to maximize benefits from new technologies and also address the resulting challenges. In converged telecom and broadcasting sector, aspects such as new entry, interconnect, consumer protection, sharing of infrastructure, and QoS will be required to be revisited from the perspective of policy, licensing, governance and regulation. As discussed earlier, OTT world may also be required to be factored-in while carrying out required reforms. Through this chapter, the issue(s) regarding 'Amending the licensing regime to enable the convergence of carriage of broadcasting services and telecommunication services' are being discussed as per the reference received from DoT. To start with, it is important to look at the existing framework governing various licenses/authorizations related to the telecom and broadcasting sector.

Table 2.1: Overview of existing authorization framework of different services

Service	Authorization type	Authorization granted under	Authorization granted by	Spectrum granted by
Telecommunication services	License	Indian Telegraph Act, 1885	DoT	DoT
Broadcasting Services	Permission	D/L-U/L guidelines	MIB	DoT/DoS
Direct-to-Home (DTH) Services	License	Indian Telegraph Act, 1885*	MIB	DoT/ DoS
Cable TV services	Registration	The Cable Television Network (Regulation) Act, 1995	MIB	-

I. Licensing in Telecommunication Sector

2.3. The **Indian Telegraph Act, 1885** is the enabling legislation in India which governs the use of wired and wireless telegraphy, telephones, teletype, radio communications and digital data communications. As per section 3 (1AA) "telegraph" means any appliance, instrument, material, or apparatus used or capable of use for transmission or reception of signs, signals, writing, images and sounds or intelligence of any nature by wire, visual or other electro-magnetic emissions, Radio waves or Hertzian waves, galvanic, electric or magnetic means. As per the Act, the Central Government shall have the exclusive privilege of establishing, maintaining, and working telegraphs.

2.4. The Indian Telegraph Act, 1885 contains six parts. Part I deals with definitions of key words used in the Telegraph Act. Part II grants the government the exclusive privilege with respect to telegraph. Part II also

gives power to issue licenses to private operators to offer telegraph services. Part IIA was inserted in the Telegraph Act by the Indian Telegraph (Amendment) Act, 2003. It deals with setting up of the Universal Service Obligation Fund (USOF) for the purpose of meeting universal service obligation. Part III deals with procedures and guidelines to be followed for installing and maintaining communication equipment. It also lays down guidelines for setting up communication devices in private property and also the procedure for resolution of any dispute which may arise between the service provider and the owner of the private property. Part IV lays down the offences and penalties with respect to unauthorized use of communication or telegraph services. Part V deals with other supplementary provisions.

Evolution of Telecom Policies and Unified Licensing Regime

2.5. Licensing framework has been an integral part of India's telecommunication law. Under section 4 of the Indian Telegraph Act, 1885, the Government has the power to grant the license to any person for establishing, maintaining, or using a telegraph.

Section–4 *– Exclusive privilege in respect of telegraphs, and power to grant licenses. – Within India, the Central Government shall have the exclusive privilege of establishing, maintaining and working telegraphs: Provided that the Central Government may grant a license, on such conditions and in consideration of such payments as it thinks fit, to any person to establish, maintain or work a telegraph within any part of India.*

(2) The Central Government may, by notification in the Official Gazette, delegate to the telegraph authority all or any of its powers under the first proviso to sub-section (1).

DoT was responsible for telecom services in the entire country until 1986 when Mahanagar Telephone Nigam Limited-MTNL was established to run the telecom services of metro cities (Delhi and Mumbai). However, in the

telecom sector, the Government had a complete monopoly only until the early 1990s.

2.6. The Government announced the National Telecom Policy (NTP) in 1994, to increase accessibility to telecom services. The policy was formulated for the purpose of opening up the Indian markets for foreign direct investment as well as domestic investment in the telecom sector. The Policy also aimed at providing 'world-class' quality telecom services and development of telecom services in India, for which the policy defined certain important objectives, including the availability of telephone on demand, provision of world-class services at reasonable prices, ensuring India's emergence as a major manufacturing/export base of telecom equipment, and universal availability of basic telecom services to all villages. NTP 1994 was the first step towards deregulation, liberalization, and private sector participation in the telecom service sector.

2.7. In 1999, New Telecom Policy was released, which aimed at the rapid expansion of tele-density. It also set the objective for the creation of a modern, and efficient telecommunications infrastructure considering the convergence of IT, media, telecom, and consumer electronics, and thereby propelling India into becoming an IT superpower. It also allowed for the migration of the licensees from a Fixed License Fee Regime to a Revenue Share Arrangement Scheme (w.e.f. 1st August 1999). Under the new scheme, the license fee is collected as a percentage of the service provider's revenue.

2.8. In November 2003, the Government introduced the Unified Access Service License (UASL) regime as per recommendations given by TRAI. The UASL permitted an access service provider to offer both fixed and/or mobile services under the same license, using any technology. Licenses under UASL were given in the years 2003, 2004, 2006, 2007, and 2008 following the principle of First Come First Served. In the year 2010, the 3G and Broadband wireless access spectrum was auctioned.

Subsequently, the Government announced delinking of the spectrum from the license.

2.9. National Telecom Policy, 2012, was issued by the Government in June 2012. One of the objectives of the NTP, 2012, was to simplify the licensing framework and to strive for the creation of a **One Nation – One License** across services and service areas. That is, to move towards Unified License regime in order to exploit the attendant benefits of convergence, spectrum liberalization, and facilitate delinking of the licensing of networks from the delivery of services to the end-users in order to enable the operators to utilize their networks and spectrum optimally and efficiently by sharing active and passive infrastructure.

2.10. Further, the Authority in April 2012 has given its Recommendations on **"Guidelines for Unified Licence/Class Licence and Migration of Existing Licenses"**. To achieve the key objective of National Telecom Policy-2012 *'Strive to create One Nation–One License',* across services and service areas, and considering the recommendations of TRAI for Unified Licenses, the Government decided to grant Unified License (UL). The Government decided to implement this regime in two phases, in the first phase, the UL regime was introduced in 2013, and in the second phase, towards the delinking of licensing for networks from the delivery of services, a new category of Unified License (Virtual Network Operator) was introduced in 2016.

2.11. In the Unified License regime allocation of spectrum was delinked from the license and it has to be obtained separately as per the prescribed procedure, i.e., bidding process. Only one Unified License is required for all telecom services in the entire country. The service provider may choose the services to be offered, which is called Service Authorizations. Authorization for various services, as contained in UL, are mentioned below:

a) Unified Licence (All Services)

b) Access Service (Service Area-wise)
c) Internet Service (Category – A with All India jurisdiction)
d) Internet Service (Category – B with jurisdiction in a Service Area)
e) Internet Service (Category – C with jurisdiction in a Secondary Switching Area)
f) National Long Distance (NLD) Service
g) International Long Distance (ILD) Service
h) Global Mobile Personal Communication by Satellite (GMPCS) Service
i) Public Mobile Radio Trunking Service (PMRTS)
j) Very Small Aperture Terminal (VSAT) Closed User Group (CUG) Service
k) Indian National Satellite (INSAT) Mobile Satellite System-Reporting (MSS-R) Service
l) Resale of International Private Leased Circuit (IPLC) Service

The licensing regime has, thus, evolved with technological and market developments.

2.12. The relevant guidelines for providing telecom services through UL regime 'Guidelines[13] for grant of Unified License' are notified on 19th August 2013. Similarly, the 'Guidelines[14] for Grant of Unified License (Virtual Network Operators)' are notified on 31st May 2016. The broad features of the guidelines for grant of UL are described below –

General:

i. The applicant must be an Indian company, registered under the Indian Companies Act 1956. Unified License and Authorization under UL shall be issued on a non-exclusive basis i.e., without any restriction on the number of entrants for provision of any service in a Service Area. One Company can have only one Unified License.

[13] https://dot.gov.in/accessservices/guidelines-grant-unified-licence
[14] https://dot.gov.in/sites/default/files/2016_06_06%20VNO-%20AS-I.pdf?download=1

The total composite foreign holding shall be governed by the Foreign Direct Investment (FDI) policy of the Government of India as announced by the Department of Industrial Policy and Promotion from time to time.

Financial:

ii. **Entry Fee:** A one-time non-refundable Entry Fee for authorization of each Service and service area shall be payable before signing of the license agreement. The total amount of the Entry fee shall be subject to a maximum of Rs. 15 Crore (Rupees Fifteen crore only).

iii. **License Fee:** In addition to the Entry Fee, an annual License fee as a percentage of AGR shall be paid by the Licensee service-area wise for each authorized service separately as per the procedure prescribed in the applicable Chapter of Unified License from the effective date of the respective authorization. The License fee is at present 8% of the AGR, inclusive of USO Levy which is presently 5% of AGR.

iv. **Terms of License:** The UL shall be issued on a non-exclusive basis, for a period of 20 years. The Licensor may renew, if deemed expedient, the period of License by 10 years at a time, upon request of the Licensee, if made during the 19th year of the license period, on the terms specified by the Licensor, subject to the extant policy.

v. **Equity holding in other companies:** In the event of holding/obtaining Access spectrum, no licensee or its promoter(s) directly or indirectly shall have any beneficial interest in another licensee company holding "Access Spectrum" in the same service area.

vi. **Provision of Telecommunication services using satellite media:** The Licensee shall abide by the prevalent Government orders, directions, guidelines, or regulations on the subject like satellite communication policy, V-SAT policy etc., For use of space segment and setting up of the Earth Station etc., the Licensee shall directly

coordinate with and obtain clearance from Network Operations and Control Centre (NOCC), apart from obtaining SACFA clearance.

vii. **Security Conditions**-The Chief Officer in charge of technical network operations ..... shall be resident Indian citizen. The positions of the Chairman, ... if held by foreign nationals, would require to be security vetted by Ministry of Home Affairs (MHA). LICENSOR shall have the right to take over the SERVICE, equipment, and networks .....

viii. **Migration/Renewal of existing Licenses:** In order to ensure that the UL Regime covers all existing Licenses, a migration path is offered to the existing licensees to migrate to the UL regime.

ix. After the issue of the UL guidelines, no other license for any of the services covered under Unified License shall be issued/extended/ renewed.

x. The LICENSOR reserves the right to modify at any time the UL guidelines and terms and conditions of the LICENSE.

2.13. After considering the recommendations of TRAI on VNO, the government also decided to grant Unified License of Virtual Network Operator viz. UL(VNO) and was introduced in 2016 with the aim to delink the "licensing of networks from the delivery of services". Since the UL regime (of 2013) did not segregate the layers of services, the introduction of UL(VNO) was seen as the first step towards the unbundling of layers through differential licensing. Unlike an ISP, a VNO operator works in a virtual environment to buy bandwidth and resell it to internet subscribers.

2.14. The relevant guidelines for granting the Telecom Service are –

i. Guidelines for Grant of Unified License dated 19th August 2013

ii. Guidelines for Grant of Unified License (Virtual Network Operators) dated 31st May 2016

The (Draft) Indian Telecommunication Bill, 2022

2.15. Recently on 21st September 2022, DoT has released the Draft Indian Telecommunications 2022 Bill for public consultation to develop a modern and future-ready legal framework in telecommunication. Though the draft bill is still in its initial phases and the text/content of the bill may undergo several changes, the key provisions of the bill that may be of some significance to convergence have been discussed here.

2.16. The draft Bill is an attempt by the DoT to consolidate various legislations presently governing the telecommunication landscape in India, i.e., the Bill consolidates three separate acts which currently govern the telecommunication sector — the Indian Telegraph Act, 1885, Indian Wireless Telegraphy Act, 1933, and The Telegraph Wires (Unlawful Protection) Act, 1950. Another key reason for bringing into force a new regulatory framework is to bring the law at par with technological advancements and remove obsolete provisions from the colonial era laws it seeks to replace. The goal is to update the extant regulatory framework in keeping with the advancements and challenges in the sector. The Bill empowers the central government to govern three key aspects of telecom:

i) telecommunication services and networks.

ii) telecommunication equipment and infrastructure; and

iii) Spectrum, including its assignment.

A. Licensing, registration, and authorization

2.17. Under the Bill, four types of permissions are identified - license, registration, authorization, and assignment (only for spectrum). While the Bill does not differentiate between the four types of permissions, it clarifies that a license is only required for providing telecommunication services or operating telecommunication networks. Registration must be obtained for establishing telecommunication infrastructure and an

authorization is essential for the possession of wireless equipment. Assignment only applies to spectrum. The Bill also reasons that for specific cases such as establishing telecommunication infrastructure, a registration requirement has been introduced to simplify the process of setting it up. To ensure policy continuity, the Bill clarifies that entities licensed under the previous license conditions will be allowed to operate under their erstwhile licenses until migration.

B. OTT communication/broadcasting services regulation

2.18. The OTT Communication services offer voice, video, and messaging services, that are substitutable with similar services offered by licensed TSPs. The TSPs bear the costs for the infrastructure, spectrum management and pay license fees for use of spectrum. At the same time, they need to meet Universal Services Obligations and roll-out obligations and comply with other regulations. The counterpart OTT service providers are presently not mandated to adhere to any regulatory obligations and do not have to bear any such costs. Further, TSPs have argued that OTT communication services are grabbing their SMS and voice call businesses and, therefore, should be licensed just as they are. TSPs are also required to maintain network QoS and comply with Tariff framework and are also subjected to various Government levies. As a counter argument, big tech firms argue that the services provided by OTTs and TSPs are not similar and should ideally be regulated under separate frameworks – information technology laws for OTT services and telecom laws for telecommunication services.

2.19. At present, while telecom companies need a licence to offer services, OTT platforms do not. The Bill's intent in widening the definition of 'telecommunication services' to include OTT communication/ broadcasting/messaging services may be to bring these platforms under administrative and regulatory oversight. The inclusion of such internet-

based communication platforms within the regulatory ambit has been the demand of telecom, broadcasting/OTT industries in many countries on plank of level-playing field and is a contentious policy issue. In India also, it is a long-standing demand of the telecommunications industry on two key issues namely, (a) level-playing field and (b) network expansion costs.

However, the definition of 'telecommunication services', meaning any service provided through telecommunication, i.e., transmission, emission, or reception of any messages through wire, radio, optical or other electro-magnetic systems is all encompassing, and can potentially cover a wide range of digital platforms. Thus, bringing OTT telecommunication services and OTT platforms under the ambit of telecom services may mean that they will be subject to the regulatory regime as TSPs and would require a licence or registration to offer OTT services.

C. Inclusion of broadcasting services related provisions in the draft Indian Telecommunication Bill, 2022

2.20. The draft Indian Telecommunication Bill, 2022 has incorporated certain provisions that are related to broadcasting services. Inclusion of following provisions can be said to be enablers for convergence of carriage of Broadcasting and Telecommunication services:

i) **Definitions:** One of the themes that emerged after examining the comments of the Consultation Paper is the need for updating the nomenclature and definitions of relevant terms in the telecommunication legal framework.

- The Bill introduces a broad definition of **'telecommunication services',** which now includes internet-based services, in-flight and maritime connectivity, interpersonal communications services,

machine to machine communication services, and over-the-top (OTT) based communication services that are made available to users by telecommunication. Other telecommunication services included in the definition are:

i. broadcasting,
ii. communication services including electronic mail, voice mail, voice, video, data, audiotex services, videotex services, fixed and mobile services,
iii. internet and broadband services
iv. satellite-based communication services and any other service notified by the central government to be telecommunication services.

- The term **telecommunication** is also defined as transmission, emission, or reception of any message by wire, radio, optical or other electro-magnetic systems. Message is defined as any sign, signal, writing, image, sound, video, data stream or information intended for telecom.
- The **'broadcasting services'** are defined as the telecommunication services that are intended to be received by the general public either directly or indirectly. Further, the definition of wireless equipment includes any wireless transmitter that is capable of use for broadcasting or emission of wireless communication.
- The term **'license'** is defined as a license, approval, authorization, permission by whatever name called, granted under this Act (the Bill) for providing:
  i. telecommunication services (including only such broadcasting services as specified under sub-clause (c) below);
  ii. telecommunication network; and

iii. broadcasting services in Schedule 2 and any other broadcasting services as may be notified by the Central Government as requiring a license.

ii) As per the Schedule 2 of the Bill, the broadcasting services requiring license as of the Appointed Date are –

i. Direct to Home (DTH) Services.
ii. Community Radio Stations.
iii. FM Radio Broadcasting Services through Private Agencies.
iv. Internet Protocol Television (IPTV) Services.
v. Downlinking of Television Channels.
vi. Uplinking of Television Channels.

It is also mentioned that subject to the provisions under the Section 'Power of Central Government to amend Schedules', the Central Government may alter the above Schedule.

*(**Note:** As the draft Telecom Bill is still under discussions and is in public domain for consultation, it is pertinent to note that the provisions mentioned in the bill may change subsequently, and accordingly some observations may not be applicable subsequent to changes in the draft bill)*

II. Licensing in Broadcasting Sector

2.21. Ministry of Information and Broadcasting (MIB) is the nodal ministry responsible for the issuance of all broadcasting and cable services related licenses/permissions/registrations to broadcasters and distribution platform i.e., DTH operators.

2.22. The broadcasting services, such as satellite - based DTH and Cable TV Services, are not included in the scope of authorizations under Unified License. Although, under the scope of Access Service Authorization and Internet Service Authorization, the licensee is permitted to provide IPTV service, which is a broadcasting service. This is the only broadcasting service that is dealt under the telecom license regime. The licensing

regime in the telecom sector has been discussed in detail in the preceding section.

2.23. Currently, MIB is granting license/permission/registration for the provision of the following broadcasting services:

Table 2.2: Licenses/permissions/registrations related to Broadcasting and Cable services.

Operator	Authorization
Uplinking and downlinking of satellite TV channels/Set-up of Teleports	Permission
Direct-to-Home (DTH) operators	License
Headend-In-The Sky (HITS) operators	Permission
Multi-system Operator (MSO)	Registration
Local Cable Operator (LCO)	Registration
Private FM broadcasters	Permission
Community Radio Stations	Permission

2.24. **Uplinking and downlinking of TV channels –** These are governed by the policy guidelines laid down by MIB. Satellite TV channels are being granted permissions in two categories viz. "News and Current Affairs TV channels" and "Non-News and Current Affairs TV channels". The permission process goes through various departments and ministries after submission of the application with the prescribed processing fee, as applicable to MIB. The application processing requires checking of eligibility of the applicant company by MIB, security clearance from Home Ministry, satellite use clearance from DoS, clearance from Department of Revenue (for downlinking permission only), examination of net worth by empaneled CAs, clearances from Wireless Planning and Coordination Wing (WPC) and Network Operation and Control Center

(NOCC) (for frequency assignment). Permission for teleports is also granted by MIB under the uplinking guidelines issued by MIB. The process of granting permission for setting up uplinking Hub/Teleports is quite similar to that of uplinking permission. Table 2.3 below details out the processing fees, minimum net-worth, bank guarantee, annual renewal, permission fees and period of permission for the uplinking/downlinking of TV channels as prescribed in the guidelines.

Table 2.3: Applicable fees on broadcasters/teleport operators

Broadcasters/ Teleports		Processing Fee (in Rs)	Minimum Net-worth (in Rs)	Bank Guarantee (in Rs)	Annual Renewal Fees (in Rs)	Permission Fees	Period of Permission
Uplinking of TV channels	**News and Current Affairs**	10,000 per channel	1st TV Channel- 20 crs Additional- 5 crs	2 cr per channel	2 lakhs per channel per annum	NIL	10 years
	Non-news and Current Affairs	10,000 per channel	1st TV Channel- 5 crs Additional- 2.5 crs	1 cr per channel	2 lakhs per channel per annum	NIL	10 years
Downlinking of TV channels		10,000 per channel	1st TV Channel- 5 crs Additional- 2.5 crs	NIL	5 lakhs per channel per annum	10 lakhs	10 years
Teleports		10,000 per teleport	1st TV Channel- 3 crs Additional- 1 crs	25 lakhs	2 lakhs per teleport per annum	NIL	10 years

2.25. **License to Direct to Home (DTH) operators –** The Government had issued policy guidelines for DTH broadcasting services in India on 15th March 2001. As of now, apart from DD Free Dish, which is a free-to-air DTH service of Doordarshan, there are 4 private pay DTH service

providers in operation in the country. DTH services make use of satellites and DTH operators are allowed to use Ku band frequencies. DTH license is issued under Section 4 of the Indian Telegraph Act, 1885 by MIB after clearance from different ministries/ departments. A detailed writeup on DTH Guidelines and comparison of the Unified License guidelines for telecommunication services and License guidelines for DTH service is provided in ***Annexure II.***

2.26. **Permission to HITS operators –** Policy guidelines for HITS operators have been issued by MIB on 26th November 2009. The amendment to the guidelines has been issued by MIB on 6th November 2020, through which MIB has also permitted sharing of infrastructure by HITS operators. As of now, only one service provider distributes TV channels using HITS technology. HITS operations also use satellite-based technology (uses both C and Ku band). The process for obtaining permission is similar to that of DTH services.

2.27. **Registration of MSOs and LCOs –** Cable TV is a popular platform for receiving TV broadcasts. MSO receives programming services from broadcasters and re-transmits the same either directly in the form of primary subscribers or through one or more local cable operators as secondary subscribers. The signal is provided by a local cable operator (LCO) to the consumer through a cable laid up to the TV set. As on 1st March 2021, there are around 1715 MSOs registered with MIB and an estimated 1,40,000 cable operators operational in the country. The Government enacted the Cable Television Networks (Regulation) Ordinance, 1994 on 29th September 1994 that set down rules for registration of cable TV operators and introduced the programming code & the advertisement code. Subsequently this ordinance was converted into the Cable Television Networks (Regulation) Act 1995 (hereinafter "Cable TV Act") on 25th March 1995. Under sub-section (1) of section 4 of the cable TV Act, for operating a cable television network, a person is

required to register as a cable operator with the registering authority. The head postmaster of the head Post office of the local area has been notified as to the registering authority for Local Cable Operator (LCO). With the introduction of digital addressable system (DAS), the Government has amended the Cable Television Networks (CTN) Rules, 1994 by issuing Cable Television Networks (Amendment) Rules, 2012 on 28th April 2012. Any company or individual who intends to provide cable television network services with DAS, it is mandatory for them to register from MIB. In response, the TV industry has witnessed the entry of huge Multi System Operators (MSOs). For registration of MSO, applicants are required to make an application to the MIB.

2.28. The various financial impositions on the existing DPOs are summarized in the Table 2.4 below.

Table 2.4: Comparison of applicable fee structure of the DPOs

DPOs	Processing Fee (in Rs)	Entry fee (in Rs)	Min. Net-worth (in Rs)	BG (in Rs)	License Fees (in Rs)	WPC license fees and Royalty	Period of license
MSO	1 Lakh	NIL	NIL	Positive, without quantification	NIL	NIL	10 yrs
LCO	500 as registration fees	NIL	NIL	NIL	500 as renewal fees	NIL	1 yr
DTH	N.A.	10 crores	N.A.	5 crs and after, an amount equal to License fee for two quarters	8% of AGR	As prescribed	20 yrs (renewal-10 years)
HITS	1 Lakh	10 crores	10 crores	40 crores	NIL	As prescribed	10 yrs

2.29. **FM Radio –** FM licensing process is transparently administered through auctions. For operating FM Radio stations, the eligible entity has to take part in the auction process for FM Radio Channels conducted by MIB.

Only successful bidders in the auction are granted permission by MIB subject to fulfillment of terms and conditions.

2.30. **Community Radio Stations –** To encourage radio broadcasting for specific sections of society the Government has allowed the setting up of Community Radio Stations (CRS). They address the specific information needs of far-flung and difficult areas like tribal, hilly, and remote areas and populations having similar interests like university campuses. Today there are more than 290 operational CRS. Permission for setting up a CRS is granted by MIB, whereas the frequency is assigned on an administrative basis by WPC.

2.31. Further, processes for granting various licenses undergoes through several other Ministries and Departments (DoS/MHA/WPC/NOCC) for necessary clearances and approvals etc. These processes are detailed as follows:

Table 2.5: Licenses/permissions/registrations related to Broadcasting and Cable services

	Service Provider	**Permission required from Ministry/ Department before issue of license/ registration by MIB**
A	Multi System Operators	MHA for security clearance
B	DTH Operators	i. MHA for Security clearance ii. DoS for Satellite clearance iii. Frequency authorization by WPC/ NOCC iv. Net worth examination by empaneled CA
C	HITS Operators	
D	Uplinking of TV channels/ Permission for Setting up of Uplinking Hub / Teleports	
E	Downlinking of TV channels	i. MHA for Security clearance ii. DoS for Satellite clearance iii. Frequency authorization by WPC/ NOCC iv. Net worth examination by empaneled CA v. DoR for examination of exclusive marketing and distribution rights with the owner of TV channels in case of TV channel uplinked from abroad.
F	Change in Name, Language, Logo, format of Television Channels	Before MIB grants permission, clearance required from WPC
G	FM Radio Broadcasting and Community Radio Station	Clearance required for Frequency authorization by WPC/ NOCC

2.32. It can be seen from the above Table 2.5 that nodal wings of DoT like Wireless Planning and Coordination (WPC) and Network Operation & Control Centre (NOCC) do play integral roles in granting

clearances/licenses to the different stakeholders in the broadcast television sector of India.

III. Convergence trends in Telecom and Broadcasting sectors in India

2.33. In the cable industry, the offering of additional services of telephony and broadband on the cable network is representative of convergence of telecom and broadcasting sector. Many telecom service providers are also bundling content and other value-added services like IPTV, video streaming, video conferencing, music, security services, etc. along with broadband services.

2.34. Most of the cable providers who have recently entered the wireless space, and incumbent wireless players are also eyeing the home broadband market, especially with the onset of 5G. Many Local cable operators and ISPs have tied up for providing broadband services and television content on fiber to the consumers. In addition, the convergence of broadcast services is provided through Hybrid Set Top Boxes which allow users to view digital cable programmes as well as videos from the Internet or local IP network.

2.35. There are many new technology choices for the consumers with the advent of OTT, Mobile TV, IPTV etc. Hybrid/IPTV Set-top boxes (STBs) have replaced certain RF STBs. Small Multi Service Operators (MSOs)/Distribution Platform Operators (DPOs) may upgrade their networks to converged hybrid or IPTV networks and offer hybrid/IPTV STBs at a subsidized cost to their subscribers.

2.36. There is an increasing trend to provide broadcasting services through IPTV by Multi- System Operators (MSOs) as well as the Internet Service providers (ISPs). Although the license to operate as MSO and ISP are being given by the respective ministries i.e. Ministry of Information and Broadcasting (MIB) and Department of Telecommunications (DoT),

however, as per their guidelines all telecom licensees/ Multi-system Operators before providing IPTV are required to submit a self-certified declaration to MIB, DoT and TRAI giving details such as license/ registration under which IPTV service is proposed, the start date, the area being covered, and details of the network infrastructure etc.. In the last one year around seven multi-system operators have provided intimation to the Ministry of Information and broadcasting (MIB) for providing IPTV services, but they are yet to roll out the services to their subscribers. There is a significant degree of convergence already existing in the offering of the services. Hence there is a need to align the corresponding business processes i.e., with regard to the issuance of all broadcasting and cable services related licenses/permissions/ registrations by various ministries to take full advantage of convergence resulting in ease of doing business.

IV. Legal & licensing issues concerned with convergence in telecom and broadcasting sector.

2.37. Unified License offers service-wise authorizations for establishing service-specific network and to provide the authorized service(s). Only one Unified License is required for all telecom services in the entire country. The service provider may choose the services which are called Service Authorizations. They may choose service areas where the service can be offered. The same is also mentioned against each service authorization in the unified license. The allocation of spectrum is delinked from the licence, and it has to be obtained separately for different services as per the prescribed procedure.

2.38. The broadcasting services such as satellite based DTH and Cable TV Services, are not included in the scope of authorizations under Unified License. However, under the scope of Access Service Authorization and Internet Service Authorization, the licensee is permitted to provide IPTV

service, which is a broadcasting service. The relevant clause of the UL guidelines is reproduced below:

"2.2 (iv) The Licensee shall not provide broadcasting services under this License, for which a separate License / registration is required as per Cable TV Networks (Regulation) Act 1995 and guidelines for DTH License, or any other broadcasting service issued by Ministry of Information and Broadcasting. However, provision of IPTV is permitted under the service authorization of Access Service/Internet Service."

2.39. The terms and conditions contained in the Access Service authorization under the Unified License in respect of provision of TV Channels through IPTV are reproduced below:

"Clause 5. Provision of IPTV Service:

5.1(a) The Licensee while providing TV channels through IPTV shall transmit only those television channels and in exactly same form (unaltered), which are registered with or are otherwise permitted by the Ministry of Information and Broadcasting. In such cases, the responsibility to ensure that content is in accordance with the extant laws, rules, regulations etc. shall be that of the broadcaster and telecom Licensee will not be held responsible. The Licensee shall not carry any television channels prohibited either permanently or temporarily or not registered with the Ministry of Information & Broadcasting.

5.1(b) The Licensee can obtain content from the Multi System Operator or the Cable Operator for providing IPTV services.

5.1(c) The Licensee providing IPTV will show only those News and Current Affairs television channels which have been registered with Ministry of Information and Broadcasting. The Licensee will not produce

or provide any other broadcast or non- broadcast channel having any element of News and Current Affairs.

5.1(d) The provisions of Programme code and Advertisement code as provided in Cable Television Network (Regulation) Act 1995 and Rules there under shall be applicable even in the case of contents other than TV channels from broadcast provided by the Licensee. Since the Licensee will be providing this content, the Licensee shall be responsible for ensuring compliance to the codes with respect to such content. In addition to this, such LICENSEEs will also be bound by various Acts, instructions, directions, guidelines issued by the Central Government from time to time to regulate the contents.

5.1(e) If the contents are being sourced from content providers other than Licensee, then it will be the responsibility of Licensee to ensure that their agreements with such content providers contain appropriate clauses to ensure prior compliance with the Programme and Advertisement Codes and other relevant Indian laws, civil and criminal, regarding content.

5.1(f) The Central Government in the Ministry of Information and Broadcasting shall have the right to notify the number and names of channels of Prasar Bharati or any other channel for compulsory carriage by the Licensee and the manner of reception and retransmission of such channels.

5.1(g) The Licensee while providing IPTV services should provide commercial interoperability so that if the subscribers decide to switch over to any other service provider or platform, they should be able to do so at the least cost. Commercial interoperability here would mean that in addition to offering the receiver set on an outright purchase basis, a subscriber should also have the option to purchase it on a hire-purchase basis or on rental basis with a provision to return the receiver set on

such terms and conditions as may be laid down by regulations issued by TRAI.

The Government / Ministry of Information and Broadcasting may direct the Licensee providing IPTV service to ensure preservation and retention for a period of 90 days from the date of broadcast unless specified otherwise, of different kinds of content made available to their subscribers and requires it to ensure its security and also that it is not tampered with during such period. The Licensee providing IPTV service may be required to produce the same to the Government or its authorized representative, as and when required and the Licensee providing IPTV service will be required to ensure compliance to all such directions.

The Licensee providing IPTV service shall provide necessary facility for continuous monitoring of the IPTV network at its own cost. The monitoring system must provide Set top Box subscriber information as well as contents to the law enforcement agency in plain readable, audible and viewable format as the case may be.

Provided that in case of any dispute, the records of broadcast of programmes and advertisements shall be maintained till final disposal of the dispute Provided further that the Licensee shall provide access to the Government or its authorized representative to all its facilities, including equipment, records, system etc. for purposes of inspection.

On demand by the Government in the Ministry of Information and Broadcasting or its authorized representative, Licensee providing IPTV service shall provide the necessary equipment, services and facilities at designated place(s) for continuous monitoring of the IPTV service by or under supervision of the Government or its authorized representative.

The Licensee providing IPTV service shall submit such information with respect to its service as may be required by the Government in the

Ministry of Information and Broadcasting or its authorized representative from time to time.

The Licensee providing IPTV service shall furnish any such information at periodic intervals as may be required by the Government in the Ministry of Information and Broadcasting or its authorized representative concerning Programme Content and Quality, Technical parameters etc. relating to the service in the format as may be required by the Government or its authorized representative from time to time.

The Licensee providing IPTV service shall furnish the complete details such as name, technical details and license etc. of the value-added service being provided through IPTV network.

Provided that in case any new value-added service is added, the Licensee providing IPTV service shall obtain prior approval of the Government or Licensor. The Government or the Licensor may from time to time, prescribe or prohibit certain value-added services.

Any breach of the provisions of Act / License / Registration / Permission by Licensee / cable operator/ Broadcasters shall be dealt with by designated agencies which are responsible for administering such Acts / License / Registration / Permissions.

The decision of the Ministry of Information & Broadcasting regarding any violation of prevailing Acts/Rules/Guidelines pertaining to their administrative jurisdiction in respect of content carried on IPTV service shall be final. The quantum of penalties for such violation will be decided by Licensor in consultation with respective Ministries/ Department.

The Licensee before providing IPTV will give a self-certified declaration in the specified format to the Licensor, M/o I&B and TRAI giving details of license no. and service area under which IPTV service is proposed to

be provided / started, the start date, the areas being covered, details of network infrastructure etc."

2.40. The same provisions, as reproduced above, are also applicable for licensees having Internet Service authorization under Unified License for provision of TV Channels through IPTV. It may be noted here that the Access Service provider and Internet Service provider are permitted to provide TV channels through IPTV under the respective authorizations using their access network. However, for the content regulation, the licensees are required to follow the prevailing Acts/Rules/Guidelines of the MIB in respect of content carried on IPTV.

2.41. Thus, the carriage part (access network) is regulated/licensed by DoT under Indian Telegraph Act, 1885 and the content part is regulated by MIB under the Cable Television Network (Regulation) Act 1995 and Rules made there under and other guidelines issued by MIB from time to time.

2.42. It can be argued that in converged era, a logical step can be of converging the licensing framework. It can be argued that rather than issuing different licenses/permissions for broadcasting, they can also be made as authorizations under unified license, if the same is permitted through a modified converged Act. Convergence at licensing level can be described as the system of providing a single license/permission with authorizations for different communication services/communication service providers. Such authorization can be provided by the ministry or department which oversees provision of the communication service or infrastructure network.

2.43. However, that would essentially mean converging at statute level (convergence of legal framework or the Acts) as certain broadcasting registrations are issued under the Cable TV Act while DTH license is issued by MIB under the Telegraph Act. Convergence at Statutory level can be understood as a single unified Code/Act which comprehensively

covers all the communications services. Key considerations for developing a single code/ Act may be by consolidating the laws governing provision of communication services, development, establishment, operation and expansion of communication services, communication infrastructure and networks and management of communication resources and for matters connected or incidental thereto. For example, it may cover,

- Traditional Telecommunication Services
- Broadcasting & TV Services
- IP based communication services
- OTT Communication/Broadcasting Services
- Subscription/ User-id based Video on Demand services.
- Linear/ Live Linear Television Channels through various OTT platforms
- Machine to Machine (M2M) Communication Services.
- AR/VR communication

2.44. The various services which could be included in this Code/Act are as below:

- Preamble to the single Act/Code and a legal framework consisting of new definitions may be developed so that the communication services and communication service network can be comprehensively governed and converged.
- Preamble to the Code/Act may include consolidation of the laws governing provision of communication services, development, establishment, operation and expansion of communication services, communication infrastructure and networks and management of communication resources and for matters connected or incidental thereto.

2.45. It may also include coordination among the related Ministries and Departments to maximize the benefits of new communication

technologies and digitalization by promoting coordination and collaborations among various user Ministries/Departments/ Agencies as far as data and technology driven policy making is concerned. Digital inclusion may be one of key objectives of such an Act.

2.46. The next issue that will follow will be administration of the converged license issued under the converged Act. Will the authorizations under the Unified License (UL) be issued by respective ministries? If so, what happens if a UL holder having NLD authorization issued by DoT wants to add authorization for DTH services subsequently? Part-I of UL is common to all authorizations. In such a scenario, who will monitor and ensure compliance of license terms and condition for common Part-I? If a security condition mentioned in Part-I of license is violated by use of equipment for DTH service, who will handle this violation? There may be several such issues involved if unified licensing framework is implemented for both telecom and broadcasting services, but the authorizations are continued to be issued/handled by respective ministries.

2.47. Thus, to avoid confusion and delays, it can be argued that apart from the requirement for convergence of the legal and licensing framework, there will also be a requirement for convergence at administrative level. On the other hand, it can also be argued that as such there is no need to introduce change in governance at various levels to achieve convergence. Concerns related to better administration of these sectors, if any, may be achieved by bringing in various procedural adjustments as part of implementing Ease of Doing Business (EoDB). Close coordination among various administrative ministries can alternatively be achieved through use of ICT tools like developing a digital portal that handles issues in granting of licenses and permissions including compliances etc., across involved ministries.

2.48. Since the issues related to DTH and Cable TV are being handled by MIB, TRAI has sent the DoT Reference, as mentioned in para 1.56 of Para IX of Chapter-I, to MIB for its view. The correspondence between TRAI and MIB on the issue is available at ***Annexure III***. MIB, vide its reply has, inter alia, averred:

a. This Ministry is already in the process of amending CTN Act to bring all the different broadcasting carriage platforms under its ambit, in order to holistically address all institutional, regulatory, and legal aspects of broadcasting services under a unified Act.
b. Convergence of technologies has already happened to a great extent in the last decade; and TRAI along with the Ministry have so far handled very successfully all the legal, policy and regulatory requirements arising out of such changes. Hence carriage policy and regulations for broadcasting should continue with MIB.
c. Also, regulation of content requires separate skill sets of creative and artistic persons than that of technocrats or economists who can factor the impact of content on sensibilities, morals, and the value system of the society. Hence, content policy and regulation should also continue with the MIB.
d. The issues related to allocation of broadcasting spectrum and its realignment should be dealt by MIB at national and international levels as the spectrum bands for various services are standardized by international bodies like ITU and MIB is well versed with its policy and plans for utilization in broadcasting functions.
e. Broadcasting requires close coordination with multiple agencies and MIB has been meeting this requirement flawlessly. So, shifting the licensing functions to another department, say DoT, will not do any good but will only disturb the established practices.
f. The need for the hour is not to bring in further disturbances but only to re-engineer business processes. The regulatory convergence

in the broadcasting sector is being achieved through the 'Ease of Doing Business Model' by creating a single platform in the form of Portal on which all the stakeholders/ministries/Departments are integrated/being integrated. This will serve the purpose of holistically addressing all aspects related to DTH, HITS and Cable TV services.

2.49. Currently, The Government of India (Allocation of Business) Rules, 1961, inter-alia, makes the following allocations to MIB and DoT:

To MIB:

I. BROADCASTING POLICY AND ADMINISTRATION

1. All matters relating to radio and television broadcasting within the Union including regulation of the use of All India Radio and Doordarshan by recognised national and regional political parties during elections to the Lok Sabha and State Assemblies and procedure to be followed by the official electronic media during periods of national mourning on the demise of a high dignitary.

2. The enunciation and implementation of the law relating to radio and television broadcasting in India by private Indian companies or Indian nationals.

3. Broadcast Monitoring and Administration of the Prasar Bharati (Broadcasting Corporation of India) Act, 1990 (25 of 1990) .....

II. CABLE TELEVISION POLICY

5. Cable Television Networks (Regulation) Act, 1995 (7 of 1995). III. RADIO

6. All business connected with All India Radio embracing news services in the home programmes, programmes for the foreign countries and Indians overseas, radio journals, research in the field of broadcasting engineering, monitoring of foreign broadcasts, programme exchange and

transcription services, supply of community receiving sets to State Governments under the community listening scheme, etc.

7. Development of radio Broadcasting throughout the Union, installation and maintenance of Radio Stations and Transmitters and operation of broadcasting services.

To DoT:

A. DEPARTMENT OF TELECOMMUNICATIONS (DOOR SANCHAR VIBHAG)

1. Policy, Licensing and Coordination matters relating to telegraphs, telephones, wireless, data, facsimile and telematic services and other like forms of communications.

2. International cooperation in matters connected with telecommunications including matters relating to all international bodies dealing with telecommunications such as International Telecommunication Union (ITU), its Radio Regulation Board (RRB), Radio Communication Sector (ITU-R), Telecommunication Standardization Sector (ITU-T), Development Sector (ITU-D), International Telecommunication Satellite Organization (INTELSAT), International Mobile Satellite Organization (INMARSAT), Asia Pacific Telecommunication (APT).

3. Promotion of standardization, research and development in telecommunications.

4. Promotion of private investment in Telecommunications.

5. Financial assistance for the furtherance of research and study in telecommunications technology and for building up adequately trained manpower for telecom programme, including-

(a) assistance to institutions, assistance to scientific institutions and to universities for advanced scientific study and research; and

(b) grant of scholarships to students in educational institutions and other forms of financial aid to individuals including those going abroad for studies in the field of telecommunications.

.....

10. Administration of laws with respect to any of the matters specified in this list, namely:

(a) The Indian Telegraph Act, 1885 (13 of 1885);

(b) The Indian Wireless Telegraphy Act, 1933 (17 of 1933); and

(c) The Telecom Regulatory Authority of India Act, 1997 (24 of 1997).

..."

2.50. For effective governance of licenses in converged era, it can be argued that the DTH license (carriage part- setting up of the earth stations (tele-port) and terminal stations (user terminal dish) can be brought under the jurisdiction of DoT while leaving the content part to be regulated by MIB. Similarly, the carriage part of the Cable TV Service providers may also be brought under the jurisdiction of DoT while content regulation continues with MIB. An administrative convergence, if required, would mean revision of allocation of business between MIB and DoT.

2.51. In view of aforesaid, there can be following different views on dealing with convergence of carriage of telecom and broadcasting services:

a. The present statutory, licensing, regulatory, administrative, and institutional framework is not disturbed and only minor amendments to this framework might be required to deal with the challenges posed by convergence. Emphasis should rather be on the use of ICT tools to improve EoDB, as suggested by MIB.

b. Licenses for telecom and broadcasting continue to remain separate as per existing statutory framework but are managed/administered by a single ministry by amending Business Allocation Rules.

c. A new statute (comprehensive code) is enacted to facilitate convergence of telecom and broadcasting holistically at legal, administrative, regulatory, and licensing level. Accordingly, licenses are administered and issued by a single ministry.

2.52. Furthermore, technology keeps evolving and there will be new types of services/ service providers on the horizon. OTT based communication services, Multi-access Edge Computing (MEC) (computation power and execution environment for applications), digital online platforms, Artificial Intelligence and Machine Learning algorithms and several other technological developments will bring forth new type of services and service providers. There are challenges to the government/ regulatory institutions to remain agile and ensure a level playing field amongst existing service providers and such new service providers. Existing service providers follow certain licensing and regulatory compliance procedures, whereas new types of service providers may not be covered in existing type of licensing or regulatory structure. This enables technology driven new type of service providers to disturb the level playing field. Therefore, there exists a case for provisioning of registration/licenses on the basis of use cases instead of on the basis of type of technology for service provisioning. The march of technology continues to move at a faster pace and therefore the definitions of services need to be technology agnostic and also all encompassing.

2.53. In this background stakeholders' comments are solicited on the following issues:

Fast evolving concepts and emerging technologies like OTT based services, Multi-access Edge Computing (MEC) digital online platforms, Artificial Intelligence, Augmented Reality, Virtual Reality, Machine Learning algorithms etc., are leading to enormous changes due to convergence as discussed above. In wake of this, please provide your detail response on the following questions:

Q1. Whether the present laws are adequate to deal with convergence of carriage of broadcasting services and telecommunication services? If yes, please explain how?

OR

Whether the existing laws need to be amended to bring in synergies amongst different acts to deal with convergence of carriage of broadcasting services and telecommunication services? If yes, please explain with reasons and what amendments are required?

OR

Whether there is a need for having a comprehensive/converged legal framework (separate Comprehensive Code) to deal with convergence of carriage of broadcasting services and telecommunication services? If yes, provide details of the suggested comprehensive code.

Q2. Whether the present regime of separate licenses and distinct administrative establishments under different ministries for processing and taking decisions on licensing issues, are able to adequately handle convergence of carriage of broadcasting services and telecommunication services?

If yes, please explain how?

If no, what should be the suggested alternative licensing and administrative framework/architecture/establishment that facilitates the orderly growth of telecom and broadcasting sectors while handling challenges being posed by convergence? Please provide details.

Q3. How various institutional establishment dealing with –

(a) Standardization, testing and certification.

(b) Training and Skilling.

(c) Research & Development; and

(d) Promotion of industries

under different ministries can be synergized effectively to serve in the converged era. Please provide institution wise details along with justification.

CHAPTER 3

Unified Policy Framework and Spectrum Management Regime for the Carriage of Broadcasting and Telecommunication Services

A. Introduction

3.1 Spectrum is a range of electromagnetic radio frequencies used for transmission of voice, data, and images. This is a scarce natural resource, which is both non-exhaustible and non-storable, although it may become increasingly congested. Therefore, it is essential that spectrum is used efficiently, so that equitable access could be available to different users for operation of radio communication networks in an interference free environment.

3.2 The radio frequencies are allocated to various sectors viz. telecommunications, broadcasting, space, defense, railways etc. for communication over airwaves. It plays a pivotal role in the functioning of these sectors and is used as factor input for provisioning for various communication services making it an indispensable resource. With the emerging new technologies and the phenomenal growth of radio communication services, requirements for the radio frequency spectrum are increasing. Usability of radio spectrum depends on factors such as propagation characteristics of different bands, availability of device ecosystem, and decision of the Regulatory Authorities.

3.3 As discussed previously, in NDCP 2018[15], under the mission 'Connect India: Creating Robust Digital Communications Infrastructure', one of the strategies under 'Enabling Infrastructure Convergence of IT, telecom and broadcasting' is 'establishing a unified policy framework and spectrum management regime for broadcast and broadband technologies. Convergence of these platforms may facilitate efficient

[15] https://dot.gov.in/sites/default/files/EnglishPolicy-NDCP.pdf

utilization of the underlying infrastructure used for carriage of Telecommunications and Broadcasting services. Wireless access networks which utilize the spectrum are also expected to become more efficient and may provide a seamless platform for delivering Broadcasting as well as Telecommunications services. With increasing Convergence of technology and services, further synergy between the roles of Ministries/Departments currently dealing with different services, may be required.

3.4 Through this chapter, the issue(s) regarding '*Establishing a unified policy framework and spectrum management regime for the carriage of broadcasting services and telecommunication services*' are being discussed as part of the reference received from DoT ***(Annexure I)***.

B. Spectrum Management:

3.5 The radio Frequency spectrum has been recognised world-over as an important tool for socio-economic development of a nation. As radio waves do not stop at national frontiers, international planning of frequency allocations, and protection of the legitimate use of radio spectrum are key issues in Spectrum Management whereas global compatibility of devices and technology are the key issues in Spectrum Utilization.

3.6 Spectrum Management involves regulatory, administrative, supervisory, and specialized technical procedures necessary to ensure the efficient operation of radio communication services. It includes frequency planning, assignments, and monitoring of spectrum assigned to different users. The Nodal agency is required to balance the demands of government users and private service providers. Rapid changes in technology, liberalization of markets, globalization and public welfare are important factors that go into strategic planning of Spectrum. In Spectrum Management, short -term, medium -term and long-term

planning is an absolute necessity for management of requirements due to dynamic changes in spectrum uses and technology.

3.7 At the global level, the International Telecommunication Union (ITU), is the specialized planning agency of the United Nations. The ITU Radio Regulations, an international treaty signed by India and other Member States of the ITU, governs the use of radio-frequency spectrum and satellite-orbits (geostationary and non-geostationary) at the global level. The ITU Radio Regulations facilitate equitable access to and rational use of the natural resources of the radio-frequency spectrum and geostationary satellite orbits. They also ensure the availability of the frequency spectrum for distress and safety purposes and assist in the prevention and resolution of cases of harmful interference between the radio services of different administrations. Further, the regulations facilitate the efficient and effective operation of all radiocommunication services and, where necessary, regulate new applications of radiocommunication technology.

3.8 At the national level, the Wireless Planning & Coordination (WPC) Wing of Department of Telecommunications (DoT), Ministry of Communications, is the nodal agency of the Government of India for radio frequency regulation. It is responsible for planning, regulation, and management of limited resources of radio frequency (RF) spectrum and caters the needs of all wireless users, Government and Private, in the country. WPC Wing issues National Frequency Allocation Plan (NFAP) of India and it provides a broad regulatory framework, identifying which frequency bands are available for – cellular mobile service, Wi-fi, sound and television broadcasting, radionavigation for aircrafts and ships, defence and security communications, disaster relief and emergency communications, satellite communications and satellite-broadcasting, and amateur service etc.

3.9 The National Frequency Allocation Plan (NFAP) governs the use of spectrum in India; however, it does not by itself provide the right to use the spectrum. Before any part of the spectrum is used in India, a licence is required to be obtained from the WPC Wing, unless such a requirement is exempted by the Government. WPC Wing of DoT is also responsible for the planning, coordination, and management of spectrum for India at the international as well as national level.

The Radio Regulations (Edition of 2020) is the foundational text used for drawing up the National Frequency Allocation Plan 2022 (NFAP 2022) of India. The NFAP 2022 is envisaged as a tool of innovation, R&D and investment in the country enabling the Indian communications industry to develop and harness new technologies for all round development.

C. Licensing Framework for Spectrum Use:

(a) ITU Radio Regulations[16]

3.10 The Preamble of the ITU Radio Regulation declares:

0.1 'These Regulations are founded on the following principles:'

0.2 'Members shall endeavor to limit the number of frequencies and the spectrum used to the minimum essential to provide in a satisfactory manner the necessary services…'.*

…

0.4 'All stations, whatever their purpose, must be established and operated in such a manner as not to cause harmful interference to the radio services or communications of other Members or of recognized operating agencies, or of other duly authorized operating agencies which carry on a

[16] https://www.itu.int/hub/publication/r-reg-rr-2020/

radio service, and which operate in accordance with the provisions of these Regulations (No. 197 of the Constitution)'.

3.11 Under Article 18 (Licenses`) of the Radio Regulations, Article 18.1 provides that:

18.1 No transmitting station may be established or operated by a private person or by any enterprise without a licence issued in an appropriate form and in conformity with the provisions of these Regulations by or on behalf of the government of the country to which the station in question is subject.

3.12 Thus, a license, by or on behalf of the government of the country, enables recognition of spectrum use(s) and their protection against harmful interference.

(b) The Indian Telegraph Act, 1885[17]

3.13 The Section 4 of the Indian Telegraph Act, 1885 provides as below:

"4. Exclusive privilege in respect of telegraphs, and power to grant licenses: Within India, the Central Government shall have the exclusive privilege of establishing, maintaining and working telegraphs:

Provided that the Central Government may grant a license, on such conditions and in consideration of such payments as it thinks fit, to any person to establish, maintain or work a telegraph within any part of India:

[Provided further that the Central Government may, by rules made under this Act and published in the Official Gazette, permit, subject to such restrictions and conditions as it thinks fit, the establishment, maintenance and working—

[17] https://www.indiacode.nic.in/bitstream/123456789/2307/1/a1885___13.pdf

(a) of wireless telegraphs on ships within Indian territorial waters [and on aircraft within or above India, or Indian territorial waters], and

(b) of telegraphs other than wireless telegraphs within any part of India.]"

3.14 The Section 3(IAA) of the Indian Telegraph Act, 1885 defines the term '*telegraph*' as below:

"(1AA) "telegraph" means any appliance, instrument, material or apparatus used or capable of use for transmission or reception of signs, signals, writing, images and sounds or intelligence of any nature by wire, visual or other electro-magnetic emissions, Radio waves or Hertzian waves, galvanic, electric or magnetic means;

Explanation. — "Radio waves" or "Hertzian waves" means electro-magnetic waves of frequencies lower than 3,000 giga-cycles per second propagated in space without artificial guide:"

3.15 The Section 7 of the Indian Telegraph Act, 1885 provides as below:

"7. Power to make rules for the conduct of telegraphs. — (1) The Central Government may, from time to time, by notification in the Official Gazette, make rules consistent with this Act for the conduct of all or any telegraphs established, maintained or worked by the Government or by persons licensed under this Act.

(2) Rules under this section may provide for all or any of the following, among other matters, that is to say:—

…"

(c) The Indian Wireless Telegraphy Act, 1933[518]

3.16 This is an Act to regulate the possession of wireless telegraphy apparatus. The Section 2(1) defines:

"2(1) wireless communication means any transmission, omission or reception of signs, signals, writing, images and sounds, or intelligence of any nature by means of electricity, magnetism, or Radio waves or Hertzian waves, without the use of wires or other continuous electrical conductors between the transmitting and the receiving apparatus.

2(2) "wireless telegraphy apparatus" means any apparatus, appliance, instrument or material used or capable of use in wireless communication, and includes any article determined by rule made under Sec. 10 to be wireless telegraphy apparatus, but does not include any such apparatus, appliance, instrument or material commonly used for other electrical purposes, unless it has been specially designed or adapted for wireless communication or forms part of some apparatus, appliance, instrument or material specially so designed or adapted, nor any article determined by rule made under Section 10 not to be wireless telegraphy apparatus;

2(2A) "wireless transmitter" means any apparatus, appliance, instrument or material used or capable of use for transmission or omission of wireless communication;

2(3) "prescribed" means prescribed by rules made under Section 10.

3. Prohibition of possession of wireless telegraphy apparatus without licence.— Save as provided by Section 4, no person shall possess wireless telegraphy apparatus except under and in accordance with a licence issued under this Act.

[18] https://www.indiacode.nic.in/bitstream/123456789/2396/1/A1933-17.pdf

10(1) Power of Central Government to make rules.— The Central Government may, by notification in the Official Gazette, make rules for the purpose of carrying into effect the provisions of this Act.

…"

3.17 From the above, the Indian Telegraph Act, 1885 and the Indian Wireless Telegraphy Act, 1933 provide an exclusive power to the Central Government in respect of telegraphs, and power to grant licenses and to make rules for the conduct of telegraphs. The WPC wing of the DoT exercises the statutory functions of the Central Government and issues licenses to establish, maintain and operate wireless stations under Section 4 of the Indian Telegraph Act, 1885. A license enables recognition of spectrum uses and their protection against harmful interference for the intended use.

(d) The (Draft) Indian Telecommunication Bill, 2022[19]

3.18 The Section 5 of the draft Bill deals with the spectrum management and provides:

"5(6) *The Central Government may, to enable more efficient use of spectrum, re-farm or harmonize any frequency range assigned under sub-section (2), subject to the terms and conditions, including payment of fees and charges, as may be prescribed.*

"re-farming" means repurposing of a frequency range for a different use, other than that for which it may currently be used by an existing assignee; and

"harmonization" means rearrangement of a frequency range.

[19] https://dot.gov.in/sites/default/files/Draft%20Indian%20Telecommunication%20Bill%2C%202022.pdf

5(7) The Central Government may, to enable the utilization of the spectrum in a liberalized and technologically neutral manner, notify that an assignee of a spectrum may deploy new technologies in such spectrum, subject to such terms and conditions, including applicable fees and charges, as may be prescribed.

D. Convergence and Evolving Technologies

3.19 For the Broadcasting and Telecommunication Services, technology convergence has made immense contribution in terms of, inter alia, simplification of services - High quality voice and video over IP, smart devices, unified delivery of services enabling efficient utilization of infrastructure - IPTV over broadband. These technological developments have made available more services to the users. It has also enabled the journey towards bridging digital divide by bringing more people in using digital services, access opportunities, and also governance at doorstep. Further, high-speed wireless technologies are creating a substitute for the traditional broadcasting platforms such as of DTH and Cable TV and have become an alternative to the fixed broadband services. Thus, there is a mix of technologies / platforms which are offering similar content/linear channels and experience.

3.20 The success of broadband streaming has shown that user-interactivity is an essential value for modern media and entertainment industries as consumers these days prefer to be an active participant rather than remaining as a passive recipient. The media broadcasting, in the new convergence era, will find its momentum from interactivities among various platforms and systems. Based on those interactions, the broadcast Digital Terrestrial Television (DTT) is expected to be able to identify itself through real-time programs enriched in broad dimensions, enhanced qualities of experience and service.

3.21 Convergence of telecommunication and broadcasting services may combine their benefits to improve the delivery of audio-visual media services to mobile devices. With content consumption in India increasingly shifting to smartphones and video consumption becoming the key driver of mobile data growth in India, it may become imperative to bring direct broadcasting capabilities to mobile phones. It is anticipated that broadcast capable smartphones and mobile phones will be able to stream multiple high-quality video/audio services optimally utilizing valuable spectrum and easing the burden on cellular networks. For this, Prasar Bharati and IIT Kanpur are exploring the development of direct to mobile broadcasting capabilities with an aim to align these emerging technologies with the global standards for 5G[20].

3.22 India, as the largest open market for digital video content and smartphones, will benefit immensely from the indigenous development of converged 5G standards for direct to mobile broadcasting. In a future scenario, both audio and video broadcast content can be directly delivered to smartphones and mobile phones over a common broadcast infrastructure[21].

3.23 Thus, in the converged era, different stakeholders can expect to benefit depending on the different convergence scenarios. The broadcast and telecom sector need to come together to explore innovative converged technology platforms and new business models to serve the consumers.

3.24 Newer technologies which are based on the Internet Protocol, are being developed to enable convergence of broadcast and unicast infrastructure for cost effective delivery of content[22]. Some of the technologies are discussed below.

[20] https://www.iitk.ac.in/new/collaborate-on-nextgen-broadcasting-technology
[21] https://home.iitk.ac.in/~adrish/DTM/WP.pdf

(a) Latest Technology Trends in Converged Era

(i) Direct-to-Mobile (D2M):

3.25 The Direct-to-Mobile (D2M) is a technology based on the convergence of broadband and broadcast which uses mobile phones to receive terrestrial digital TV. This kind of convergence opens up the possibility to deliver both broadcast video and audio services over a common infrastructure to a common application interface on smartphones apart from opening up avenues for a new class of data broadcast services into internet-of-things and machine-to-machine ecosystems as well as autonomous vehicles. One of the main use cases of the D2M network is its ability to converge with traditional mobile networks and provide additional data pipe to the mobile operators, which can potentially help decongest the network from heavy bandwidth-consuming applications such as Video, OTT, etc.[23]

3.26 Thus, D2M broadcasting provides a very efficient supplementary downlink (SDL), one-to-many distribution, allowing the transmission of linear content[24]. In such a scenario, the display screen of the mobile handset is used for viewing television programs which will require D2M receiver-enabled mobile devices to receive signals over both the broadcast and broadband network. This content delivery mechanism does not use the mobile telecommunications network. The method of content delivery is very similar to the FM radio tuner provided in many mobile telephone handsets[25].

[23] https://www.communicationstoday.co.in/5g-in-india-true-convergence-with-direct-to-mobile-broadcasting/
[24] https://www.aspiremagz.com/direct-to-mobile-d2m-broadcasting-promises-streaming-without-the-internet-but-is-it-possible/

[25] https://analyticsindiamag.com/did-india-miss-the-bus-to-direct-to-mobile-long-back/

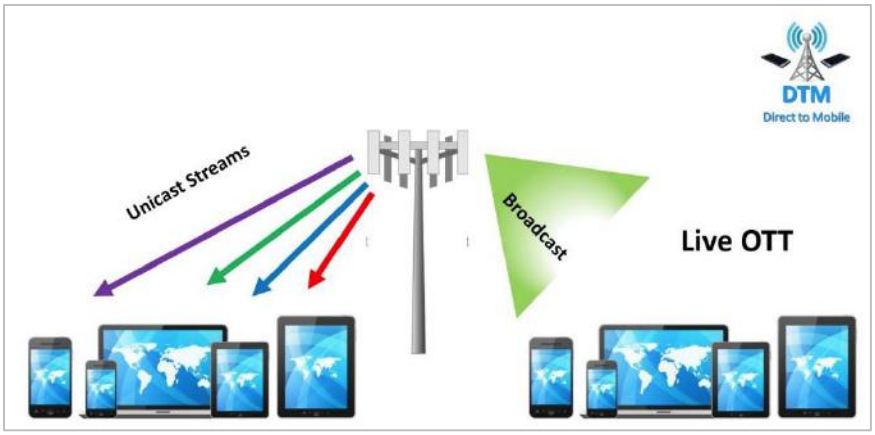

Figure 3.1: Direct-to-Mobile Broadcasting

(Source: Saankhya Labs)

3.27 The D2M Next Generation converged broadcast-broadband network is expected to enhance the consumer experience by delivering the same superior quality to all users, regardless of the number of users consuming the content. Additionally, D2M network can converge with traditional mobile networks and provide additional data pipe to the mobile operators, which can potentially help them to decongest their network from heavy bandwidth consumption through applications such as Video, OTT etc.[26]. For the broadcaster it will increase its customer reach and enhance the ability to monetize the available spectrum since anyone with IP content can plug into the Converged D2M platform. Once a D2M network is rolled out, Broadcaster can use such a network as data pipe and deliver various applications apart from traditional TV, such as educational content, emergency alert system, Video on demand, firmware upgrade over the air (FOTA) etc.[27].

3.28 As part of the transition from analog to D2M, it is imperative that newer and more efficient transmission technologies, platforms, and architectures are explored. Traditional single High Power High Tower

[26] https://www.communicationstoday.co.in/5g-in-india-true-convergence-with-direct-to-mobile-broadcasting/

[27] https://home.iitk.ac.in/~adrish/DTM/WP.pdf

(HPHT) with linear video distribution is inefficient and expensive on spectrum resources because the same frequencies cannot be reused in adjacent areas and low signal level supports a very small bandwidth capacity to mobiles. Therefore, multiple technical and policy studies have reached the conclusion that DTT should be aligned with the cellular architecture.

3.29 Recently, in a study[28], it has been concluded that a hybrid transmission network with a combination of HPHT and Low Power Low Tower (LPLT) with accurate radio frequency (RF) planning is very well suited for a Public Broadcaster for improved outdoor as well as indoor coverage. Dense single frequency networking (SFN) is one of key innovations brought about by the Next Generation Broadcasting. Compared to HPHT, dense SFN architecture uses much lower power transmitters and provides excellent indoor signal coverage. Content and advertising can be distributed over a cluster of broadcast cells or localized to a single cell. Further, mobile and fixed TV viewing can be simultaneously supported by such a hybrid network.

(ii) 5G Broadcast

3.30 The 5G Broadcast System is based on a continuous evolution of Multimedia Broadcast/Multicast Service (MBMS) to meet the requirements for a dedicated broadcast system for linear television and radio broadcast services, referred to as the LTE-based 5G Broadcast System. The Release 14 of 3rd Generation Partnership Project (3GPP) developed the dedicated requirements of broadcast service. With the development of 5G from Release 15 onwards, 3GPP formulated requirements for the system and radio access technology. With the completion of Release 16, a comprehensive set of 3GPP specifications is

[28] https://ieeexplore.ieee.org/document/7047756?arnumber=7047756

available that fulfils the use cases and requirements for a 5G Broadcast system[29].

3.31 5G Broadcast is based on the Further evolved Multimedia Broadcast Multicast Service (FeMBMS) broadcast standard which was first introduced in 3GPP Release 14. It is designed to reach to unlimited number of users with a single data stream, and without any loss of quality. It enables the distribution of linear media content via large radio cells and all mobile devices within the coverage area of the cell can receive the programmes distributed via the data stream. Since the signal is distributed only once to all receiving devices there is no excessive network utilization based on the number of receiving devices per cell and, therefore, the quality of the programmes will not be reduced due to many devices[30].

3.32 The overall aim of dedicated 5G Broadcast is to provide broadcasters with the means of delivering linear TV services to mobile and portable devices, as well as conventional TV sets, with a single chipset in accordance with their requirements[30].

3.33 5G Broadcast specifies receive-only mode operation which enables content to be delivered without an uplink, SIM-card or subscription to an operator or service. Thus, Free-to-air (FTA) reception without a SIM-card is possible. If the FTA broadcast network is extensive enough to provide universal coverage, universal access could also be provided for the linear services from a single network as the 5G Broadcast signal could be received by all compatible devices regardless of the MNO network to which they subscribe. The concept is illustrated in the Figure 3.2. The FTA broadcast network could either be operated by the media

[29] https://www.etsi.org/deliver/etsi_ts/103700_103799/103720/01.01.01_60/ts_103720v010101p.pdf
[30] http://www.ors.at/en/5g-broadcast/underlying-technology/#:~:text=5G%20Broadcast%20is%20based%20on,%2Dtower%20high%2Dpower%20transmitter

content provider, or a third party such as Mobile Network Operator or Broadcast Network Operator.

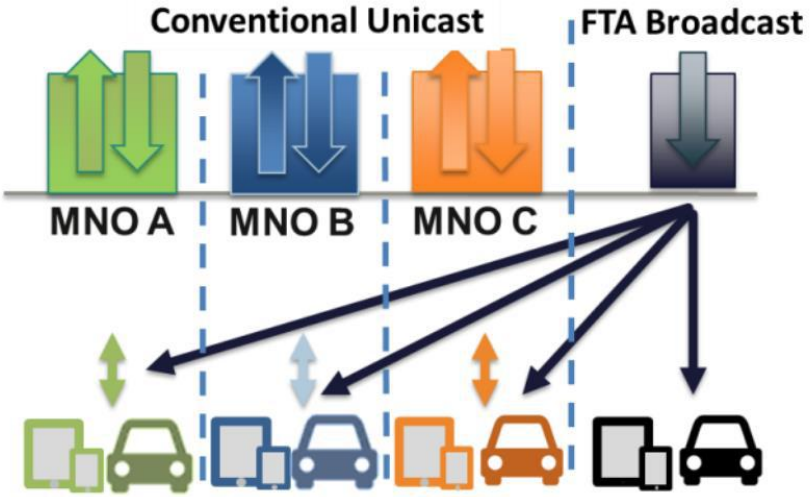

Figure 3.2: Universal access provided by a single FTA broadcast network[31]

3.34 At present, the only means for the delivery of on-demand audio-visual (AV) media services to portable and mobile devices is a unicast connection. However, the large-scale delivery of AV content over mobile unicast networks is not satisfactory from the perspective of media service providers as well as users due to deficits regarding QoS, coverage, and costs. 5G, the latest iteration of cellular technology, as specified by the 3GPP, offers an opportunity to bridge this gap. Since, LTE-based 5G Terrestrial Broadcast system is designed and standardized by 3GPP, and is part of the 3GPP family of standards, it can be fully integrated into 3GPP-compliant devices and complemented by conventional mobile broadband data In the new 5G Broadcast transmission[31].

3.35 According to Rohde & Schwarz, 5G Broadcast supports features needed for broadcasters such as: high-power deployments; operation without

[31] https://tech.ebu.ch/docs/techreports/tr054.pdf

SIM card; support of ultra-high frequency (UHF) spectrum; and support of fixed reception. The integration with the 3GPP stack allows for advanced features such as emergency notifications, interactive broadcasts, etc. The 5G Broadcast system, apart from its ease of integration in handsets, inherits features of cellular systems such as support of multiple antennas, carrier aggregation, etc. 5G Broadcast system has continuously evolved during the last few releases and may be further enhanced to meet new use cases/requirements.

3.36 5G Broadcast supports new ways of broadcasting where the resources (infrastructure and frequencies) might be shared between various stakeholders to create new applications ranging from time-limited local services (like Venue Casting in extremely dense local areas) to nationwide services (like terrestrial based- Positioning, Navigation and Timing) while using limited capacity out of all existing slices.

3.37 5G Broadcast offers network operators two different ways of network deployment:

i) An overlay network whereby high-power 5G broadcast transmitters are able to cover large geographic areas with 5G signals in order to enhance the capability of the cellular unicast network. In this, the infrastructure of a simplified LTE network that enables unicast-based bidirectional communication can be upgraded to enable multicast and broadcast services. With a simplified architecture, in addition to MFN (Multi-Frequency Network) or SFN (Single-Frequency Network) transmission mode in the access network,-few infrastructure elements are needed in core networks to support lower latency and transparent transmission[32].

[32] https://scdn.rohde-schwarz.com/ur/pws/dl_downloads/dl_common_library/dl_brochures_and_datasheets/pdf_1/Rohde-Schwarz_5G-Broadcast-Multicast_bro_3609_6135_92_v0100.pdf

ii) To upgrade existing cellular sites using supplementary downlink (SDL), in which unicast cells can be enhanced by 5G broadcast SDLs to maintain spectrum efficiency and coverage. They can be used in either dedicated mode or mixed mode. In this solution, instead of having an HPT/MPT as in an overlay infrastructure, the focus is on SDL-based transmitters, i.e., Low Power Transmitters (LPTs) within existing cellular sites to have a localized multicast and broadcast approach[33].

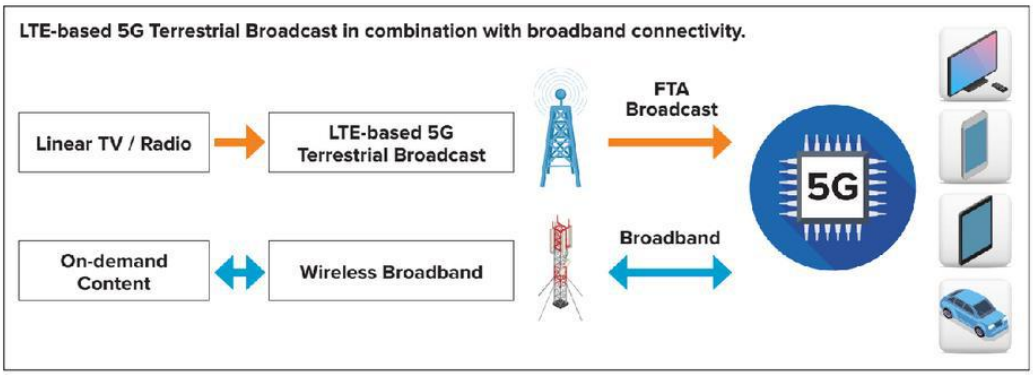

Figure 3.3: LTE-based 5G Terrestrial Broadcast for TV and radio distribution

(Source: 5G-MAG Explainer - LTE-based 5G Terrestrial Broadcast)

3.38 Some of the benefits of 5G broadcasts include[34]:

- **Wider coverage and spectrum efficiency:** Broadcasting information via overlay networks is much more efficient than sending it hundreds of thousands of times to mobile network cells. Owing to greater cell coverage, this improved flexibility will substantially reduce deployment and operation costs.
- **Better quality of service:** Consumers expect higher quality with High Definition (HD) and Ultra-High Definition (UHD) resolutions as well as high dynamic range (HDR) for better picture quality. With lower latency and higher flexibility, consumer experience can be improved with more real-time applications.

[33] ibid

[34] https://scdn.rohde-schwarz.com/pdf_1/Rohde-Schwarz_5G-Broadcast-Multicast_bro_3609_6135_92_v0100.pdf

- **Free-to-air and/or encrypted Received Only Mode:** In this new environment, there will be dedicated carriers with 100% broadcast/multicast allocation in downlink mode. Services will be distributed in such a way that all kinds of devices can receive them including smart cars and smart home appliances. Since, no SIM card is necessary, consumers are required to be within coverage zone for receive-only mode.
- **Simplified architecture:** In addition to MFN or SFN transmission mode in the access network, only a few infrastructure elements are needed in core networks.
- **Smart pipes:** With the 5G Broadcast, the data pipe will be smarter as this can selectively offload content meant for one-to-many communications to the other.

(iii) Satellite Networks for Broadcast and Telecom Services

3.39 Satellite networks are used to provide two major types of services: TV services (associated with broadcast services) and telecommunication services (associated with two-way communication services, symmetric telephony, or asymmetric – internet access). One or more satellite networks can be deployed under the coverage of a single satellite and operated by a satellite network operator. It relies on a ground segment and utilizes some satellite on-board resources. The ground segment is composed of a user segment and a control and management segment, which are also considered as parts of the space segment.

3.40 For TV services, satellites are of paramount importance for satellite news gathering (SNG), for the exchange of programmes between broadcasters, and for distributing programmes to terrestrial broadcasting stations and cable heads, or directly to the individual consumer. The latter are commonly called direct broadcasting by satellite (DBS) systems, or direct-to-home (DTH) systems.

3.41 In the user segment, satellite terminals (STs) are connected to the end-user customer premises equipment (CPE), and hub or gateway stations connected to terrestrial networks. Satellite terminals are earth stations connected to CPE, sending carriers to, or receiving carriers from a satellite. They constitute the satellite access points of a network, when the satellite network is a digital video broadcast with return channel via satellite (DVB-RCS) network, satellite terminals are also called return channel satellite terminals (RCST).

3.42 A satellite broadcast network consists of a transmitting hub station and a number of receive-only earth stations and uses the resource of one or several channels (transponders) of a communications satellite. It relies on a star topology and point-to-multipoint connectivity. Links are unidirectional, from the hub towards the earth stations. An evolution of this network architecture and its associated services consists of introducing interactivity due to a low-data-rate return link transmitted from the earth stations towards the hub. This allows the offering of interactive TV or video-on-demand services.

3.43 A broadband satellite network consists of one or several gateways (or hubs) and a number of satellite terminals with receive and transmit capability and uses the resource of one or several channels (transponders) of a communication satellite. It can rely on a variety of network topologies (star, multi-star, mesh, or hybrid star/mesh) and provide a variety of types of connectivity and links are bidirectional. The characteristics of the satellite terminals and the gateways or hubs can vary a lot according to the market that is addressed.

3.44 Broadband satellite networks are designed to offer most of the services provided by terrestrial Internet networks. Internet service provision by satellite is mainly addressed through the widely accepted digital video broadcasting (DVB) standards family. The satellite-specific DVB-return channel satellite standard (DVB-RCS) family provides the specification

for the return traffic flows from DVB-RCS terminals (DVB-RCST) to gateways[35].

3.45 In general, satellite system supports symmetric predictive traffic, as well as bursty traffic generated by large number of users, owing to dynamic allocation. The satellite system supports interworking with terrestrial networks as well as IP networks. The satellite system supports integrated IP-based data services and native MPEG video broadcasting.

(b) Trials of D2M and 5G Broadcast:

(i) Direct to Mobile

3.46 A Conclave on 'Direct to Mobile and 5G Broadband - Convergence Roadmap for India' was organized by IIT Kanpur, in collaboration with Telecommunications Standards Development Society, India (TSDSI), in New Delhi in June 2022. During the conclave, D2M technology was demonstrated in which smartphones and other smart devices received NextGen Over the Air (OTA) broadcast TV signals from DD, in both stationary and moving environments[36], using the 5G converged network. Essentially, the functionality of TV antenna has been brought to mobile. Since the mobile handset is tuned for certain frequency bands which are not among those held by DD, an additional intermediary device was needed.

3.47 DoT has set up a committee to study the feasibility of a spectrum band for offering broadcast services directly to users' smartphones. As per media reports, Band 526-582 MHz is envisaged to work in coordination with both mobile and broadcast services. Presently, this band is used by the MIB across the country for TV transmitters. Public service broadcaster in 2021 announced a collaboration with IIT Kanpur to test

[35] Satellite Communications Systems: Systems, Techniques and Technology, 6th Edition

[36] https://www.thebroadcastbridge.com/content/entry/18551/india-spotlights-the-importance-of-converged-direct-to-mobile-broadcasting

the feasibility of the technology and MIB is of the opinion that mass roll out of the technology will entail changes in infrastructure and some regulatory changes.

(ii) 5G Broadcast

a. United Kingdom:

3.48 5G RuralFirst, a project funded under the UK government's 5G Trials and Testbeds scheme, delivered broadcast radio over 5G with the BBC from June 2018 – September 2019. The main aim of the project was to test 4G/5G Broadcast for the delivery of radio services directly to members of the public. The 5G Broadcast Radio trial comprised two parts; a public trial based on commercially available 4G equipment and the in-house development of a standalone '5G broadcast' modem that implemented the latest mobile broadcast features that were not available in commercial handsets.

b. United States of America:

3.49 In April 2022, Rohde & Schwarz and Qualcomm partnered to deliver a full end-to-end live 5G broadcast/multicast streaming demonstration during the 2022 NAB Show in Las Vegas. The demonstration showcased broadcast/multicast capabilities over 5G. Pre-recorded content was encoded and transmitted live using a 5G Broadcast signal over the air, offering show attendees an up-close look at an advanced live mobile experience. During the demonstration, a live signal was transmitted over the airwaves inside the Las Vegas Convention Centre using sectorized antenna systems to a smartphone form-factor test device from Qualcomm Technologies. The 5G Broadcast solution was built on the 3GPP Rel-16 feature-set, operating in a Receive-Only Mode (ROM), Free-To-Air (FTA) and without the need for a SIM card (SIM-free reception).

The 5G Broadcast dedicated mode was demonstrated with a standalone transmitter while operating within the UHF band[37].

c. China:

3.50 In China, the Academy of Broadcasting Science (ABS) and China Broadcasting Network (CBN) set up a proof-of-concept (POC) trial which started in August 2019. The Chinese technical standards organizations are preparing a new mobile Broadcast-Multicast standard named Advanced Interactive Broadcast (AIB) that will be considered as the future industry standard. It is based on FeMBMS/5G Broadcast standardized in 3GPP Release 16. The AIB working group's strategy is to support mobile and broadcast convergence within a 5G technology environment where Point-to-Point communications utilize the existing 5G standard. Regarding Point-to-Multipoint communications, the group is innovating to meet Broadcasters' requirements, converging within sub-700 MHz frequency for commercial deployment[38].

E. Spectrum Aspects[39]:

3.51 Conventional mobile networks require both a downlink and an uplink frequency. The uplink and downlink can use different frequencies, as in the case of frequency division duplex (FDD) allocation or can use the same frequency but at a different time, as in the case of time division duplex (TDD) allocation (Figure 3.4 (a)). In contrast, LTE-based 5G terrestrial broadcast is a downlink-only system and is therefore similar to any existing broadcast standard and uses downlink only (Figure 3.4 (b)).

[37] https://www.newscaststudio.com/2022/04/12/nab-show-2022-rohde-schwarz-and-qualcomm-to-show-end-to-end-5g-live-broadcast/
[38] https://www.rohde-schwarz.com/broadcast-and-media/5g-broadcast-multicast-is-evolving_254087.html
[39] https://tech.ebu.ch/docs/techreports/tr054.pdf

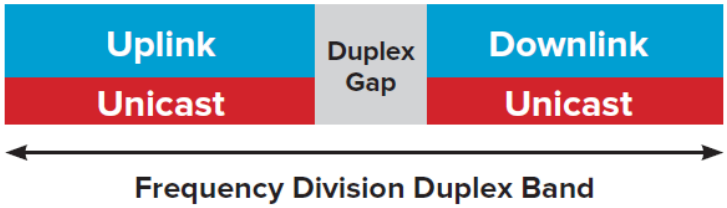

Figure 3.4 (a): FDD allocation with uplink and downlink

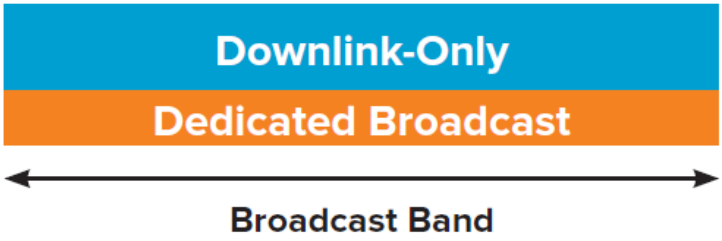

Figure 3.4(b): Downlink-only allocation for dedicated broadcast carriers

3.52 In regard to the spectrum requirement, LTE-based 5G Terrestrial Broadcast has the following main features, which enable operation without uplink[40]:

(a) Dedicated broadcast carriers: up to 100% of each radio frame may be configured to carry broadcast services and related signaling. No user data nor any other information related to unicast is transmitted.

(b) Receive-only mode: user equipment requires neither connectivity nor registration to any network. All the necessary signaling and contextual information is self-contained in the downlink carrier.

5G Broadcast technology relies on the LTE frequency bands as defined in 3GPP TS 36.101 – 'Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) radio transmission and reception', which provides many options for the deployment of such technology. Mobile Network Operators (MNOs) are likely to prefer a mixed mode where

[40] 5G-MAG Explainer - Spectrum for LTE-based 5G Terrestrial Broadcast

broadcast is used in addition to unicast for local bandwidth optimization[41].

3.53 Bands below 1 GHz are ideal for covering large areas with limited amounts of sites. Most of the available RF bandwidth is in higher bands is well suited for densely populated areas. In rural areas, primarily bands below 1 GHz are used. With network load primarily driven by audio visual (AV) content, networks would soon typically exceed a ratio of 10:1 between downlink (DL) and uplink (UL)[42].

3.54 The UHF broadcast bands, from around 470 MHz to 694/698 MHz, depending on the geographical region (Figure 3.5), may be suitable for LTE-based 5G Terrestrial Broadcast as well. However, the channel bandwidth allocations in that portion of the spectrum - 6, 7 or 8 MHz depending on the region, do not comply with those currently specified in the 3GPP specifications, that is, 3, 5, 10, 15 and 20 MHz for the terrestrial mobile network. Using the same bandwidths as other broadcasting systems would maximize compatibility and facilitate the introduction of LTE-based 5G Terrestrial Broadcast[43].

[41] https://tech.ebu.ch/docs/techreports/tr054.pdf
[42] https://tech.ebu.ch/docs/techreports/tr054.pdf
[43] 5G-MAG Explainer - Spectrum for LTE-based 5G Terrestrial Broadcast

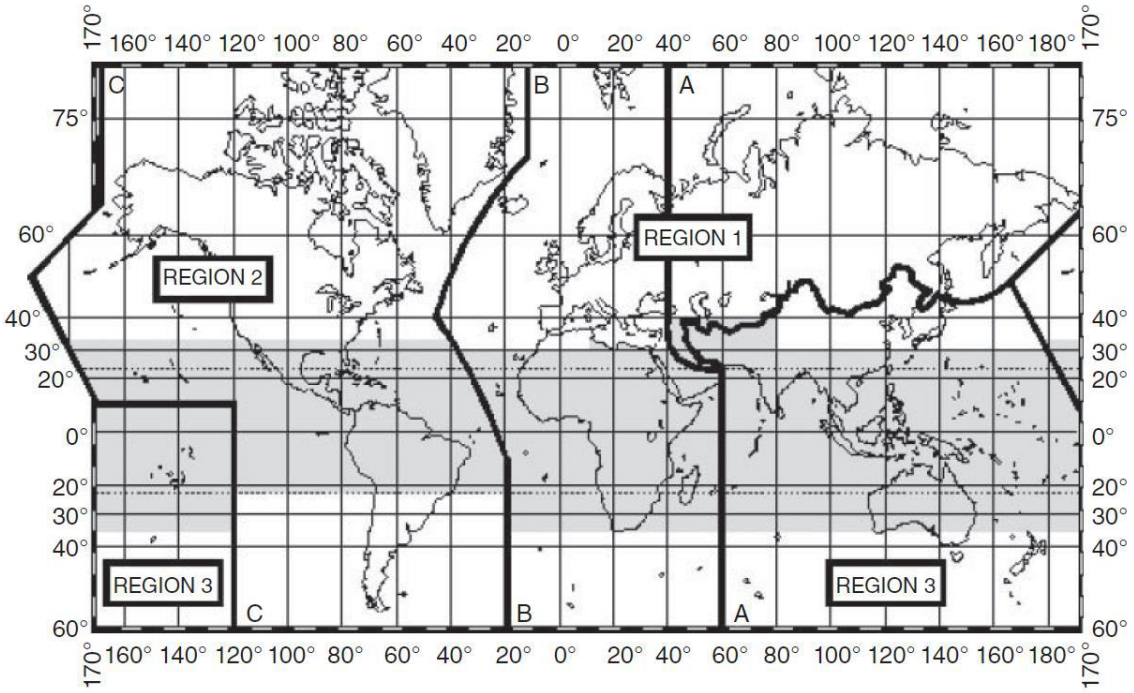

Figure 3.5: Map of regions and areas for frequency allocation in the ITU Radio Regulations (RR)

3.55 In Release 17 and Release 18, new work items are approved to enable the operation of LTE-based 5G Terrestrial Broadcast in UHF broadcast spectrum, potentially alongside existing digital terrestrial television (DTT) systems and bandwidths of 6, 7 and 8 MHz will be defined[43].

3.56 The Release 17 scope includes standalone broadcast enhancements and mixed-mode multicast support. For instance, introducing the support of 6/7/8 MHz carrier bandwidths for standalone broadcast, and defining multicast operations for 5G NR with simultaneous/ dynamic switching between broadcast and unicast transmissions[44].

3.57 However, for standalone 5G Broadcast networks the number of spectrum options is rather limited, especially if near-universal coverage is required. Such coverage may be best provided by lower frequency bands. Standalone, wide area 5G Broadcast networks may not be commercially

[44] https://www.qualcomm.com/news/onq/2022/03/just-3gpp-completes-5g-nr-release-17

viable in the bands owned by MNOs as they would likely derive higher revenues from mobile unicast services[45].

3.58 LTE-based 5G Terrestrial Broadcast could be deployed in any mobile downlink band including SDL (supplemental downlink) bands, for example the L-band (1452–1492 MHz). SDL is a form of carrier aggregation. It is not possible to aggregate all combinations of carriers together – only the combinations set out in 3GPP TS 36.101 are currently permitted[46].

3.59 There are several challenges associated with a possible deployment of 5G Broadcast networks in the SDL bands, including standardization, device support, regulatory conditions, and ensuring commercial viability. Following table contains an example of potential FDD allocations in the 700 and 800 MHz bands as well as the allocation intended to be used to realize SDL[47].

Table 3.1: Examples of FDD bands

Band	Uplink (UL)			Downlink (DL)			Duplex Mode
	F_{UL_low}		F_{UL_high}	F_{DL_low}		F_{DL_high}	
20	832 MHz	-	862 MHz	791 MHz	-	821 MHz	FDD
28	703 MHz	-	748 MHz	758 MHz	-	803 MHz	FDD
32		N/A		1452 MHz	-	1496 MHz	FDD*
67		N/A		738 MHz	-	758 MHz	FDD*

* Restricted to Carrier Aggregation, where the downlink band is paired with the uplink of another carrier.

(Source: EBU Technical Report, May 2020)

3.60 The potential allocations to downlink-only transmission with unpaired uplink, Standalone Downlink Only (SDO) are not defined in 3GPP. Further consideration is therefore required of which bands may be

[45] https://tech.ebu.ch/docs/techreports/tr054.pdf
[46] ibid
[47] ibid

suitable for 5G Broadcast deployment, including the technical/ regulatory considerations associated with them[48].

F. Unified policy framework and spectrum management regime for the carriage of broadcasting services and telecommunication services

3.61 As seen from the previous sections, the WPC wing of the DoT exercises the statutory functions of the Central Government and issues licenses to establish, maintain and operate wireless stations under Section 4 and Section 7 of the Indian Telegraph Act, 1885. A license enables recognition of spectrum uses and their protection against harmful interference for the intended use. Thus, spectrum is assigned to all users by the WPC wing of the DoT. However, for the delivery of services for broadcasters, say for example, licenses for DTH services and Cable TV are issued by the MIB whereas for the Telecommunication Services licenses are issued by the DoT.

3.62 Further, as depicted in the above Table 2.1, the spectrum to all broadcasting services and telecommunication services is assigned by the WPC wing of DoT and is also performing the function of Indian Administration for planning, coordination, and management. For the Access Services, spectrum assigned through auction is treated as liberalized and is technology neutral. However, for any existing spectrum holding which was assigned through administrative allocation, the telecom service providers (TSPs) have been given a choice to get it liberalized after paying differential between the entry fee and the market determined price for the remaining validity of spectrum.

3.63 It is also to note that spectrum assigned through auction or through administrative assignments, is for specified service. Similarly, the spectrum assigned to broadcast service providers is for specified service.

[48] https://tech.ebu.ch/docs/techreports/tr054.pdf

3.64 In Europe, the sub-700 MHz UHF band (the entire 470-694 MHz range) is currently heavily used by DTT[49]. In New Zealand, the range from 502-622 MHz is used by Digital Television Channels[50]. In India, at present frequency band 526-582 MHz is being used by Prasar Bharati (DD) for providing Terrestrial TV Broadcasting and many Analogues, Digital Ready and Digital Terrestrial TV Transmitters are operating in this band.

3.65 While ITU has identified spectrum in 470-698 MHz as an IMT band in Region 2 and Region 3 (India is in Region 3), frequency arrangement for 526-582 MHz and 582-617 MHz bands have not been defined by ITU. Further, no band plans have been defined so far for 526-582 MHz and 582-617 MHz bands and thus development of ecosystem for IMT in 526-617 MHz frequency range will take some time.

3.66 TRAI in its recommendations on 'Auction of Spectrum in frequency bands identified for IMT/5G' dated 11th April 2022, inter-alia, recommended the following:

(a) Considering the facts that presently (i) band plan(s) for the frequency range 526-612 MHz is yet to be defined by 3GPP/ITU, (ii) development of ecosystem for IMT in 526-612 MHz frequency range will take some time and (iii) MIB is using 526-582 MHz band extensively across the country for TV transmitters; the 526-612 MHz frequency range should not be put to auction in the forthcoming auction.

(b) DoT should come out with a plan for refarming 526-582 MHz band to be utilized for IMT deployments. To make 526-582 MHz band available for IMT, DoT should work with MIB to prepare a plan for an early migration from Analogue to Digital Transmission, so that the frequency band from 526-582 MHz can be vacated for IMT services. Considering that ITU has identified spectrum in 470-698 MHz as an IMT band in Region 2 &

[49] https://tech.ebu.ch/docs/techreports/tr054.pdf
[50] https://www.rsm.govt.nz/assets/Uploads/documents/ab6e11fc39/digital-television-channel-usage-table.pdf

Region 3, DoT may adopt a holistic approach and review the entire frequency range starting from 470 MHz to 582 MHz.

(c) *In case, complete refarming of 526-582 MHz frequency range for IMT is not feasible, DoT may explore the possibility of this band being used for IMT as well as for broadcasting by MIB on coexistence basis. Refarming of this frequency range for IMT may be performed in a phased manner so that as and when some frequency carriers are vacated, the same can be auctioned for IMT services.*

3.67 Globally, work is going on to reap the benefits of convergence between telecommunication and broadcasting services. Undoubtedly, the convergence of broadband services and broadcasting services will bring substantial efficiencies. From regulatory and policy perspective also, it may be desirable that similar services are regulated in a similar manner. The issue arises as to whether there is a need for any change in spectrum management regime in India for carriage of broadcasting services and telecommunication services to facilitate the convergence.

3.68 In this background, stakeholders are requested to provide their comments with justification to the following question:

Q4. What steps are required to be taken for establishing a unified policy framework and spectrum management regime for the carriage of broadcasting services and telecommunication services? Kindly provide details with justification.

G. Looking at convergence holistically

3.69 The reference from DoT specifically refers to convergence of carriage of telecom and broadcasting service and seeks recommendations of the Authority on restructuring of legal, licensing, and regulatory frameworks for reaping the benefits of convergence of carriage of broadcasting

services and telecommunication services and establishing a unified policy framework and spectrum management regime for the same. However, as discussed in previous chapters, due to convergence in IP based networks, the aspect of convergence goes beyond telecom and broadcasting and involves convergence with IT sector as well.

3.70 Network functions are getting virtualized and can be optimized to be hosted in edge data centers. This is being referred to as 'Telco cloudification' and indicates to hosting or using network resources and services from the cloud. Convergence of networking and cloud/edge computing will ultimately affect the way the telecom as well as broadcasting services are delivered. Performance of service delivery is now a mixture of performance of the infrastructure deployed by Information Technology enabled Services (ITeS) providers and Telecom Service Providers (TSPs). In many cases these may not be two separate entities. In such a scenario, it is difficult to differentiate the responsibilities of ITeS provider and TSP, which would create serious issues in achieving the performance objectives or other regulatory provisions already laid out for the telecom/broadcasting users. In the coming years, it would almost be impossible to demarcate and assign responsibilities between cloud and telecom service providers from a regulatory perspective.

3.71 As has been discussed in the first chapter, 6G networks are being designed to provide services using various access technologies like fixed, mobile and satellite. 3GPP is already working on developing 5G NR for satellite communications that will converge NTNs with terrestrial mobile networks. LEO based mobile communication is all set to address reachability and service continuity in unserved/underserved areas. Device ecosystem of terrestrial networks and satellite phones is also converging where some latest models offer delivery of services through both NTNs as well as terrestrial networks.

3.72 It is therefore imperative to look at the convergence not just from a telecom and broadcasting lens, but in a more holistic manner involving ITeS and space sector as well. In this background stakeholders are requested to provide their comments with justification to the following question:

Q5. Beyond restructuring of legal, licensing, and regulatory frameworks of carriage of broadcasting services and telecommunication services, whether other issues also need to be addressed for reaping the benefits of convergence holistically? What other issues would need addressing? Please provide full details with suggested changes, if any.

CHAPTER 4

International Experience

4.1. To accommodate new services and the evolving marketplace, many countries are modifying their policy-making and regulatory frameworks and institutions addressing the phenomenon of convergence of the telecom and broadcasting industries. One of the ways this has been achieved is by merging different regulatory authorities for telecom and broadcasting into one regulatory body. Large economies around the world like the USA, UK, Australia, European Union, etc. have established the converged regulators who are empowered and made responsible for overseeing the complete electronic communication space which includes telecommunication, broadcasting, media, and cyberspace. They have a common body that authorizes or provides licenses for both telecommunications and broadcast services. The international developments in the licensing regimes and regulation with respect to convergence in different countries is deliberated in this section.

I. United States

4.2. The Federal Communications Commission (FCC) was established by the Communications Act of 1934, regulates radio, television, wire, satellite, and cable communication, both interstate and international. The Communication Act of 1934 (as amended) deals with the regulation of telegraph, telephone, and radio communications in great detail. The Act provides for regulation in almost all aspects of the communications and broadcasting industry. The FCC is further divided into seven separate bureaus that process applications, filing of licenses, complaints, and making policies, etc.

4.3. **Telecommunication services:** In the USA, the entities are authorized to provide telecommunication services, which are automatically granted upon registration with the FCC. For utilizing the radio spectrum to

provide domestic telecom service, entities must obtain a radio license for the frequencies to be used before commencing the service. Providers of licensed wireless, broadcast or satellite services are required to operate consistent with the terms of their FCC license and applicable FCC rules including that of interference. Licensees providing commercial mobile radio services are classified as telecommunications carriers and must obtain an FCC Registration Number. Entities seeking to provide telecommunications services between the U.S. and any foreign point must apply for and obtain an international authorization before commencing service.

4.4. Though FCC regulates interstate telecommunications, the state public utility commissions/public service commissioners oversee intrastate telecommunications. Some state laws also require approval by the state prior to the transfer of control or assignment of state telecommunications authorizations. Telecommunications providers must, however, register with the state public utility/service commission, as well as meet other state-specific criteria. On the other hand, the states do not have jurisdiction over either information services or wireless services as these falls under the interstate category. For Voice Over Internet Protocol (VoIP) providers, some states require registration, but it's mostly the FCC that regulates this area.

4.5. **Broadcasting services:** FCC issues the broadcasting license, which is a type of spectrum license granting the licensee permission to use a portion of the radio frequency (RF) spectrum in a given geographical area for broadcasting purposes. The FCC licenses TV and Radio Stations as well as gives registration to cable operators.

Content Regulation: In the USA, FCC is responsible for content regulation also. Content over the internet is very lightly regulated by FCC compared to content delivered by over-the-air broadcasting, cable, and satellite. As new media delivery begins to compete with and replace more

traditional modes of delivery, the FCC is likely to increasingly apply regulations.

4.6. Thus, in the USA, FCC regulates providers of telecommunication services, broadcasting services, cable services and its content.

II. United Kingdom

4.7. The UK communication industry is regulated by The Office of Communications (OFCOM), having duties in television, radio, telecommunications, and wireless communications services[51]. The Communications Act 2003 (CA 2003)[52] is the primary source of communication legislation and regulation in the UK that regulates the provision of electronic communication services as well as broadcasting services. The Broadcasting Standards Commission, Independent Television Commission, Office of Telecommunications, Radio Authority, and Radio-communications Authority merged their 16 regulatory duties under OFCOM in 2002. OFCOM provides licenses for TV broadcast, radiocommunications, radio broadcast, spectrum, etc.

4.8. **Telecommunication services:** In the UK, a general authorization regime prevails, which makes no distinction between fixed, mobile and satellite networks and services. Broadly, there are two types of communication providers:

- Electronic Communication Networks (ECN) Providers
- Electronic Communication Services (ECS) Providers

No license is required to install or operate electronic communications networks or services unless the use of a radio frequency spectrum is involved. Anyone using radio spectrum (such as satellite service providers) needs a license under the Wireless Telegraphy Act (WTA) 2006

[51] https://www.ofcom.org.uk/about-ofcom/what-is-ofcom
[52] https://www.access-info.org/wp-content/uploads/ukpga_20030021_en.pdf

unless the government has exempted the particular use from the need for a license. All U.K. communications networks and service providers do need to comply with a general authorization regime (under the Communications Act 2003) for the provision of communications services.

4.9. **Broadcasting services:** OFCOM is responsible for licensing all UK commercial television and broadcast services and an operator has to acquire TV broadcast licenses before commencing its operation. The Communications Act of 2003 requires that a person may provide electronic communications network and electronic communication service only after giving due notification to OFCOM. The Act provides, Inter-alia, as below:

(a) "electronic communications network" means a transmission system for conveyance, by the use of electrical, magnetic, or electro-magnetic energy, of signals of any description. Reference to the conveyance of signals includes references to the broadcasting of signals for general reception.

(b) "electronic communications service" means a service consisting in, or having as its principal feature, the conveyance by means of an electronic communications network of signals, except in so far as it is a content service.

Thus, under the regulatory framework in UK, "electronic communication service" includes broadcasting service and excludes content service. A single government approved entity administers all providers of telecommunication and broadcasting services in UK under the provisions of a single Act of Parliament.

4.10. **Content regulation:** Media content regulation in the UK is carried out by different regulators based on the type of media. OFCOM is in charge of content control, regulates the content of television and radio programs, and VoD, by establishing and applying codes containing rules which broadcasters are obliged to follow. The principal code for regulating content is the OFCOM Broadcasting Code. Video streaming services, OTT

platforms are not regulated but a framework is proposed in 2018 to regulate online curated content in the UK in the future.

III. Australia

4.11. The Australian Broadcasting Authority and the Australian Communications Authority were integrated in 2005 to become the Australian Communications and Media Authority (ACMA). ACMA is a converged regulator, created to oversee the convergence of telecommunications, broadcasting, radio communications and the internet[53]. The key responsibilities of the ACMA include:

- licensing and regulating telecommunications carriers, carriage service providers and content service providers.
- licensing and regulating RF spectrum.
- regulating television and radio broadcasting, including content regulation.
- regulating telecommunications and radiocommunications equipment; and regulating telephone, email marketing and online content.

4.12. **Telecommunication services:** ACMA distinguishes between the carriers and carriage service providers while regulating the communications and media services in Australia. Telecommunication or carriage services can be provided by carriers or carriage service providers through the Telecommunications 'Network Unit' to supply the carriage services. Telecommunications companies need *carrier licenses or nominated carrier declarations (NCD)* to operate facilities (transmission infrastructure cabling, wireless networks, satellite facilities), to supply telecom services to the public. Carriers must be individually licensed by the ACMA. The licensed carrier applies for the NCD to the ACMA, and the owner of the network unit does not require a carrier license. A carrier

[53] https://www.acma.gov.au/who-we-are

can also be a carriage service provider as it does not require a license, and there is no prohibition. Both the carriers and carriage service providers must comply with any ACMA pre-selection determinations.

4.13. There are two types of service providers in Australia: Carriage Service Providers and Content Service Providers. Carriers provide the basic transmission infrastructure on which carriage and content services are supplied to the public. Telecommunications carriers own network units that deliver carriage services. Their facilities may include:

- transmission infrastructure
- cabling
- wireless networks
- satellite facilities

A carriage service provider (CSP) does not have its own network units. These providers do not need individual licenses, but they must comply with the Telecommunications Act 1997, and certain obligations including access obligations, and other types of service provider rules imposed by ACMA. Carriers operate telco networks and infrastructure. Carriage service providers use carrier networks to provide services such as phones and internet.

4.14. Radio Communications Licenses are necessary to use the radiocommunications' equipment, and there are three categories of this license – *Apparatus, Class, and Spectrum*. Carrier that operates radiocommunication equipment for the purpose of supplying carriage needs to have a spectrum license.

Broadcasting services: In case of broadcasting services, ACMA regulates broadcasting in Australia through licensing, planning, TV and radio programming and media ownership rules. A *broadcast content license* and an *apparatus licence* are required for an operator to broadcast

or transmit on radio or TV. The broadcast content license may be a class license, depending on the type of service.

4.15. **Content Regulation:** Australia has an interrelated framework comprising funding and regulatory mechanisms to secure Australian content, the Government and ACMA are responsible for regulating the screen industry and publishing information for compliance purposes. ACMA regulates traditional media, has an eSafety Commissioner for matters related to digital media, and includes restricted access to certain kinds of content. 'Screen Australia' is the federal funding body for screen content. The Broadcasting Services Act, 1992 is the legislation governing the OTT sector that laid down detailed guidelines on the kind of content which may be hosted online. Apart from Industry codes and industry standards, it has a complaint mechanism and 'refused classification' to be prohibited. The complaints-based mechanism was introduced in 2000, known as the online content co-regulatory scheme.

4.16. Thus, a single entity administers all providers of telecommunication services and broadcasting services under two separate Acts of law in the Commonwealth of Australia.

IV. European Union

4.17. To address the emerging challenges from technological convergence, the European Union (EU) has issued the European Electronic Communications Code (EECC) directive[54], which provides a framework to regulate electronic communications networks and services. The EECC was adopted in December 2018. It represents a revision of the entire EU regulatory framework for the telecommunications sector and repeals and replaces the Framework Directive, the Authorization Directive, the Access Directive, and the Universal Services Directive. This Directive

[54] https://eur-lex.europa.eu/eli/dir/2018/1972/oj

establishes a legal framework to guarantee that electronic communications networks and services can be freely provided.

4.18. According to the directive, the convergence of the telecommunications, media and information technology sectors means that all electronic communications networks and services should be covered to the extent possible by a single EECC established by means of a single Directive, except for matters better dealt with through directly applicable rules established by means of regulations. As stated in the EECC, it is necessary to separate the regulation of electronic communications networks and services from the regulation of content.

4.19. **Authorization/ Licensing regime:** The EECC Directive has replaced the individual license regime by introducing a 'general authorization' regime. Under this authorization regime, the provision of electronic communications networks or services can only be subject to a 'general authorization'. As an exception to the 'general authorization' regime, member states can grant, upon request, individual licenses for the use of scarce resources: frequencies, numbers, and rights of way.

As of mid-2021, only a few countries had taken necessary legislative actions and fully implemented EECC. These countries are Bulgaria, Denmark, Finland, France, and Hungary. EECC has been partially implemented in Germany, Greece, Netherlands, Poland, and the UK. In the rest of the member countries no formal implementation of any EECC legislation has been done.

4.20. **Content Regulation:** EU policymakers are presently working to regulate online content and there have been recommendations for this purpose. The policy approaches by the proposed EU Terrorist Content regulation and the EU Copyright Reform directive are focused on regulating online content. A paper on "Illegal and harmful content on the Internet" by the

EU listed content that can be a concern to national security and spoke about protection of minors, racial hatred, or racial discrimination.

But in one of the EU member-states, Ireland, the Irish government has approved the general scheme of the Online Safety and Media Regulation Bill to establish a regulatory framework to deal with the spread of harmful online content. The Bill provides that the Media Commission will replace the Broadcasting Authority of Ireland (BAI) and will take on the role of regulating the audio-visual sector.

V. Singapore

4.21. In 2016, the regulatory landscape changed in Singapore, with the formation of the Info-communications Media Development Authority (IMDA) following the passing of the IMDA Bill. This was done by restructuring the Info-communication Development Authority of Singapore-IDA and the Media Development Authority of Singapore-MDA to form one single authority. In regulating the Infocomm and media sectors, IMDA administers various licenses, creating a level playing field for the various industry players and licensees[55].

4.22. IMDA provides registration and licenses in the industries of arts, broadcast, internet, films and video games, newspaper, and printing press, postal and telecommunication. Some of the licenses and registration that are provided by IMDA include licenses for the operation of radio-communication station or network, general and localized radio-communication station licenses, equipment registration, network license, satellite license for broadcasting purposes, Internet Access Service Providers, OTT licenses, etc.

4.23. **Telecommunication services:** IMDA is tasked with administering and overseeing telecom licensing compliance. The IMDA divides licenses for the operation and provision of telecoms systems and services into

[55] https://www.imda.gov.sg/regulations-and-licensing

facilities-based operators (FBOs) and services-based operators (SBOs), with the Radio-Communications Regulations requiring additional licensing where RF spectrum is required for the provision of wireless services. All persons providing and operating telecom systems and services to customers in Singapore are subject to licensing regulation (*section 5, Telecommunications Act*). Telecommunication service is defined in the Act to mean any service for telecommunications, excluding any broadcasting service. A telecommunication system means any system used or intended to be used for telecommunications, including (for the avoidance of doubt) a system capable of being used for operating a broadcasting service.

4.24. **Broadcasting services:** Prior to the merger, Singapore Broadcasting Authority was set up to regulate the broadcasting industry, and the broadcasting services are subject to a class license under the Broadcasting (Class Licence) Notification of the Broadcasting Act56. All class licensees must comply with the license conditions contained in the Notification. Presently, under section 5 of the Broadcasting Act, IMDA grants two types of licenses: broadcasting licenses and broadcasting apparatus licenses. To broadcast programs in Singapore, a person must obtain a broadcasting license from the IMDA, which is granted for the categories of licensable broadcasting services listed in the Notification. A company wishing to provide a licensable broadcasting service that is subject to the class license regime must also register with IMDA.

4.25. **Content Regulation:** IMDA's content regulation aims to reflect community standards, the general principle is that services with higher reach and impact should be subjected to more stringent content regulatory requirements. The industry is guided by various medium-specific content codes and classification guidelines set by IMDA and the

[56] https://sso.agc.gov.sg/SL/BA1994-N1?DocDate=20200622

laws on the regulation of content are direct. Mandating the service providers to obtain a license, IMDA developed a content code of practice[57] for OTT, VoD and niche services, with a very specific list of prohibited content. Foreign entities that operate broadcasting and platform services in Singapore are also bound by such requirements. The code further requires service providers to "ensure a balance between the viewpoints expressed in the news and current affairs", and when the code is breached, the license is revoked.

4.26. **Converged competition code for telecommunication and media markets[58]:** At present, competition and market-related matters in the telecoms and media sectors are governed separately by two different codes of practice in Singapore. In line with the IMDA's role as a converged regulator, it has decided to review both codes of practice with the aim of merging the two frameworks and developing a harmonized converged competition code for both markets. For this purpose, in 2019, IMDA developed a Draft Code of Practice for Competition in the Provision of Telecommunication and Media Services and launched a public consultation process to seek views on its proposed converged competition code. IMDA will issue the final Code soon, which aims to promote fair and efficient competition, enhance consumer protection, and improve regulatory clarity to encourage licensees to develop new and innovative services.

VI. South Korea

4.27. Earlier, South Korea had four government authorities responsible for regulating the communications industry – Telecommunications Commission; Ministry of Information and Communication (MIC); Broadcasting Commission; and the Ministry of Culture and Tourism.

[57] https://www.imda.gov.sg/Regulations-and-Licensing/Codes-of-Practice/OTT-VOD-Niche-Services-Content-Code-updated-29-April-2019.pdf
[58] https://www.imda.gov.sg/regulations-and-licensing/consultation-for-converged-competition-code

This overlap in agencies was delaying the roll-out of IPTV services and eventually, in December 2007 the government enacted a new law eliminating MIC and calling for a unified broadcasting and communications commission, merging the Broadcasting Commission, the Telecommunications Commission and MIC's Broadcasting Policy Office. Now, the major government authorities in relation to the telecom and broadcasting industry are the Minister of Science and ICT (MSIT)[59] and the Korea Communications Commission (KCC) – the regulation agency modeled after the FCC of the United States.

4.28. With respect to the telecommunications and internet industry, MSIT holds the majority rights and authorities including granting of licenses and implementation of plans, regulations, and policies under the Telecommunication Business Act (TBA)[60]. MSIT has the authority to issue licenses for satellite and Cable TV broadcasting also.

4.29. The basic regulatory framework is set out in the TBA and the Radio Waves Act (RWA). Traditionally, under the TBA, there were three types of telecommunications businesses, namely –

- providers of core telecommunications services (CTS);
- special category telecommunications services (SCTS); and
- value-added telecommunications services (VATS).

However, the amendments to the TBA, which came into effect as of 25 June 2019, restructured telecommunications services into two main types, CTS and VATS, absorbing SCTS into the broadened class of CTS.

4.30. **Authorization/ Licensing regime:** Under the amended TBA, all CTS providers must register with the MSIT. These requirements for registration are the same as those that applied to CTS providers and SCTS providers under the previous provisions of the TBA. In contrast to

[59] https://english.msit.go.kr/eng/contents/cont.do?sCode=eng mPid=19&mId=24
[60] https://www.law.go.kr/LSW/lsInfoP.do?lsiSeq=142966&viewCls=engLsInfoR&urlMode

CTS providers, VATS providers are only required to submit a report to the MSIT. Businesses that are not mainly engaged in telecom services but engage in sales (in their own name) of goods or services that incorporate telecommunications-enabled components, such as vehicles with certain built-in telecom services, are not required to obtain any licenses or registrations but are required to file a report to the MSIT. Digital platforms are categorized as VATS providers under the TBA and the providers must file a report with the MSIT.

4.31. Further, there is no distinction, in the applicability of authorization or licensing requirements under the amended TBA, between the different means of communication (fixed, mobile or satellite) or the particular technology applied (e.g., 2G, 3G, or 4G in the mobile communication context). However, any telecommunication business using radio waves (e.g., for mobile or satellite services) must also comply with additional requirements under the RWA to be assigned particular radio frequencies.

4.32. **Content Regulation:** South Korea is the first country to have any internet-specific censorship law and regulation. The regulatory framework for the media sector is set out within the Broadcasting Act and the Internet Multimedia Broadcasting Services Act (the IPTV Act). Whereas the IPTV Act specifically sets out the regulations to be followed by Internet Protocol Television (IPTV) operators and IPTV content providers, and the Broadcast Act sets out the regulations applicable to operators of other types of broadcasting platforms, system operators, terrestrial broadcasting operators, broadcasting related business operators, signal transmission network business operators (TBOs) and programme providers (PPs). Online media services are generally subject to the IT Network Act. Both the KCC and MSIT are in charge of regulations applicable to the operators above for providing general, home and specialized programmes and broadcasting services anywhere in South Korea.

VII. Canada

4.33. The Canadian Parliament formed a self-governing body, the Canadian Radio-television and Telecommunications Commission (CRTC)[61] in 1968, that report to Parliament via the Minister of Canadian Heritage. The CRTC is in charge of overseeing and regulating all parts of the Canadian broadcasting system, as well as telecommunications common carriers and service providers that come under federal jurisdiction.

4.34. **Telecommunication and Broadcasting services:** Those wishing to provide telecommunications services in Canada must register with the CRTC and appear on one of their registration lists. Local voice services, VoIP services, internet services, long distance services, wireless services, and payphone services are just a few examples of services included in telecommunications services. For entities to carry telecommunications traffic between Canada and any other country, CRTC issues Basic International Telecommunications Services License. CRTC also issues broadcasting licenses.

4.35. **Content Regulation:** CRTC enforced rules and quota requirements on Canadian content in broadcasting for TV, radio, cable TV, DTH broadcast services, specialty television, and satellite radio services. Canadian content refers to the CRTC requirements, derived from the Broadcasting Act of Canada, that radio and television broadcasters (including cable and satellite specialty channels) must produce and/or broadcast a certain percentage of content that was at least partly written, produced, presented, or otherwise contributed to by persons from Canada.

[61] https://crtc.gc.ca/eng/home-accueil.htm

VIII. South Africa

4.36. The Independent Communications Authority of South Africa (ICASA)[62] is the regulator of telecommunications and the broadcasting sectors and was created in July 2000. The functions of previous regulators, the South African Telecommunications Regulatory Authority-SATRA and the Independent Broadcasting Authority-IBA were replaced by ICASA. These two authorities were combined into ICASA to promote effective and smooth regulation of telecommunications and broadcasting with respect to convergence of technology.

4.37. ICASA's responsibilities include issuing licenses to broadcasters, signal distributors, telecommunications service providers, and postal service providers, as well as making regulations, imposing license conditions, and planning, assigning, controlling, enforcing, and managing the frequency spectrum. In South Africa, the licensing framework for telecommunications[63] is contained in the Electronic Communications Act (ECA), 2005. The rules in Chapter 3 of the Act assist ICASA in performing its licensing duty. The main service licenses can be categorized as[64]:

(a) Electronic Communications Services Licenses
(b) Broadcasting Services Licenses
(c) Unreserved Postal Services Licenses

4.38. **Telecommunication services:** For communication services, ICASA grants individual licenses for electronic communications network services (ECNS), and electronic communications services (ECS). ECNS makes available an Electronic Communications Network (ECN), either by sale, lease or otherwise. ECN is the system of electronic communications facilities (in line with the technologically neutral licensing framework),

[62] https://www.icasa.org.za/pages/about-us-1
[63] https://www.icasa.org.za/pages/services-licencing
[64] https://www.icasa.org.za/pages/list-of-licensees

and may include satellite systems, fixed and mobile systems, fiber-optic cables, and electricity cable systems. ECS service is provided to the public, the state, or the subscribers by any means of electronic communications over an ECN but excludes broadcasting services.

Broadcasting services: To offer a commercial broadcasting service in South Africa, an operator or a person must obtain a broadcasting services licence from ICASA.

4.39. **Content Regulation:** South African Government regulates online content and media under the Films and Publications Amendment Act of 2019 which brings the law in line with advancements in digital technologies to protect against harmful online content. The Act aims to ensure that citizens are protected from content in films, games and publications that could cause them moral, emotional or psychological harm. ICASA also has Local TV content regulations for broadcasting licensees.

4.40. From the international practices it is observed that the governments around the world have slowly but steadily moved towards convergence of the carriage of broadcasting services and telecommunication services. In most of the developed/developing nations, licenses and authorization for both telecommunication services and broadcasting services are under one single ministry or organization. Further, many countries have put in place a regulatory mechanism in which the providers of transmission infrastructures of broadcasting services and telecom services are governed by a single organ of the government under a single Act of legislature.

CHAPTER 5

Issues for Consultation

Q1. Whether the present laws are adequate to deal with convergence of carriage of broadcasting services and telecommunication services? If yes, please explain how?

OR

Whether the existing laws need to be amended to bring in synergies amongst different acts to deal with convergence of carriage of broadcasting services and telecommunication services? If yes, please explain with reasons and what amendments are required?

OR

Whether there is a need for having a comprehensive/converged legal framework (separate Comprehensive Code) to deal with convergence of carriage of broadcasting services and telecommunication services? If yes, provide details of the suggested comprehensive code.

Q2. Whether the present regime of separate licenses and distinct administrative establishments under different ministries for processing and taking decisions on licensing issues, are able to adequately handle convergence of carriage of broadcasting services and telecommunication services?

If yes, please explain how?

If no, what should be the suggested alternative licensing and administrative framework/architecture/establishment that facilitates the orderly growth of telecom and broadcasting sectors

while handling challenges being posed by convergence? Please provide details.

Q3. How various institutional establishment dealing with –

(a) Standardization, testing and certification.

(b) Training and Skilling.

(c) Research & Development; and

(d) Promotion of industries

under different ministries can be synergized effectively to serve in the converged era. Please provide institution wise details along with justification.

Q4. What steps are required to be taken for establishing a unified policy framework and spectrum management regime for the carriage of broadcasting services and telecommunication services? Kindly provide details with justification.

Q5. Beyond restructuring of legal, licensing, and regulatory frameworks of carriage of broadcasting services and telecommunication services, whether other issues also need to be addressed for reaping the benefits of convergence holistically? What other issues would need addressing? Please provide full details with suggested changes, if any.

ANNEXURE I (Chapter 1/Para no. 1.66 & 1.67)

Reference received from DoT

Government of India
Ministry of Communications
Department of Telecommunications
Access Services Wing
Sanchar Bhavan, 20, Ashoka Road, New Delhi-110001

No: AS-25/1/2021-AS-V Date:12.08.2022

To,
The Secretary,
Telecom Regulatory Authority of India,
Mahanagar Doorsanchar Bhavan,
Jawaharlal Nehru Marg, New Delhi-110002

Subject: DoT's Reference Dated 20.10.2021 on Convergence of Carriage of Broadcasting Services and Telecommunication Services – reg.

1. It may be recalled that through the letter No. 20-281/2010-AS-1 Vol. XII (Pt.) dated 20.10.2021 (copy enclosed as **Annexure**), a Reference on Convergence of Carriage of Broadcasting Services and Telecommunication Services was sent to TRAI with a request to furnish recommendations on the following items under the terms of Section 11 of the TRAI Act, 1997 (as amended) :
   (a) Amending the license regime to enable the convergence of carriage of broadcasting services and telecommunication services; and
   (b) Establishing a unified policy framework and spectrum management regime for the carriage of broadcasting services and telecommunication services.

2. The matter related to Convergence of Carriage of Broadcasting Services and Telecommunication Services was deliberated in DoT, and accordingly, it has been decided to seek recommendations of TRAI on the following items as well:

(a) Restructuring of legal, licensing and regulatory frameworks for reaping the benefits of convergence of carriage of broadcasting services and telecommunication services; and

(b) Revising regulatory regime in respect of DTH and Cable TV services holistically addressing all institutional, regulatory and legal aspects.

3. While providing its recommendations on the Reference dated 20.10.2021 on Convergence of Carriage of Broadcasting Services and Telecommunication Services, TRAI is requested to include the items mentioned in the para 2 above, and provide its consolidated recommendations under the terms of Section 11 of the TRAI Act, 1997 (as amended).

4. This letter is being issued with the approval of the Hon'ble Minister of Communications.

Enclosure: As above

12/8/22

(Sunil Kumar Singhal)
Deputy Director General (AS)
Tel: 011-2371 4232

AS-25/1/2021-AS-V

625405/2022/Office of DIR(AS-V)

Government of India
Ministry of Communications
Department of Telecommunications
Access Services Wing
Sanchar Bhawan, 20, Ashoka Road, New Delhi-110001

No.: 20-281/2010-AS-I Vol. XII (Pt.) Date: 20.X.2021

To,
The Secretary,
Telecom Regulatory Authority of India,
Mahanagar Doorsanchar Bhawan,
Jawaharlal Nehru Marg (Old Minto Road),
New Delhi-110002

Subject: Reference on Convergence of Carriage of Broadcasting Services and Telecommunication Services

1. This is with reference to the letter No. R-3/5(3)/2021-BBPA dated 17.08.2021, through which, TRAI has stated, *inter-alia*, as below:

   "4. From the aforesaid, it can be clearly seen that various references/ letters received from DoT requires clarification on the scope and area to be covered. Authority is of the opinion that the issue of convergence needs a holistic approach. Hence it is requested that a fresh reference addressing above issues may be sent under section 11 of TRAI Act so that TRAI can initiate consultation process and accordingly give its recommendations."

2. The matter has been examined. Accordingly, in supersession of the DoT's letter No. 20-281/2010-AS-I Vol. XII (pt.) dated 31.05.2021, taking note of the technological developments and policy evolution across the world, TRAI is requested to furnish recommendations on the following items under the terms of Section 11 of the TRAI Act, 1997 (as amended):

   (a) Amending the licensing regime to enable the convergence of carriage of broadcasting services and telecommunication services; and

(b) Establishing a unified policy framework and spectrum management regime for the carriage of broadcasting services and telecommunication services.

3. This letter is being issued with the approval of the Secretary, Department of Telecommunications, Ministry of Communications, Government of India.

20/1/2022

(S.B. Singh)
Deputy Director General (AS)
Tel: 011-23036918

ANNEXURE II (Chapter 2/Para no. 2.25)

Comparison between Unified License Guidelines and DTH Guidelines

DTH Guidelines

1. In the year 2000, DTH broadcasting service has been permitted in the Ku band in India. MIB notified detailed 'Guidelines[65] for Obtaining License for Providing Direct-To-Home (DTH) Broadcasting Service in India' on 15th March 2001. The policy guidelines include Application Form and the Licensing Agreement for providing DTH services. DTH license is issued by MIB under Section 4 of Indian Telegraph Act, 1885, after clearance from different ministries/departments.

2. Several amendments are also notified by the Government in the years 2005, 2006, 2007 and the latest amendment[66] is passed on 30th December 2020, by which the existing licensees are required to apply afresh to get License for providing DTH services. The issue of fresh license to the existing Licensees will be subject to their clearing all dues and fulfilling all obligations under the terms and conditions of existing license as well as those arising out of legal cases pending before various Courts of Law. As of now, apart from DD Free Dish, which is a free-to-air DTH service of Doordarshan, there are 4 private pay DTH service providers in operation in the country.

3. The salient features of the DTH Guidelines in terms of eligibility criteria, basic conditions or obligations and procedure for obtaining the license to set up and operate DTH service are briefly described below –

   i) **Eligibility Criteria:** The applicant company shall be an Indian company, registered under the Indian Companies Act, 1956 or 2013.

[65] https://digitalindiamib.com/Detailsguidlinesupdated6.11.2007.pdf

[66] Amendment in Guidelines for obtaining license for providing DTH Broadcasting Services in India dated 30.12.2020 https://mib.gov.in/sites/default/files/Amendment%20in%20Guidelines%20for%20obtaining%20DTH_license

The FDI policy of the Government of India shall be followed as notified from time to time. *(As of amended 2020 Guidelines)*

ii) **Number of Licensees:** No restrictions on the total number of DTH licenses and these will be issued to any person who fulfills the necessary terms and conditions and is subject to the security and technical clearances by the appropriate authorities of the Government.

iii) **Period of License:** License will be valid for a period of 20 years from the date of issue of wireless operational license by Wireless planning and Coordination (WPC) Wing of Ministry of Communications. License may be renewed by 10 years at a time. However, the license can be canceled/suspended by the Licensor at any time in the interest of the Union of India. *(As of amended 2020 Guidelines, previously license validity was 10 years only)*

iv) **Basic conditions/obligations:** The license will be subject to terms and conditions contained in the agreement and its schedule (Form-B of the Guidelines)

v) **Procedure for application and grant of licenses:** To apply to the Secretary, MIB, in triplicate, in the prescribed proforma (Form-A of the Guidelines). Eligible applications will be subjected to the security clearance of the Board of Directors as well as key executives of the company such as the CEO etc. in consultation with the Ministry of Home Affairs and for clearance of satellite use with the Department of Space. After payment of entry fee, the applicant would be informed of the intent of the Ministry to issue the license and requested to approach WPC for obtaining SACFA clearance.

vi) **License Fee:** As of Amended 2020 Guidelines, the Licensee shall pay an annual fee equivalent to 8% of its AGR, calculated by excluding GST from Gross Revenue as reflected in the audited accounts of the company for that particular financial year. The minimum annual license fee shall be subject to 10% of the Entry Fee. No entry fee will be

charged from the DTH operators holding licenses on the date of notification of Amended 2020 guidelines.

vii) **Arbitration Clause:** In case of any dispute, matter will be referred to the sole Arbitration of the Secretary, Department of Legal Affairs, Government of India or his nominee, for adjudication. The award of the Arbitrator shall be binding on the parties. The Arbitration proceedings will be governed by the law of Indian arbitration in force at the point of time. Venue of Arbitration shall be India.

viii) Latest Amendments *(as of amended 2020 Guidelines)* –

a. **Reserving of operational channel capacity:** A vertically integrated entity will not reserve more than 15% of the operational channel capacity for its vertically integrated operator. The rest of the capacity is to be offered to the other broadcasters on a non-discriminatory basis.

b. **Bank Guarantee:** The Licensee will have to submit a Bank Guarantee from any scheduled Bank to the MIB for an amount of Rs.5 crores for the first two quarters, and, thereafter for an amount equivalent to the estimated sum payable, equivalent to the License fee for two quarters and other dues not otherwise securitized.

c. **Platform Service:** The DTH operator is permitted to operate Platform Services channels i.e., DTH operators own channels exclusively available to its subscribers, to a maximum of 5% of its total channel carrying capacity, one time registration fee of Rs. 10,000 shall be charged from the DTH operator.

d. **Sharing of Infrastructure:** DTH operators are allowed to share the DTH platform and transport stream of TV channels, on a voluntary basis, wherever technically feasible.

e. **Set-Top Box:** Set-Top Boxes offered by a DTH Service Provider shall have specifications as laid down by the Bureau of Indian Standards (BIS) from time to time.

Comparison between Unified License Guidelines and DTH Guidelines

Parameter	Unified License Guidelines	Guidelines for obtaining license for providing DTH Broadcasting Services in India
Guidelines	1) Guidelines for grant of Unified License dated 19th August 2013 2) Guidelines for Grant of Unified License (Virtual Network Operators) dated 31.05.2016	1) Guidelines for Obtaining License for Providing Direct-To-Home (DTH) Broadcasting Service in India dated 15.3.2001 2) Amendment in Guidelines for obtaining license for providing DTH Broadcasting Services in India dated 30.12.2020
Scope of Authorization	Telecommunication services	Broadcasting i.e., Direct-to-Home (DTH) service
Authorization granted under	Under Section 4 of Indian Telegraph Act, 1885 (Exclusive privilege in respect of telegraphs, and power to grant licenses.)	
License Granted by	Department of Telecommunications (DoT), Ministry of Communications	Ministry of Information and Broadcasting (MIB/MIB)
License Agreement	1) License Agreement for Unified License (2013) 2) License Agreement for Unified License for VNO (Virtual Network Operators) (2016)	License Agreement for DTH service (FORM-B of 2001 Guidelines and amended Guidelines)

Service Authorization	Applicant can apply for Unified License along with authorization for any one or more services of the 12 services listed below: a. Unified License (All Services) b. Access Service (Service Area-wise) c. Internet Service (Category-A with All India jurisdiction) d. Internet Service (Category-B with jurisdiction in a Service Area) e. Internet Service (Category-C with jurisdiction in a Secondary Switching Area) f. National Long Distance (NLD) Service g. International Long Distance (ILD) Service h. Global Mobile Personal Communication by Satellite (GMPCS) Service i. Public Mobile Radio Trunking Service (PMRTS)Service j. Very Small Aperture Terminal (VSAT) Closed User Group (CUG) Service k. INSAT MSS-Reporting (MSS-R) Service. l. Resale of International Private Leased Circuit (IPLC) Service	To set up and operate DTH TV service anywhere across the country.
Eligible Company	Applicant Company to be an Indian Company registered under Indian Company's Act, 1956.	
FDI	The total composite foreign holding shall be governed by Foreign Direct Investment (FDI) policy of the Government of India as announced by the Department of Industrial Policy and Promotion from time to time.	The FDI policy of Government of India shall be followed as notified from time to time.

Equity holding in other companies	• In the event of holding/obtaining Access spectrum, no licensee or its promoter(s) directly or indirectly shall have any beneficial interest in another licensee company holding "Access Spectrum" in the same service area. • Promoter shall mean legal entity other than the Central Government, financial institutions and scheduled banks, which hold 10% or more equity in the licensee company.	• Broadcasting companies and/or cable network companies shall not be eligible to collectively own more than 20% of the total equity of the applicant company at any time during the license period. Similarly, the applicant company does not have more than 20% equity share in a broadcasting and/or cable network company. • The Licensee shall be required to submit the equity distribution of the Company in the prescribed Proforma once within one month of the start of every financial year.
License Term and Renewal	The Unified License shall be issued on non-exclusive basis, for a period of 20 years. The Licensor may renew, if deemed expedient, the period of License by 10 years at a time, upon request of the Licensee, if made during the 19th year of the license period, on the terms specified by the Licensor, subject to extant policy.	License will be valid for a period of 20 years from the date of issue of wireless operational license by wireless Planning and coordination wing of Ministry of communications. License may be renewed by 10 years at a time. However, the license can be cancelled/suspended by the Licensor at any time in the interest of the Union of India.
Entry Fee	A one-time non-refundable Entry Fee for each authorized Service shall be paid. The total amount of Entry fee shall be subject to a maximum of Rs. 15 Crore (Rupees Fifteen crore only).	No entry fee will be charged from the DTH operators holding license on the date of notification of Amended guidelines i.e., 30th December 2020.
License Fee	The License fee is at present 8% of the AGR, inclusive of USO Levy which is presently 5% of AGR.	The Licensee shall pay an annual fee equivalent to 8% of its AGR, calculated by excluding GST from Gross Revenue (GR) as reflected in the audited accounts of the company for that particular financial year. The minimum annual license fee shall be subject to 10% of the Entry Fee.

Number of Licenses/ Exclusivity	Unified License and Authorization under UL shall be issued on non-exclusive basis i.e., without any restriction on the number of entrants for provision of any service in a Service Area. After the issue of these guidelines, no other license for any of the services covered under Unified License shall be issued/extended/ renewed.	There will be no restrictions on the total number of DTH licenses and these will be issued to any person who fulfils the necessary terms and conditions and subject to the security and technical clearances by the appropriate authorities of the Govt.
Migration of existing Licenses	In order to ensure that the UL Regime covers all existing Licenses, a migration path is offered to the existing licensees to migrate to the UL regime. Licenses of any of the existing Telecom Service Providers shall be eligible to migrate to UL with any number of additional services, however, the Telecom Service Provider has to migrate all of its existing licenses.	No guideline regarding migration of existing licenses.
SACFA clearance	Provision of Telecommunication services using satellite media: • In case of provision of services by the Licensee through the satellite media, the Licensee shall abide by the prevalent Government orders, directions, guidelines or regulations on the subject like satellite communication policy, V-SAT policy etc. • For use of pace segment and setting up of the Earth Station etc., the Licensee shall directly coordinate with and obtain clearance from Network Operations and Control Centre (NOCC), apart from obtaining SACFA clearance. The clearance from other authorities as may be applicable shall also be obtained by the Licensee.	Procedure for application and grant of licenses: • The eligible application will be subjected to security clearance of the Board of Directors as well as key executives of the company such as CEO etc. in consultation with the Ministry of Home Affairs and for clearance of satellite use with the Department of Space. • After these clearances are obtained, the applicant would be required to pay an initial non-refundable entry-fee of Rs.10 crores. • The applicant would be informed of the intent of MIB to issue the license and requested to approach WPC for SACFA clearance. • After obtaining SACFA clearance, within one month of the same, the Licensee will have to submit a Bank guarantee (in prescribed Form) from any Scheduled Bank to the MIB for an amount of Rs.40 crores valid for the duration of the license.

Right to Modify	The LICENSOR reserves the right to modify at any time these guidelines and terms and conditions of the LICENSE, if in the opinion of the LICENSOR it is necessary or expedient to do so in public interest or in the interest of the security of the State or for the proper conduct of the telegraphs. The decision of the LICENSOR shall be final and binding in this regard.	No guideline regarding modifications. The license will be subject to terms and conditions contained in the agreement and its schedule (Form-B).

ANNEXURE III (Chapter 2/Para no. 2.48)

Views of MIB on DoT reference

No. 8/13/2021-BP&L
Government of India
Ministry of Information & Broadcasting

Shastri Bhawan, New Delhi
Dated, the 04th October,2022.

To

The Secretary,
Telecom Regulatory Authority of India (TRAI),
Mahanagar Doorsanchar Bhawan,
Jawahar Lal Nehru Marg,
New Delhi-110002.

Sub: DoT's Reference dated 20.10.2021 on Convergence of carriage of Broadcasting Services and Telecommunication Services– regarding.

Sir,

I am directed to refer to TRAI's letter no. R-3/5/(3)/2021-BBPA dated 05.09.2022 on the above mentioned subject asking for inputs on "Revising regulatory regime in respect of DTH and Cable TV services holistically addressing all Institutional, regulatory and legal aspects" and to say that as per the '**Allocation of Business Rules**', the matters relating to broadcasting has been allocated to the Ministry of Information and Broadcasting (MIB).

2. This Ministry, therefore, governs policies and legal framework for broadcasting sector through various Acts/Rules/Guidelines etc. which inter-alia include Cable Television Network (Regulation) Act, DTH guidelines, HITS guidelines, Guidelines for uplinking/ downlinking of TV channels etc. This Ministry is also in the process of amending CTN Act to bring all the different broadcasting carriage platforms under its ambit, in order to holistically address all institutional, regulatory and legal aspects of broadcasting services under a unified Act.

3. Further, Telecom Regulatory Authority of India (TRAI) is a common regulator for the carriage segment of Telecommunication and Broadcasting Sector. It has been giving recommendations suo-moto or on reference from the M/o I&B, on various aspects of broadcasting like carriage platforms, foreign investment provisions, license fee, digital terrestrial transmission etc. Convergence of technologies has already happened to a great extent in last decade; and TRAI along with the Ministry have very successfully handled so far all the legal, policy and regulatory requirements arising out of such changes. Hence carriage policy and regulations for broadcasting should continue with MIB. Also, regulation of content requires separate skill sets of creative and artistic persons than that of technocrats or economists who can factor the impact of content on sensibilities, morals and value system of the society. Hence, content policy and regulation should also continue with the MIB.

4. The spectrum bands for various services are standardized by international bodies like ITU and this Ministry is well versed with its policy and plans for utilization in broadcasting functions. It is strongly felt that the issues related to allocation of broadcasting spectrum and its realignment should be dealt by this Ministry at national and international levels.

5. Broadcasting is an important sector that has relevance for educating and informing the masses, especially those below poverty line who might not have access to mobile/internet data, and thus, has a crucial role to play in economic development of the country. Also, broadcasting networks have proved to be very effective during natural disasters and emergencies (when internet and satellite based signals are susceptible to jamming). Considering the sensitivity and impact of broadcasting on the country, it is categorized as a strategic sector which needs to be regulated. Therefore, multiple agencies are involved for the purposes of company clearanceslike MHA for security clearance, DoT for wireless and spectrum clearance, DoS for satellite allocation to various licensees, MEA, DPIIT for FDI and foreign executives working in broadcasting entities, MCA for company matters, MeitY for digital news and online curated contentetc. and the MIB has established systems and processes to effectively coordinate with all these agencies. Shifting of licensing functions to another department say DoT, will not serve any good but will only disturb the established practices.

6. The need of the hour is not to bring in further disturbances but to re-engineer business processes such that there is ease and convenience of doing business for these entities. The regulatory convergence in the broadcasting sector is being achieved through the **'Ease of Doing Business Model'** by creating a single platform in the form of **'Broadcast Seva Portal'** on which all the stakeholders/ministries/Departments are integrated as a single window for all licensing, permissions and reporting requirements etc. As of now this portal is integrated with DoT's 'Saral Sanchar Portal' and portals of other Ministries/Departments are also planned to be integrated under single window system that will enable ease of obtaining license/permissions etc. This will serve the purpose of holistically addressing all aspects related to DTH, HITS and Cable TV services. Any change in the legal, regulatory framework should entail bare minimum changes of essential nature and aim to provide smooth transition. Further, there is no guarantee of the advantages that will be achieved which cannot be achieved through the single window clearance system as being implemented by this Ministry.TRAI is already doing consultation on 'Ease of Doing Business' and it may consider the aspect of single window clearance system in this effort.

7. This Ministry has no further reference to make for now on the subject.

Yours faithfully,

04/10/22

(Shiv Ram Meena)
Under Secretary to the Government of India
Tel. No.: 011-23386746
E-mail: usbpl-moib@gov.in

Copy to: Secretary, Department of Telecommunications, Sanchar Bhawan, 20, Ashoka Road, New Delhi

List of Acronyms

S.No	Acronym	Description
1	3GPP	3rd Generation Partnership Project
2	5G	Fifth generation
3	6G	Sixth generation
4	ABS	Academy of Broadcasting Science
5	ACMA	Australian Communications and Media Authority
6	AI	Artificial Intelligence
7	AIB	Advanced Interactive Broadcast
8	APT	Asia Pacific Telecommunication
9	AR	Augmented Reality
10	ASCI	Advertising standards council of India
11	AV	Audio-visual
12	BAI	Broadcasting Authority of Ireland
13	BBC	British Broadcasting Corporation
14	BECIL	Broadcast Engineering Consultants India Limited
15	BIS	Bureau of Indian Standards
16	BISAG-N	Bhaskaracharya National Institute for Space Applications and Geo-informatics
17	CA	Communications Act
18	CABs	Conformity Assessment Bodies
19	CAPEX	Capital Expenditure
20	CBFC	Central Board of Film Certification
21	CBN	China Broadcasting Network
22	CCA	Controller of Certifying Authorities
23	CCI	Communication Commission of India
24	C-DAC	Centre for Development of Advanced Computing
25	C-DOT	Centre for Development of Telematics
26	C-MET	Centre for Materials for Electronics Technology
27	CP	Consultation Paper
28	CPE	Customer premises equipment
29	CRS	Community Radio Stations
30	CRTC	Canadian Radio-television and Telecommunications Commission
31	CSP	Carriage service provider
32	CTN	Cable Television Networks
33	CTNR	Cable Television Networks Regulation
34	CTS	Core telecommunications services
35	CUG	Closed User Group
36	D2M	Direct-to-Mobile

37	DAS	Digital Addressable Systems
38	DBS	Direct broadcasting by satellite
39	DD	Doordarshan
40	DL	Decision Letter
41	DoS	Department of Space
42	DOT	Department of Telecommunications
43	DPIIT	Department for Promotion of Industry and Internal Trade
44	DPO	Distribution Platform Operators
45	DSIR	Department of Scientific and Industrial Research
46	DTH	Direct to Home
47	DTT	Digital Terrestrial Television
48	DVB	Digital video broadcasting
49	DVB-RCS	Digital video broadcast with return channel via satellite
50	ECA	Electronic Communications Act
51	ECN	Electronic Communication Networks
52	ECNS	Electronic communications network services
53	ECS	Electronic Communication Services
54	EECC	European Electronic Communications Code
55	EoDB	Ease of Doing Business
56	ERNET	Education & Research in Computer Networking
57	Ers	Essential Requirements
58	EU	European Union
59	E-UTRA	Evolved Universal Terrestrial Radio Access
60	FBOs	Facilities-based operators
61	FCAT	Film Certification Appellate Tribunal
62	FCC	Federal Code of Communication
63	FDD	Frequency Division Duplex
64	FDI	Foreign Direct Investment
65	FeMBMS	Further evolved Multimedia Broadcast Multicast Service
66	FM	Frequency Modulation
67	FOTA	Firmware-over-the-air
68	FTA	Free-to-air
69	GMPCS	Global Mobile Personal Communication by Satellite
70	GOPA	Grant of Permission Agreements
71	GP	Green Passport
72	HD	High Definition
73	HDR	High dynamic range
74	HITS	Headend-In-The Sky
75	HPHT	High Power High Tower
76	HPT/MPT	High Power Transmitter/ Medium Power Transmitter

77	I&B	Information and Broadcasting
78	ICASA	Independent Communications Authority of South Africa
79	ICTs	Information and Communication Technologies
80	IDA	Info-communication Development Authority
81	IIMC	Indian Institute of Mass Communication
82	IIRS	Indian Institute of Remote Sensing
83	IIST	Indian Institute of Space Science and Technology
84	IIT	Indian Institutes of Technology
85	ILD	International Long Distance
86	IMC	InterMinisterial Committee
87	IMDA	Info-communications Media Development Authority
88	INMARSAT	International Mobile Satellite Organization
89	INSAT	Indian National Satellite
90	IN-SPACe	Indian National Space Promotion and Authorization Centre
91	INTELSAT	International Telecommunication Satellite Organization
92	IoT	Internet of Things
93	IP	Infrastructure Provider
94	IPLC	International Private Leased Circuit
95	IPTV	Internet Protocol Television
96	ISP	Internet Service Provider
97	ISRO	Indian Space Research Organization
98	IT	Information Technology
99	ITeS	Information Technology enabled Service
100	ITU	International Telecommunication Union
101	ITU-D	International Telecommunication Union-Development Sector
102	ITU-R	International Telecommunication Union-Radio Communication Sector
103	ITU-T	International Telecommunication Union- Telecom sector
104	IWT	Indian Wireless Telegraphy
105	KCC	Korea Communications Commission
106	LCO	Local Cable Operator
107	LEO/MEO	Low Earth Orbit and Medium Earth Orbit
108	LPLT	Low Power Low Tower
109	LPTs	Low Power Transmitters
110	LTE	Long-Term Evolution
111	M2M	Machine to Machine
112	MAG	Media Action Group
113	MBMS	Multimedia Broadcast/Multicast Service
114	MEC	Multi-access Edge Computing

115	MeitY	Ministry of Electronics and Information Technology
116	MFN	Multiple Frequency Network
117	MHA	Ministry of Home Affairs
118	MIB	Ministry of Information and Broadcasting
119	MIC	Ministry of Information and Communication
120	MNO	Mobile network operator
121	MPEG	Moving Picture Experts Group
122	MRAs	Mutual recognition agreements
123	MSH	MeitY Start-up Hub
124	MSIT	Minister of Science and ICT
125	MSO	Multi Service Operator
126	MSS-R	Mobile Satellite System-Reporting
127	MTCTE	Mandatory Testing and Certification of Telecom Equipment
128	MTNL	Mahanagar Telephone Nigam Limited
129	NAB	National Association of Broadcasters
130	NARL	National Atmospheric Research Laboratory
131	NBA	News Broadcasters Association
132	NBSA	News Broadcasting Standards Authority
133	NCD	Nominated carrier declarations
134	NDCP	National Digital Communications Policy
135	NFAP	National Frequency Allocation Plan
136	NFV	Network Function Virtualization
137	NICF	National Institute of Communication Finance
138	NIELIT	National Institute of Electronics and Information Technology
139	NLD	National Long Distance
140	NOCC	Network Operations & Control Centre
141	NR	New Radio
142	NSIL	New Space India Limited
143	NTIPRIT	National Telecommunications Institute for Policy Research Innovation Training
144	NTN	Non-Terrestrial Networks
145	NTP	National Telecom Policy
146	OFCOM	The Office of Communications
147	OGD	Open Government Data
148	OPEX	Operational Expenditure
149	OTA	Over-the-air
150	OTT	Over-the-top
151	PB	Prashar Bharthi
152	PM JAY	Pradhan Mantri Jan Arogya Yojana
153	PMO	Prime Minister's Office

154	PMRTS	Public Mobile Radio Trunking Service
155	POC	proof-of-concept
156	PPs	Programme providers
157	PRL	Physical Research Laboratory
158	PVR	personal video recorder
159	QoS	Quality of Service
160	R&D	Researh and development
161	RCST	Return channel satellite terminals
162	RF	Radiofrequency
163	ROM	Receive-Only Mode
164	RRB	Radio Regulation Board
165	RWA	Radio Waves Act
166	S&T	Signal & Telecommunication
167	SACFA	Standing Advisory Committee on Radio Frequency Allocation
168	SATRA	South African Telecommunications Regulatory Authority
169	SBOs	Services-based operators
170	SCTS	Special category telecommunications services
171	SDL	Supplementary downlink
172	SDN	Software Defined Networking
173	SDO	Standalone Downlink Only
174	SFN	Single frequency networking
175	SIM	Subscriber Identity Module
176	SNG	Satellite news gathering
177	SPs	Service Providers
178	STB	Set-top boxes
179	STPI	Software Technology Parks of India
180	STQC	Standardization, Testing and Quality Certification
181	STs	Satellite terminals
182	TBA	Telecommunication Business Act
183	TCIL	Telecommunications Consultants India Ltd
184	TCOE	Telecom Centers of Excellence India
185	TDD	Time division duplex
186	TDSAT	Telecom Disputes Settlement and Appellate Tribunal
187	TEC	Telecommunication Engineering Centre
188	TEPC	Telecom Equipment and Services Export Promotion Council
189	TMT	Technology, Media and Entertainment, Telecom
190	TRAI	Telecom Regulatory Authority of India
191	TS	Technical Specification
192	TSDSI	Telecommunications Standards Development Society, India

193	TSPs	telecom service providers
194	TV	Television
195	UASL	Unified Access Service License
196	UE	User Equipment
197	UHD	Ultra-High Definition
198	UHF	Ultra-high frequency
199	UK	United Kingdom
200	UL	Unified License
201	UL	uplink
202	USA	United States of America
203	USO	Universal Service Obligation
204	USOF	Universal Service Obligation Fund
205	VATS	Value-added telecommunications services
206	VC	Venture Capitalist
207	VNO	Virtual Network Operator
208	VoD	Video on demand
209	VOIP	Voice Over Internet Protocol
210	VoIP	Voice over Internet Protocol
211	VR	Virtual Reality
212	VSAT	Very Small Aperture Terminal
213	WPC	Wireless Planning & Coordination
214	WTA	Wireless Telegraphy Act