

15th June 2022

Mr. Asit Kadayan

Advisor (QoS)

Telecom Regulatory Authority of India

Mahanagar Door Sanchar Bhawan

Jawahar Lal Nehru Marg,

New Delhi-110002

Subject: Response to Consultation Paper on “Rating of Buildings or Areas for Digital Connectivity” dated 25th March 2022.

Dear Sir,

Please find enclosed Lightstorm Telecom Connectivity Private Limited response to the above-mentioned Consultation Paper for your kind reference, records & consideration.

Thanking You,

Your sincerely

For **Lightstorm Telecom Connectivity Private Limited**



(Authorized Signatory)

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**Comments on TRAI Consultation Paper on “Rating of Buildings or Areas for Digital Connectivity”
dated 25th March 2022**

Introduction

1. Lightstorm Telecom Connectivity Pvt. Ltd. (LTC) is India’s first carrier neutral infrastructure platform enabling open & neutral access across major Data Centres and enterprises.
2. At the outset, we thank the Authority for coming out with consultation paper on important subject of Digital Connectivity Infrastructure (DCI) aimed at directly addressing the needs of the end users concerning delivery of good quality telecommunication services inside buildings.
3. The rollout of telecom networks, specifically the wireless networks, is generally understood by the stakeholders in terms of “street level coverage”, which is also in line with the mandated requirements for network rollout. The current methods of assessment of quality of service are also in furtherance of this and they evaluate the networks primarily based on (i) information collected from the network (i.e. performance at network node) and (ii) field measurements (i.e. performance at the point of end user). However, the consumers’ experience of the telecom services is not solely based on the coverage provided at street level. Consumers’ perception of network quality is built on their experience under the varying usage scenarios which are unique to the different sets of users.
4. While there are advanced solutions available to cater to the specific needs of these different sets of users inside the buildings, the deployment of such solutions is a decision which is dependent on numerous operational, technical, and commercial factors and some of the factors are even beyond the purview of a TSP or IP-I alone. In the absence of specific solutions, the network coverage inside the buildings, provided through external sites, generally remains on best-effort basis only, leading to gap in traditional network assessment and consumer’s experience.
5. Service Providers face entry barriers for access to buildings for installation of telecom infrastructure in the form of prohibitive rents, monopolistic behaviour from existing infrastructure provider or in the form of resistance from residents from misapprehension on the EMF radiation concerns. There is a need to mandate suitable open access policy (all suppliers are able to obtain access to network facilities on equal terms) in the Indian context to facilitate faster rollout of DCI for services like 5G, Fiberization of Towers, and Broadband connectivity to Citizens/Institutions. The creation of neutral host DCI needs to be promoted which will facilitate faster and cost-effective rollout of 5G services in the country.
6. The rollout of any kind of telecom infrastructure, be it wireless or wireline, entails coordination with a large set of varied stakeholders and requires a comprehensive and strategic approach. It requires coordination across various activities like permissions for creation of necessary ecosystem for manufacturing, procurements and import of equipment and devices to fulfil demand and expectations of the market and consumers and balancing the commercial interests of landowners and telecom service providers/ infrastructure providers. It is the complexities arising from coordination amongst such large

set of stakeholders and managing their respective interests which are the topmost concerns which needs to be addressed efficiently through the proposed framework.

7. The longstanding issues of RoW permission for installation of Digital Infrastructure remains. Permissions are delayed due to inconsistency and uncertainty of policy and process as uniform implementation of Right of Way Rules-2016 across all states is yet to be completed. DoT has recently launched a central RoW portal, a collaborative institutional mechanism between all stakeholders including Central and State/UT Government(s), Local bodies, and Service Providers to facilitate the Right of Way (RoW) Application Process through a single interface. TSPs, IPs and ISPs can apply for RoW approvals for laying Optical Fiber Cables (OFC) and erecting Telecom infrastructures like Towers etc. to various agencies of State/UT Governments and local bodies. This is a step in right direction and should lead to faster approval of applications since pendency will be monitored centrally by the Communications Ministry.
8. There is a need to come up with an enabling framework to facilitate creation of digital connectivity infrastructure which is designed keeping in mind the specific expectations of the end users and deployed in such a manner that it can be upgraded with the changing user requirements and technological advancements. Considering the upcoming 5G deployment use cases and the network densification requirements, the neutral host network infrastructure providers have a key role to play in enabling this. In view of the above, comments of LTC on the specific issues raised in consultation paper are provided in the subsequent paras for consideration of the Authority.

Comments on specific issues raised in consultation paper

New ecosystem to create DCI

Q.1. How can an ecosystem be created to design, deploy and evaluate DCI with good connectivity in a cohesive and timely manner? What would be the typical role and responsibilities of actors of the ecosystem? Please justify your response with rationale and suitable examples, if any.

LTC response:

There is a need to create an ecosystem and an enabling framework to facilitate in designing, deployment, and evaluation of DCI. Planning for the DCI should be from a long-term perspective considering inputs like frequency bands, technology to be deployed, scale/capacity of deployment so that DCI is enabled for long term usage and building / support infrastructure is not required to be refurbished time and again, else leading to services disruption and higher cost of operation. Key areas for deliberating the creation of the said ecosystem are as below:

- i. Outline roles and responsibilities of different stakeholders as identified by the Authority in the consultation paper. It is also important to implement a uniform end-to-end process with specified timelines across the country for facilitating the creation of DCI. The process should clearly demarcate the role of each stakeholder right from the property owner/ RWA to the various central/ state/ local government bodies.
- ii. Creation of a collaborative platform for deliberations on policy issues is needed as the subject involves collating inputs from different private entities and various Central and State Government bodies from different sectors.

- iii. Formulate legal and regulatory framework for the ecosystem with clear mandate for the respective stakeholders to facilitate creation/ maintenance of DCI.
- iv. Formulate DCI design principles and DCI evaluation benchmarks to objectively cover different kinds of buildings and the user requirements.

Q.2. How would the ecosystem proposed in response to Question no.1 ensure that created infrastructure does not get monopolized? Please justify your response with rationale and suitable examples, if any.

LTC response:

By the virtue of the bidding process and awarding of contract to the winning infrastructure provider by the property owners for installation and operation of telecom infrastructure, it gives monopolistic rights to these infrastructure providers. Monopolistic behaviours may cause issues at the time of entry of a TSP into the building or at the time of upgradation of infrastructure. There is a need to ensure that the new framework under deliberation should address this issue in the form of legal/ regulatory obligations on the infrastructure providers/ property owners. Following are some measures which can be taken in this regard to ensure that created infrastructure does not get monopolized:

- i. It should be ensured that the DCI created is operated/ maintained by the property manager under an 'open access' policy where TSPs are allowed to access the building on reasonable commercial terms based on mutual agreement. However, guiding principles for commercial terms should be prescribed, clearly outlining the transparency, fairness, and non-discrimination principles.
- ii. Access to Government buildings should be at no/ minimal cost for TSPs and IP-Is. Creation of DCI as per new framework should be mandated in the upcoming Government buildings and public places following 'open access' policy.
- iii. The issues pertaining to upgradation of DCI can be addressed by the proposed building certification renewal process. The proposed certification for DCI by the evaluator should be for a fixed validity period, 5 years is suggested. After the validity period, renewal of the certification should only be done post re-evaluation of the building. The re-evaluation criteria should outline the DCI upgradation requirements and rate the plans of property manager for upgradation of infrastructure on an on-going basis.
- iv. While the responsibility of providing requisite QoS should lie with the TSPs, the IP-Is/ property manager should be mandated to take necessary steps in discussion with TSPs to ensure good quality of service is delivered to the end users, disincentive should be applicable in case of inaction on their part.

Q.3. How would the ecosystem proposed in response to Question no.1 enable DCI Designers to factor in the digital connectivity requirements of the existing and/or prospective users of the network? How can such requirements be gathered at the stage of construction of a new building or at the time of upgradation or expansion in case of pre-existing DCI? Please justify your response with rationale and suitable examples, if any.

LTC response:

User requirement gathering is an on-going process which can span across different phases be it designing and construction of the building; or planning, deployment and upgradation/ expansion of DCI. Ideally, the planning for DCI should be done at the time of planning/ construction of the building. Capturing requirements of end users is a key input for designing DCI, however, during this initial phase of planning the actual individual end user(s) of the proposed DCI are mostly yet to be identified. Hence, requirements gathering from each prospective user at the initial stages may not

be feasible. Having said that, we believe that having deployed such infrastructure/ solutions from a long time, the builders, TSPs and IP-Is have good experience and knowledge of the typical standard requirements for target set of prospective users for a particular upcoming building and these stakeholders together are best placed to define the starting point and subsequently keep adding to the knowledge through the continuous process.

Q.4. How would the ecosystem proposed in response to Question no.1 enable DCI Evaluators to get requisite information to evaluate and ensure that the designed or deployed network would meet the requirements of end users? Please justify your response with rationale and suitable examples, if any.

LTC response:

The evaluation process for the DCI should be outlined based on relevant ISO/IEC evaluation/ assessment standards. This will also provide the essential set of requirements needed for the evaluation of DCI. Since the certification would be given to the DCI in a particular building, it shall be responsibility of the property owner and property manager to apply for assessment/ certification and provide the necessary information/ documentation in accordance with the specified process.

Q.5. How would the ecosystem proposed in response to Question no.1 ensure that upgrades and expansion of the DCI are done from time to time and continue to meet rising demands? Please justify your response with rationale and suitable examples, if any.

And

Q.6. How would the ecosystem proposed in response to Question no.1 ensure that the TSPs' networks are planned, designed, deployed, and upgraded to serve the DCI requirements in a timely manner? Please justify your response with rationale and suitable examples, if any.

LTC response:

The rating/ certification criteria should also evaluate property manager's plans on upgradation/ expansion of DCI and this should be given appropriate weightage during the evaluation process. Further, after the expiry of validity period of rating certification, renewal of the certification should only be done post re-evaluation of the building. The re-evaluation criteria should also outline the DCI upgradation requirements and rate the plans of property manager for upgradation of infrastructure on an on-going basis. Given the open access to DCI at suitable commercial terms, both of which can be ensured with appropriate regulatory mandate/ guidelines, it is only in the interest of the telecom service providers deploy/ upgrade their networks in a timebound manner as it will lead to more usage and increased revenue for them. While capacity/ coverage related upgradations can be done by TSPs fairly quickly, any upgradation owing to adoption of new technologies may happen in its own due course due to dependency on various factors and stakeholders in the larger ecosystem.

Capacity Building of skilled Professionals

Q.7. How can an ecosystem be created to build capacity requirements of skilled professionals such as DCI Designers, DCI Engineers, DCI Evaluators? What would be the typical role and responsibilities of actors of the ecosystem? Please justify your response with rationale and suitable examples, if any.

And

Q.8. How would the ecosystem proposed in response to Question no.7 ensure that relevant training courses are available in the country? Please justify your response with rationale and suitable examples, if any.

And

Q.9. Whether the training courses proposed in response to Question no. 8 are already being offered by any organisation or institution that can be recognized for the purpose? If yes, please provide a list of organisations offering such courses. If not, how specialized courses can be designed to meet the requirements? Please justify your response with rationale and suitable examples, if any.

And

Q.11. Whether the requirements of additional specialized courses and practices of profession would vary depending upon the size of work or kind of work involved in a particular DCI project? Please justify your response with rationale and suitable examples, if any.

LTC response:

A DCI designer is required to have understanding of building planning, drawing, structural analysis and telecommunication network rollout. In short, the skill set for DCI designer entails an overlap of skills from Architectural, Civil and Electronics & Communication Engineering streams. As the implementation of the new DCI framework is required to be done at national scale, a large number of such skilled professionals are required for which a appropriate institutional framework would need to be devised.

As a starting point, it may be desirable to introduce relevant subjects/topics in the undergraduate curriculum for Architecture and Engineering streams in consultation with Council of Architecture (CoA) and All India Council of Technical Education (AICTE) respectively. Further, in telecom domain, there are various training and certification courses to plan, design and deploy DCI. List of some of such courses are offered by various organizations such as BICSI, TSSC, INARTE, CTNS etc. However, there may be need to examine content of such courses and their suitability in India specific environment. These courses might be accredited in present form or may be required to be customized for specific requirements. Availability of such courses in the country and affordability may also be required to be seen. The present training infrastructure available in the telecom sector may be utilized to offer such courses.

Necessary provisions in NBC will need to be included for creating a system for defining qualifications of professionals for provision of DCI and their registration processes etc. NBC can assign some specialized agency for this purpose. NBC provisions can be further incorporated in various Building Bye Laws and Guidelines published by Ministry of Housing and Urban Affairs and/or State/UT Governments.

Creation of Digital Platform to hire services of professionals and procure products

Q.12. Whether creation of a digital platform to hire services of professionals would help Property Managers in creation of DCI? Should there be a feedback mechanism to assess quality of services

delivered by professionals? Please justify your response with rationale and suitable examples, if any.

And

Q.13. Whether creation of a digital platform for procurement of certified products would help Property Managers in creation of DCI? How would the certified products for the purpose of DCI be identified and updated on the platform? Please justify your response with rationale and suitable examples, if any.

LTC response:

Establishing digital platforms which may enable collaborative working among stakeholders would help in faster roll out of DCI. These Digital Platforms would help provide certified professionals and products which maybe recommended/mandated to be used in new properties/upgradations of existing properties. Collaborative tools may help in co-designing of the network by telecom professionals and real estate together. Further, the DCI digital platform can be connected with Trusted Telecom Portal and MTCTE portal for fetching information on trusted and certified products respectively.

Q.14. What may be the possible models of DCI ownership and its upkeep? Whether co-ownership models would help in aligning incentives in realising connectivity that would meet expectations of the end users from time to time? Should there be a need to specify terms and conditions for entities owning and responsible for upkeep of DCI to function in a fair, transparent and non-discriminatory manner? Please justify your response with rationale and suitable examples, if any.

LTC response:

It is suggested that co-ownership models which involves joint and collective responsibility of all stakeholders including the end consumer, the property owner, the service provider of DCI and the government besides the civic /municipal authorities, would perhaps be the most optimal approach. Going forward it may be a good idea to encourage an independent platform which may not essentially have sensitive information like CAD designs or proprietary information which belongs to the infra provider viz. IP1.

Enabling new Ecosystem by Technical requirement specifications for DCI in Building Codes (NBC)

Q.15. As one solution might not be suitable for all types of buildings, whether current requirements stipulated in the National Building Code of India, 2016 would be required to be evolved and prescribed ab initio to make it more appropriate for DCI requirements? Please justify your response with rationale and suitable examples, if any.

And

Q.16. Whether NBC needs to prescribe a separate classification of buildings for the purpose of DCI? If yes, which factors should be considered to make such a classification? If not, how to accommodate DCI specific requirements in the existing classification of buildings by the NBC? Please justify your response with rationale and suitable examples, if any.

LTC response:

Provisions of National Building Code of India 2016 (NBC) are intended to serve as a guiding principle to be followed by all stakeholders for adoption. NBC has played a key role in providing good

practices and acceptable standards for a variety of utility services and defining requirements at the time of construction of building and at subsequent stages also such as operation and maintenance of the buildings. The Telecom/ICT related requirements were included in “Volume II Part 8: 52 Section 6” of NBC in 2016. NBC covers the essential requirements for information and communication enabled installations, technology systems and cabling installations in a building. It also covers the basic design and integration requirements for telecommunication spaces within building(s) along with their cabling infrastructure, pathway components and passive connectivity hardware. It also includes general requirements relating to installation of difference communication equipment, cable terminations, power connections and general guidelines required for planning and providing ICT services in the building at the planning and execution stages. The provisions under the NBC are basic requirements applicable to all kinds of buildings (residential and others) which can also be used at the time of upgradation of existing buildings for properly accommodating telecom systems/ services. These provisions are only indicative and subject to actual requirements in the case of buildings meant for Data Centres and housing telecom exchanges/ facilities for providing public services as they may have various other considerations.

As also noted by the Authority in the consultation paper, no separate concept of preparation of plan and designs, approval thereof and certification is prescribed in the NBC. It follows the general practices which are applicable for civil and electrical work. In view of the importance of DCI, it requires a separate classification on the line of classification of buildings for “Fire and Safety”. To design and deploy a digital connectivity infrastructure involving wireline or wireless systems which can meet the desired coverage and capacity it might be critical to refer to the specific standards of telecom and ICT and Best Current Practices (BCPs), and then NBC may be required to develop more detailed guidelines on the subject. Buildings can be specifically classified for DCI on the basis of various factors like area, height, density, type of construction and type of use. It will be very useful to define general parameters for different classes of buildings for digital connectivity infrastructure.

Q.17. Whether there is a need to include DCI Professionals as Persons on Record as typically done in building bye laws or development regulations? Or registration with the Council proposed in Question no. 10 would suffice to practice profession across the country as followed in the case of Architects? Please justify your response with rationale and suitable examples, if any.

LTC response:

Yes. There is a need to recognise and register professionals for digital connectivity infrastructure and specify qualifications and other aspects for such professionals. NBC enables government to stipulate eligible requirements for registering professionals for building works and services under Building Services part of the Code. They may consider practices being followed by national professional bodies dealing with specialist engineering services for arriving at the conclusion to recommend such professionals for digital connectivity infrastructure, if required by a law as had been done in case of other technical professionals connected with construction.

The responsibilities of Individual Persons on Record (PoR) for professionals of Architect, Engineer, Structural Engineer, etc. are mentioned in The Comprehensive General Development Control Regulations -2017 notified by Urban Development and Urban Housing Department, Government of Gujarat. For a good DCI within the building or area, it is important to engage qualified professionals for the entire period of the DCI project for an integrated approach.

Professionals referred in NBC for telecom or ICT planning and installations are only Electrical Engineers, with the competency in LV (Low Voltage) systems. They are not experts in telecom or ICT and more specifically, they may not be qualified to handle radio networks covering 2G, 3G, 4G

and upcoming 5G mobile network systems. Further, in wireless systems, installing antennas at buildings or boundary walls or street poles might be required, and such requirements need engagement of telecom or ICT design professionals. Designing wireless systems requires in depth knowledge of radio propagation models, capacity calculation on air interface, and hands-on experience on coverage prediction tools, drive or walk test tools, etc. Hence, it is necessary to create a new category of professionals to handle increasingly complex subject of digital connectivity infrastructure.

Q.18. How can the clearances or approvals required for DCI at various stages of construction of building may be incorporated in building bye laws? In typical building bye laws, there are provisions for getting clearances from central government e.g., in case of civil aviation, defence and telecom being a central subject, what role can be played by the central government in giving such clearances or granting such approvals? Please justify your response with rationale and suitable examples, if any.

LTC response:

Keeping in view the complexity of the subject, handling of varieties of building types and rapid changes on supply and demand side, it would be better to have standards which are open and ready to accommodate futuristic standards evolving from time to time. Accordingly, standardisation body created either under broad ambit of NBC or through any other agency, as deemed fit, should keep enough provisions in standards to take care of innovative solutions offered by the network designers. However, it may be useful to give legal backing to such requirements by appropriately amending various related laws, bye-laws and regulations. Amendments may also be required in the state and central laws and related regulations.

Such separate standards for DCI may not only help in dealing with rapid changes in digital communication but also would be helpful in allowing participation of relevant stakeholders in the design and implementation of digital connectivity infrastructure. Such standards will be required to be made applicable to special areas and organisations like Railways, Defence estates, Cantonment areas etc.

In such ecosystem, NBC and Building Bye Laws may be required to amended so as to recognise the DCI professionals and standardisation body so as to provide legal backing which is entrusted with formulation of standards including specifications, guidelines and processes.

Need to introduce a special class of Infrastructure Providers

Q.19. Is there a need to introduce a special class of Infrastructure Providers to create, operate and maintain DCI for a building or cluster of buildings in ownership models suggested in response to Question No. 14? What should be the terms and conditions for such special Infrastructure Providers? Should such terms and conditions vary depending upon type, size and usage of buildings? Please justify your response with rationale and suitable examples, if any.

LTC response

We don't see any need to introduce a special class of Infrastructure Providers to create, operate and maintain DCI. The infrastructure providers under the existing framework of IP-I registration are sufficient to take care of the specific needs to create, operate and maintain the DCI. Here, we would like to stress that the scope of IP-1s should be increased to include active infrastructure viz. DAS, FTTH, etc. besides passive infrastructure only. It is reiterated that creation/ maintenance of DCI should be on the principles of 'open access policy' facilitating quick deployment of DCI by both

infrastructure providers and TSPs, further it is vital that both these key stakeholders engage into open dialogue and work together accommodating/aligning to each other's interests. This collaborative approach is already manifesting itself in the form of neutral infrastructure providers and would be leading the way in creation of DCI in the country as envisaged by the Authority.

Introduce rating of building from a DCI perspective- Voluntary scheme

Q.20. What are the initiatives or practices being taken in other jurisdictions outside India with regard to rating of buildings from a DCI perspective? Please share details and suggest how similar processes can be created in India?

LTC response:

SPIRE by TIA and UL: It is the world's first comprehensive smart building assessment and rating program. Built by Telecommunications Industry Association (TIA) and UL, SPIRE is the industry's first smart building program that holistically measures building technology and performance. The first step is the self-assessment service. SPIRE Self-Assessment online tool can evaluate building intelligence and performance based on an expertly curated, objective and holistic framework across six major criteria, including power and energy, health and well-being, life and property safety, connectivity, cybersecurity and sustainability. Then SPIRE Verified Assessment and Rating offers a complete smart building evaluation with the opportunity to earn a Smart Building Verified Mark. Comparisons are available by assessment criteria and building type, giving users a point-of-reference for review and analysis. The process focuses on six key, industry-driven building criteria categories that define the full scope of smart building performance viz. Power and Energy, Life and Property Safety, Cybersecurity, Connectivity, Health and Well-being and Sustainability.

WiredScore: It is a global digital connectivity certification system that helps landlords assess, improve, benchmark and promote their buildings. WiredScore certifies buildings including commercial, residential properties and mixed-use neighbourhoods. It rates them on a scale of five, based on points earned through credit scores. WiredScore certifies buildings at four different levels, including WiredScore Certified, WiredScore Silver, WiredScore Gold, and WiredScore Platinum. The certification process involves following steps:

- i. **Audit:** Understand the digital infrastructure and connectivity capability of the building or development from the WiredScore audit and review.
- ii. **Improve:** Receive expert guidance on how to improve the asset.
- iii. **Certify:** Align and benchmark the building with one of WiredScore's globally recognised ratings.
- iv. **Promote:** Communicate the building's connectivity and WiredScore certification level to the market.
- v. **Utilise:** Receive independent and objective technical guidance and training throughout the certification period.

WiredScore undertakes measurements for following parameters:

- i. **Resilience:** Are potential outages mitigated through resilient infrastructure? Is the critical telecommunications equipment secure?
- ii. **Tenant experience:** Does the building provide tenants with a seamless digital connectivity experience?
- iii. **Mobile:** Is the tenant experience in the building enhanced by access to uninterrupted mobile coverage?
- iv. **Choice:** of providers Do multiple high-speed fibre providers service the building and provide competitive pricing?

- v. Future-readiness: Is there flexibility and capacity to adapt to new and advancing technologies?

Given below are the stages of WiredScore audit and review process:

- i. Point of entry planning: Ease of access - the design and capacity of the pathways to ensure that they enable seamless connectivity from providers. Redundancy - physical separation of primary and backup connections.
- ii. Telecommunications room planning and design
- iii. Riser planning
- iv. Electrical resilience
- v. Mobile planning and optimisation: RF survey and decision on best suitable IBS as per user requirements
- vi. Readiness and access for providers & carriers
- vii. Tech readiness: Make sure the building is able to evolve with rapidly changing technology by having adequate foundational infrastructure in place
- viii. Innovation credits: Extra credits during WiredScore audits for connectivity features that go beyond prevailing best-in-class standards

Q.21. Is there a need to introduce Rating of buildings from the perspective of DCI that may help in nudging the Property Managers to strive for collaboration with other stakeholders to meet the digital connectivity expectations of the users of the building? Please justify your response with rationale and suitable examples, if any.

And

Q.22. In case, rating is introduced as a voluntary scheme, is there a need to monitor the progress? If progress is not satisfactory, would there be a need to launch campaigns and awareness drive to encourage Property Managers to come forward for rating? Please justify your response with rationale and suitable examples, if any.

And

Q.23. Should the voluntary scheme of rating be extended to cover cities, towns and villages and even states? Would such a scheme help in encouraging local and state authorities to facilitate TSPs in creation or in improving outdoor as well as indoor DCI? Please justify your response with rationale and suitable examples, if any.

And

Q.24. If in response to the Question No. 23 answer is yes then what framework should be introduced to rate cities, towns, villages and states, and how weightages can be assigned to different aspects of indoor and outdoor connectivity? Please justify your response with rationale and suitable examples, if any.

LTC response:

Yes, we believe that there is an urgent need to introduce a rating/ certification scheme for DCI. It should be made mandatory for all new Government buildings (official and residential), new Private buildings (business/ commercial/ residential) and new public place buildings in all Tier-1 and Tier-2 cities but voluntary for other buildings. Rural areas may also be brought under the voluntary schemes gradually at a later stage once the ecosystem develops fully and stabilises. It will greatly help in delivery of good quality of service inside the buildings which is not only beneficial for the

end users but also win-win for all the stakeholders within the ecosystem. The enormous benefits to all stakeholders have been rightly highlighted by TRAI in the consultation paper:

- i. Introduction of rating systems for digital connectivity would result in the principal-agent system to work in the interest of end users.
- ii. Real estate buyers and tenants looking for high quality digital infrastructure would be able to make informed choices and thereby put pressure on builders and property managers to build and maintain good quality digital infrastructure.
- iii. Flexible business models are likely to improve business case for the mobile operators.
- iv. Collaborative models and approach of co-design, co-create, co-build and neutral network infrastructure would greatly reduce costs and speed up the rollout of new technologies like 5G, IoT, M2M, NFV etc. across the country, giving a big boost to the economy.
- v. Public authorities or the authorities who are currently responsible for grant of permissions for deploying digital connectivity infrastructure would also now be eager to improve the rating of the area/city/state and work in collaboration with TSPs to build digital connectivity infrastructure.
- vi. A system of building ratings may create an environment and eco-systems where multiple skilled agencies will get new opportunities offering services like designing and implementation of in-building solutions. New entities may emerge that can play an important role in survey, assessment, and evaluation of areas for award of ratings. This will also create opportunities for many startups, and small & medium entrepreneurs to create necessary infrastructure and support systems providing good quality of services through outsourced models.
- vii. As property managers will also be benefitted with better ratings, it is expected that rating would nudge the property managers to build good DCI. In case of new buildings where infrastructure is to be built and property managers can clearly see business model of providing good connectivity, they would be willing to invest. Even property managers of existing buildings and areas used for business related activities such as enterprise workplaces, shopping malls, industrial estates, restaurants, cafeterias etc., would be willing to invest and build good connectivity.
- viii. In case of existing residential buildings, realizing that residents are empowered to influence the property managers, these residents will be encouraged to express their requirements and expectations to the property manager and push to get better rating. It is also expected that likely commercial benefits of good connectivity would automatically push property managers to get their buildings rated.

Rating as a mandatory requirement for specific classes of buildings

Q.25. Is there a need to make rating a mandatory requirement for specific classes of buildings such as public transport hubs, government buildings or any building of public importance etc.? If yes, which type of buildings should be covered under this category? Please justify your response with rationale and suitable examples, if any.

And

Q.26. What should be the time plan to rate buildings falling under the mandatory category and is there a need to prioritize some buildings within the mandatory category to make it more

effective? Whether existing buildings falling under such classes are required to be dealt differently? Please justify your response with rationale and suitable examples, if any.

And

Q.27. Is there a need to designate a nodal official for building(s) falling under the mandatory category to comply with the rating related requirements? What actions are proposed to be taken in case of noncompliance? Please justify your response with rationale and suitable examples, if any.

LTC response:

Rating may not be made mandatory for all buildings. The market forces may push property managers to act in the direction of improving quality inside buildings and add values to their properties, to make same as business case. It is expected that once a successful model emerges, various stakeholders would start adopting it. It should be made mandatory for all new Government buildings (official and residential), new Private buildings (business/ commercial/ residential) and new public place buildings in all Tier-1 and Tier-2 cities but should be voluntary for other buildings. Rural areas may also be brought under the voluntary schemes gradually at a later stage once the ecosystem develops fully and stabilises.

Changes required in laws dealing with the development of areas or construction of buildings

Q.28. Is there a need to amend legal provisions under various laws, bye laws dealing with development of land and buildings or areas including forest areas, cantonment areas, port areas, panchayat areas, municipal areas etc. to facilitate creation of DCI and ratings of the buildings or areas? Please justify your response with rationale and suitable examples, if any. Role of Regulator in New ecosystem.

And

Q.29. In case a voluntary scheme for rating is to be introduced or rating is notified as mandatory for specific classes of buildings then what should be the role of TRAI or DoT? Please justify your response with rationale and suitable examples, if any.

And

Q.30. Whether creation of "Regulatory Sandbox" to carry out experiments or demonstrate capabilities of innovative solutions to improve digital connectivity would be helpful to make changes in existing policies, laws or regulations? What should be the terms and conditions to establish a regulatory sandbox? Please justify your response with rationale and suitable examples, if any.

LTC response:

Yes, there is a need to provide legal backing to the proposed framework for creation, maintenance and upgradation of DCI. This can be provided in the form of a new regulatory framework and/or

appropriate amendments to the legal provisions under various existing laws, bye laws dealing with development of land and buildings or areas including forest areas, cantonment areas, port areas, panchayat areas, municipal areas etc. The envisioned framework not only requires collaborative efforts from the industry stakeholders but also synergies and synchronisation across the concerned Central and State Government departments.

All the deliberations should be taken up under the aegis of DoT and it should be the leading ministry driving this engagement and coordination with other Ministries. TRAI would need to provide guidance for the regulatory framework on DCI, formulation of DCI design principles and DCI evaluation benchmarks to objectively cover different kinds of buildings and the user requirements.

Operationalization of rating framework

Q.31. Is there a need to establish a Certificate Issuing Authority to award ratings to buildings from DCI perspective? If yes, what should be the structure of such an authority? If not, who can be assigned the role to perform this function? Please justify your response with rationale and suitable examples, if any.

And

Q.32. Whether the authority suggested in response to Question no. 31 may use reports from DCI evaluators to award ratings? To ensure reliability of reports from DCI Evaluators, should Certificate Issuing Authority need to conduct periodic audits of DCI evaluators? Please justify your response with rationale and suitable examples, if any.

LTC response:

There should be a central certificate issuing authority to award certificate based on the assessment/ test reports provided by the DCI evaluators. As large number of buildings across the country may be required to be rated or there may be voluntarily options for rating, the volume of work may be huge and will require considerable amount of time and resources. This work will need to be handled by private/ Government entities across the country which will be duly accredited as DCI evaluators by the National Accrediting bodies such as National Accreditation Board for Testing and Calibration Laboratories (NABL) or by the proposed certificate issuing authority based on relevant international accreditation standards (ISO etc.). It is suggested that while a DCI rating can be provided by the DCI evaluators based on the testing/assessment done, this rating shall be certified through a certificate issued by the certificate issuing authority post further evaluation/ validation of the test reports. A property would be taken to be certified/ formally rated only post issuance of certificate by the authority and property manager will be allowed to show/ promote/ display the DCI rating only post successful certification. The process of certification should be completely online with predefined timelines; the complete process should not exceed 30 days.

Terms and conditions for using awarded ratings including provisions for its renewal, revocation & penal provisions in case of misuse

Q.33. What should be the terms and conditions for using ratings awarded to a building(s) from a DCI perspective? What should be the validity period of awarded ratings? Do you envisage any situations under which an awardee of ratings might be required to get the ratings renewed before the validity period? Please justify your response with rationale and suitable examples, if any.

And

Q.34. Whether in the initial stages of introduction of the rating system, validity should be for a shorter time period, and later it may be increased as evaluation system matures? Should the validity period be dependent on the type of buildings? Please justify your response with rationale and suitable examples, if any.

And

Q.35. Whether the process of renewal of rating should be the same as the process defined to get rated first time or it may be incremental? Or renewal process may be dependent upon the grounds on which it is being renewed e.g. expiry of validity period, introduction of new technology, introduction of new spectrum band(s), introduction of new services(s) etc.? Please justify your response with rationale and suitable examples, if any.

And

Q.36. Whether the provisions to make an appeal should be introduced to give an opportunity to the applicant to make representation against the decisions of the Certificate Issuing Authority? What should be the time frame for preferring the appeal in case of disagreement with the rating assigned and its disposal? Please justify your response with rationale and suitable examples, if any.

And

Q.37. If somebody is found to be using ratings in an unauthorized manner, what legal actions are proposed to be taken against such entities? Please justify your response with rationale and suitable examples, if any.

LTC response:

We recommend that the rating/certificate should be issued for a period of atleast 5 years, renewable for further term(s) of 5 years. In view of our response to Q.31 and 32 above, considering the fact that rating is being given by a DCI evaluator and certificate will be issued by certificate issuing authority we don't see any need for an appellate mechanism for the rating/ certification system. Anyone in disagreement with the rating assigned or denial of certificate may re-approach the evaluator/ authority for re-assessment post a period of 30 days.

Adoption of Digital Tools & Platforms, AI/ML Models to co-design and co-create DCI

Q.38. Whether creation of a digital platform that allows stakeholders to co-design and co-create DCI would be helpful to realise better, faster and cheaper solutions? Whether technologies and tools such as AI, ML would be helpful in achieving this objective? Please justify your response with rationale and suitable examples, if any.

LTC response:

Since, there may be variety of scenarios covering the different kinds of buildings and varying user requirements, it might not be feasible to come up with a “fits all” solution. To cater to such custom requirements digital tools, AI/ML may help in dealing with such large number of variants. Digital platforms created for this specific purpose may help in learning of this model from the data collected from different parts of city or state or country and offer best-fit solution for a particular set of requirements.

Typical processes involved in rating of a building

Q.39. What should be the typical process to rate a building? Whether terminologies and steps involved in the rating process need to be standardized? Please justify your response with rationale and suitable examples, if any.

And

Q.40. Whether the process of rating would vary based on the types of buildings? If yes, then what factors or aspects of a building would matter or impact the outcome of rating? Please justify your response with rationale and suitable examples, if any.

And

Q.41. Which objective methods should be used to evaluate the DCI? How can various aspects of performance to evaluate the quality can be combined together? Please justify your response with rationale and suitable examples, if any.

And

Q.42. Which subjective methods should be used to evaluate perceived quality of DCI? Whether survey techniques can be improved considering penetration of smartphones? Whether improved techniques can help in providing insights and actionable items to improve DCI? Please justify your response with rationale and suitable examples, if any.

And

Q.43. Would combining the parametric values or results of objective and subjective methods be helpful in assessing digital connectivity that is closer to the perceived quality of experience? Please justify your response with rationale and suitable examples, if any.

And



Q.44. How advanced technologies such as Artificial Intelligence (AI), Machine Learning (ML) etc. might be useful to make the evaluation process more nuanced and suitable for the purpose? How can AI/ML models evolve from the inputs of measurement and evaluation being carried out in other parts of the city, state or Country? Please justify your response with rationale and suitable examples, if any.

LTC response:

The evaluation exercise for DCI would entail a combination of data collection methods (like collection of data from the network, field measurements, drive tests etc.) and new advanced methods (like prediction tool analysis, AI/ML evaluation) also there would be increased role of crowd source apps performance details can also be directly collected from end-users via Mobile Apps. Mobile Apps developed for this specific purpose may either collect quality experienced by the users through feedback mechanism or conducting test measurements with support from end users and submit reports. Further, there will be assessments done via subjective methods which may typically involve online surveys, face-to-face interactions, and feedbacks. Property managers would also be required to be onboarded for building related data, maps drawings etc.

In order to capture more granular details for QoS inside the buildings, new spots will need to identified and new parameters for the KPIs. Considering the complexity involved in combining information from such multiple sources there needs to be clear and objective KPIs which needs to be deliberated in consultation with service providers.

Q.45. Any other issue which is relevant to this subject? Please justify your response with rationale and suitable examples, if any.

LTC response: No comments

