Inputs to
TRAI's Consultation Paper on Regulation on Rating Framework for Digital Connectivity in Buildings or Areas'

STL Response to:

Q.4- With reference to the rating criteria proposed in table at Section 6.2, kindly provide list of possible sub-criteria and corresponding sub-weightage against each criterion with justification? Please also indicate any other aspect which need to be included or modified in the proposed weightage criteria. Please provide your answer with suitable justifications.

A.4.

The need for ratings of buildings for Digital Connectivity Infrastructure (DCI) arises from the growing significance of reliable and efficient digital connectivity within buildings. Ratings serve as a means to assess and communicate the quality of DCI provisions in buildings, ensuring that users and occupants have access to high-quality connectivity services. The implementation of building ratings for DCI involves various agencies and stakeholders to establish standards, assess compliance, and provide guidance to ensure effective connectivity.

Need for Ratings of Buildings for DCI:

1. **User-Centric Approach:** Ratings help prioritize user experience, ensuring that building occupants have access to seamless digital connectivity, which has become essential for work, communication, and daily activities. Ratings empower users to make informed choices when selecting buildings, encouraging demand for higher-quality connectivity.

2. **Transparency and Choice:** Ratings provide transparency about the quality of DCI infrastructure in a building, enabling users to make informed decisions when choosing a place to work or reside.

3. **Competition and Innovation:** Ratings encourage building owners and developers to invest in robust DCI infrastructure, fostering competition among buildings to offer better connectivity and innovative services.

4. **Quality Benchmarking:** Ratings establish a benchmark for DCI standards, encouraging adherence to best practices and quality improvement across buildings.

5. **Quality of Experience of Users:** Rating parameters should be collected in a subjective method by direct surveying and interacting with customers. This can give a clear picture on the weightages that can be assigned to different KPIs captured in objective field measurements.

6. **Future-Proofing:** Ratings drive the adoption of up-to-date technologies and standards, ensuring that buildings remain well-equipped for future connectivity demands.

Implementation of Building Ratings for DCI: It is imperative for the TRAI to come up with appropriate regulatory framework for Rating of Buildings, which will also include the issue of rating certification. The framework should outline the standards and criteria that buildings must meet to achieve different rating levels, considering factors like coverage, capacity, reliability, technology support and capture user experience through surveys etc.

We would like to suggest for the following as the set of possible sub-criteria, for ensuring the robust and futuristic Digital Communication Infrastructure inside the buildings:

1. To ensure the best network quality, bend insensitive fibre ITU-T G.657.A2/B3 shall be made as minimum fibre type inside the building premises for last mile connectivity usage.

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If India continues to deploy legacy G.652.D fibre, the risk of network failure and incompatibility with future applications will increase because this vintage fibre has a lifetime of hardly 10 years due to its inability to withstand bends and quite high optical power loss.

Hence there is an urgent need to upgrade the minimum standard requirement for OF and OFC, to be deployed under Govt. projects. ITU-T G.657.A2 bend-insensitive fibre provides an optimal answer associated with legacy 'D' fibre and have 25-30 years lifetime.

2. The rating criteria shall include the sub criteria for the minimum fire safety compliance confirmations under the main criteria 4 – *"Digital Connectivity Infrastructure Resilience"*. This is critical to reduce risk of human causality and property damage during fire incident, the cables (telecom cables like – optical fibre cables, category cables etc) installed inside the building should be fire retardant / proof (means resistance to catch fire) and low smoke generation properties.

Rationale:

Cabling has a huge role to play in the propagation of fire, as faulty/ bad wiring is the most common reason for short circuit and a major reason why fire is able to cause so much damage to life and property, especially closed buildings.

India saw the huge number of deaths of people countrywide in fire incidents in both public and residential buildings (according to National Crime Records Bureau (NCRB)). Behind that, short circuits were one of the causes of the fire, that nearly took out many lives due to faulty wiring and not using fire safety rated wire. Below are statistics published by NCRB from the year 2015-2021.

Year	Total No. of Cases		% Cases due to Short Circuit	No of Deaths due to Short Circuit Fire Cases
	Accidental Fire	Short Circuit		
2015	18,450	2,485	13.4	2,255
2016	16,695	2,500	14.9	2,626
2017	13,397	1,886	14.0	1,736
2018	13,099	1,970	15.1	1,719
2019	11,037	2,183	19.8	1,990
2020	9,329	1,943	20.8	1,812
2021	8,491	1,808	21.3	1,657
Total Deaths				**13,795**

Fire Safety Compliance: The minimum fire safety compliance confirmations as per the local and international standard guidelines like IEC 62222, IEC 60332-1-2, IEC 60332-3A, IEC 60332-3C, IEC 60332-3-24, IEC 61034-2, IEC 60754-2 to ensure the safety of the installed cable. Recently, TEC has adopted these fire safety requirements in their standards for indoor premises cable applications. These standards are TEC 85110, TEC 85160, & TEC 85210. The fire safety parameters considered in the standards are:

Parameter	Test Method	Test Requirement according to IEC 62222-Ed 3
Flame spread – single cable	IEC/EN 60332-1-2	Char less than 0.54 m at completion of test (minimum recommended requirement)
Flame spread – bunched cables	IEC/EN 60332-3-24, Cat C	Char less than 2.5 m at completion of the test (minimum recommended requirement)

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Smoke	IEC/EN 61034-2	Minimum transmittance 60%
Acid gas (Toxicity)	IEC/EN 60754-2	pH not less than 4.3 Conductivity not more than 10 µS/mm

To reduce risk of human causality and property damage during fire incident, the cables installed inside the building should be fire retardant / proof (means resistance to catch fire) and/ or low smoke generation properties.

Given the fact that the overall volume of cable is continuously going up in high rise buildings, it becomes very critical to mandate the right discipline of indoor premise optical fibre cable meeting higher standards of fire compliance, in Building-By Laws. There are different types of safety norms used for cables as per applications, basis its application the NBC should mandate the usage of types of cables as below:

Application Type	**Jacket Material**	**Fire Compliance Recommended**		
		IEC	**CPR-Class**	**UL**
Standard Installations	PVC	IEC-60332-1-2	ECa	
Non-Hazardous Industries/Open Conditions	FR	IEC 60332-3C	DCa	UL 1685-CM
Hazardous Chemical Plants & Human Surroundings	FRLS	IEC 60332-3A	CCa	UL 1666-CMR
High Rise building's, metros theatres, airports etc.	LSZH	IEC 60332-3A IEC 60754-1,2	B2Ca	UL CMP standard NFPA 262

a. For standard installation conditions- cables with standard flame retardancy should be used.
b. For installations in non-hazardous industries and open conditions- cables with improved oxygen index should be mandated to be used.
c. For installations with human surroundings and chemical or hazardous plants etc.- Cables with improved oxygen index and low smoke properties must be mandated, popularly known as "FRLS" cables.
d. Further cables with "Low Smoke & Zero Halogen (LSZH)" are required in Hospitals, Railways and metros, high rise buildings, shopping malls, theatres, airports i.e., basically areas of high population in closed circumstances.

Selecting proper fire performance cabling infrastructure up front provides assurance on the correct life cycle, safety, scalability and flexibility. Hence, it is the critical segment where NBC should focus for more security and safety. USA, European Union, UAE, Saudi Arabia and other Middle East countries have made it mandatory requirement for all types of cables to be deployed in Indoor Premises.

3. Additionally, the building rating process should also give the emphasis on the deployment of right category cabling infrastructure inside the buildings, as the international standards and new applications strongly demand use of higher categories for new installations, also it is the mandatory need for the consumer premises equipment to get connected.

Rationale:

The Data cabling (Category Cables) is the media that connects the Floor distributor (FD)/Telecommunication closest (TC) to the Telecommunications Outlet/information outlet. The last mile equipment majorly gets connected over Data cable which the most preferred connectivity media options is providing many connectivity ease of advantages. There are basically two types of Category cable mechanical construction: Unshielded Twisted Pair (UTP) and Shielded Twisted Pair (STP).

The transmission of data through a copper twisted pair (balanced) conductor is similar to that of the flow of electrical power – the data is broken down into electrical energy and transmitted through the conductor. The copper cable used in structured cabling systems consists of groupings of two insulated conductors twisted

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together to form a balanced transmission line. ISO calls this cable balanced cable, while TIA/EIA calls this cable Twisted Pair. Twisted pair (balanced) cable may support a wide range of applications - from simple voice up to the large bandwidth of 2000 MHz speed technology upto 40G.

With the emerging applications demand it has become very critical to select the right design of cable meeting current and upcoming applications needs.

With emerging Information & Communication Technologies changing data cable in the physical layer is needed. The Latest applications demand higher bandwidth, and these bandwidth intensive applications require speed beyond 1 GB/s in existing Local Area Network (LAN) infrastructures. Cat5 is restricted to 100 MHz bandwidth and speed maximum to 1gigabits per seconds only.

Below International standards and new applications strongly demand the use of higher categories for new installations.

- 4-Pair PoE applications: TSB-184-A recommends installing Category 6A to achieve best thermal performance, largest bundle sizes and supports 10GBASE-T. Impact of higher Power PoE++ on twisted-pair structured cabling results in more insertion loss at higher temperature de-rates maximum channel lengths.
- New Generation Wi-Fi: The next-generation IEEE 802.11ac having Wave 2 devices will require data rates close to 2 Gb/s in the immediate future, and 4 Gb/s in the next few years. For new installations, the best viable solution to support Wave 2 802.11ac wireless devices and higher speed 802.11ax devices in the future is Category 6A.
- HDBaseT: Technology enables transmitting uncompressed full HD video, audio, Ethernet, control and power up to 100 m over balanced twisted-pair cabling with modular RJ-45 connectors Cat6a Cable is design of choice.
- ISO/IEC 11801 Edition3 Class Ea is the minimum recommended to support applications with data rate greater than 1 Gigabit per second.
- ISO/IEC 11801-5 (Data Center) and 11801-6 (Distributed services) already specify Class Ea /Cat6a minimum.
- TIA-1179-A Healthcare under revision recommends minimum copper cabling requirement is Category 6A.
- TIA-4966 Education Requires Category 6A for new Installation.

*Enhanced future ready horizontal LAN cabling infrastructure is required to avoid productivity loss due to network bottleneck. Technology is already moving towards Cat6a cables compliant to 500 MHz bandwidth and 10G speed as **minimum** specification for all new LAN horizontal cabling networks installations. Twisted pair data cabling has been continuously evolving addressing the need of higher bandwidth and speed requirements. Telecommunication Industry association (TIA) recently released TIA 568-C.2-1 Balanced twisted- pair Telecommunication cabling component standards announce addendum on minimum requirement for **Category 8** four pair shielded balanced twisted pair copper cabling up to two connectors and will support up to 30 meters only. This will be addressing the need of data centre cabling providing 25G/ 40G speed Data Centre for server-to-server connection and end of row or middle of row design.*

The table in under the clause 4.6.2 of the consultation paper containing rating criteria and its weightages, should have the above recommended parameters an the mandatory sub criteria:

i. Bend insensitive fibre ITU-T G.657.A2/B3 shall be made as minimum fibre type inside the building premises for last mile connectivity usage – under the **Main Criteria 5: "Future Readiness of Digital Connectivity Infrastructure".**

ii. The minimum fire safety compliance confirmations and adoption for IEC standards for the same **– under the Main Criteria 4: "Digital Connectivity Infrastructure Resilience".**

iii. The building rating process should also give the emphasis on the right standards / versions for category cabling infrastructure inside the buildings – under the **Main Criteria 6: "Provision of Wired Connectivity Infrastructure".**

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