**Digital Communications India Forum (DCIF)**
(A Unit of PTC India Foundation)

File no: DCIF/Technology Committee/1/8/26/01

To,

**Shri Tejpal Singh, Advisor (QoS-I),**
Telecom Regulatory Authority of India,
World Trade Centre, Tower-F, (4th to 7th Floors),
Nauroji Nagar, New Delhi- 110029

Date: 25th August 2026

**Subject: Submission of the Digital Communications India Forum (DCIF), a Unit of PTCIF, on the Consultation Paper on Draft Amendments in 'The Standards of Quality of Service of Access (Wireline and Wireless) and Broadband (Wireline and Wireless) Service Regulations, 2024'**

Ref: TRAI Consultation Paper dated 5th August 2026 (F. No. RG-17/(3)/2022-QoS)

Respected Sir,

Please find enclosed the comments of the Digital Communications India Forum (DCIF) on the Consultation Paper on Draft Amendments in 'The Standards of Quality of Service of Access (Wireline and Wireless) and Broadband (Wireline and Wireless) Service Regulations, 2024'.

The comments have been prepared after a detailed review of the draft amendments and the explanatory note issued by the Authority. The document reflects a balanced approach framed around measurable service outcomes, transparency, consumer protection, technology neutrality, network resilience and security, while ensuring that the underlying technology, data and regulatory systems remain measurable, auditable, secure and future-ready.

The comments further reiterate the need for reliable coverage information, automatic consumer remedies, minimum assured bandwidth, net neutrality, slice-aware QoS and isolation, data integrity and auditability, secure-by-design regulation, and the promotion of Make in India and trusted Indian capability in telecom equipment, software, QoS measurement, cybersecurity and regulatory technology.

We trust that the enclosed comments will assist the Authority in finalizing a progressive, secure, and future ready regulatory framework. DCIF would be pleased to provide any further clarification or participate in stakeholder discussions, as may be required.

Thank you for your consideration.

Thanking you,
Sd-
**Yours sincerely,**
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# COMMENTS TO TRAI

**Purpose.** This paper consolidates DCIF's view on consumer, technology and security-oriented recommendations on the review of Standards of Quality of Service. The recommendations are framed around measurable service outcomes, transparency, consumer protection, technology neutrality, network resilience and security.

**Guiding principle.** QoS regulation should ultimately measure and protect the service actually experienced and paid for by the consumer, while ensuring that the underlying technology, data and regulatory systems remain measurable, auditable, secure and future-ready.

## 1. Coverage Maps: Reliability of Information

**Issue:** Can the framework ensure that the published coverage map indicate not merely signal availability but the reasonably expected quality of voice, data and broadband service at the indicated location, so that a consumer can make an informed choice before purchasing a service?

**Explanation:** Coverage should represent service usability, not merely radio signal strength.

**Comments:** DCIF recommends that TRAI coverage should represent service usability, not merely radio signal strength.

## 2. Coverage Map: Indoor Experience

**Issue:** Can the framework ensure service providers to clearly distinguish outdoor coverage from reasonably expected indoor coverage, particularly in urban areas, buildings and locations where radio propagation is materially affected by structures?

**Explanation:** Consumers should not be led to expect good indoor service when the underlying representation only establishes outdoor signal availability.

**Comments:** DCIF recommends that TRAI consumers should not be led to expect good indoor service when the underlying representation only establishes outdoor signal availability.

## 3. Consumer Challenge to Coverage Information

**Issue:** When a consumer challenges the published coverage at a location, should TRAI require the service provider to provide the consumer with a unique complaint/reference number, investigation status and final resolution within a defined period?

**Explanation:** Convert coverage feedback into an enforceable consumer redressal mechanism.

**Comments:** DCIF recommends that TRAI convert coverage feedback into an enforceable consumer redressal mechanism.

**4. Incorrect Coverage: Consumer Visibility**

**Issue:** Should areas identified as having overstated coverage be prominently flagged to consumers before they purchase or port into the service, rather than merely being reported to TRAI or corrected in a subsequent map cycle?

**Explanation:** Protect the consumer before purchase, not only after a regulatory audit.

**Comments:** DCIF recommends that TRAI protect the consumer before purchase, not only after a regulatory audit.

**5. Significant Network Outage: Compensation**

**Issue:** Should consumer compensation be triggered from the actual period of service unavailability rather than only after the outage exceeds 24 hours, particularly where the consumer has paid for continuous connectivity?

**Explanation:** Link compensation more directly to the actual loss of service.

**Comments:** DCIF recommends that TRAI link compensation more directly to the actual loss of service.

**6. Material Degradation Without Complete Outage**

**Issue:** If a consumer continues to receive nominal connectivity but experiences material degradation for a prolonged period, should the consumer receive proportionate compensation even when the service is technically not classified as a complete outage?

**Explanation:** The regulation should recognise poor service as well as zero service.

**Comments:** DCIF recommends that TRAI the regulation should recognise poor service as well as zero service.

**7. Automatic Compensation**

**Issue:** Should all rebates, validity extensions and other compensation arising from a significant outage or qualifying service degradation be automatically calculated and credited to the affected subscriber without requiring a separate consumer complaint or claim?.

**Explanation:** Compensation should be automatic and system-driven.Incase customer could not use service offered by service provider because of poor indoor/ outdoor coverage or technical difficulty there should be automatic rollover of validity of plan.

**Comments:** DCIF recommends that TRAI compensation should be automatic and system-driven.Incase customer could not use service offered by service provider because of poor indoor/ outdoor coverage or technical difficulty there should be automatic rollover of validity of plan.

**8. Billing Complaints: Maximum Resolution Time**

**Issue:** Should the proposed one-week period be treated as the maximum resolution period, with simple and digitally verifiable billing disputes being resolved immediately or within 48/72 hours?

**Explanation:** Use shorter timelines where the dispute can be objectively verified through digital billing records.

**Comments:** DCIF recommends that TRAI use shorter timelines where the dispute can be objectively verified through digital billing records.

### 9. Resolution Versus Actual Refund/Credit

**Issue:** Can the framework measure the complete consumer journey, from complaint registration to actual financial credit/refund in the consumer's account, rather than measuring only the date on which the service provider declares the complaint resolved?

**Explanation:** Consumer benefit should be measured by money actually received, not merely by a complaint being marked 'resolved'.

**Comments:** DCIF recommends that TRAI consumer benefit should be measured by money actually received, not merely by a complaint being marked 'resolved'.

### 10. Unauthorised or Incorrect Charging

**Issue:** Where a billing dispute involves an unauthorised charge or charging contrary to the subscribed tariff, should the disputed amount be kept in abeyance until resolution and should the consumer be protected from penalties, suspension or late-payment consequences attributable to that disputed amount?

**Explanation:** Provide interim protection to consumers during genuine billing disputes.

**Comments:** DCIF recommends that TRAI provide interim protection to consumers during genuine billing disputes.

### 11. Quality of Experience Score: Consumer Choice

**Issue:** Should the QoE Score be designed primarily as a consumer decision-making tool, enabling a consumer to compare service providers for a particular service, technology and geographical area before selecting or changing a provider?

**Explanation:** QoES should become a consumer choice index, not merely another regulatory KPI.

**Comments:** DCIF recommends that TRAI qoES should become a consumer choice index, not merely another regulatory KPI.

### 12. QoES: Geographic Granularity

**Issue:** Can the framework publish QoE at sufficiently granular geographical levels so that consumers can assess the quality likely to be experienced at their actual location rather than relying only on LSA-level or national averages?

**Explanation:** Consumer information should reflect local experience where meaningful variations exist.

**Comments:** DCIF recommends that TRAI consumer information should reflect local experience where meaningful variations exist.

### 13. 5G Network Slicing: Protection of Ordinary Subscribers

**Issue:** Can the framework ensure service providers to demonstrate that introduction of commercial 5G network slices does not reduce the QoS experienced by ordinary subscribers who are not using such slices?

**Explanation:** Network slicing should not adversely affect subscribers outside the slice.

**Comments:** DCIF recommends that TRAI network slicing should not adversely affect subscribers outside the slice.

### 14. Premium Slices and Consumer Neutrality

**Issue:** Can the framework explicitly prohibit allocation of network resources to a commercial or premium slice in a manner that causes measurable degradation of the service experienced by ordinary subscribers using the same service?

**Explanation:** Premium services should not be created by degrading the experience of other consumers.

**Comments:** DCIF recommends that TRAI premium services should not be created by degrading the experience of other consumers.

### 15. Congestion: Network Indicator Versus Consumer Experience

**Issue:** Should PRB utilisation be supplemented by actual consumer-facing indicators such as throughput, latency, packet loss and application-level experience before concluding that consumer QoS is satisfactory?

**Explanation:** Network utilisation is an engineering indicator; consumer experience should remain the outcome measure.

**Comments:** DCIF recommends that TRAI network utilisation is an engineering indicator; consumer experience should remain the outcome measure.

### 16. Fault Reporting During Outages

**Issue:** Should every automatically generated fault ticket be linked to the affected subscriber and should the subscriber receive automatic notification of the ticket, expected restoration time and closure status?

**Explanation:** Convert network fault management into a transparent consumer service mechanism.

**Comments:** DCIF recommends that TRAI convert network fault management into a transparent consumer service mechanism.

### 17. Root Cause Information After Outage

**Issue:** Should consumers affected by a significant outage be provided with a concise explanation of the cause, duration, corrective action and preventive action, rather than this information being available only to TRAI?

**Explanation:** Give affected consumers meaningful post-outage transparency.

**Comments:** DCIF recommends that TRAI give affected consumers meaningful post-outage transparency.

### 18. Financial Disincentives: Consumer Benefit

**Issue:** Should at least a defined portion of financial disincentives imposed for consumer-impacting QoS violations be directed towards consumer compensation, service improvement in affected areas, or a consumer QoS improvement fund rather than being treated only as a regulatory penalty?

**Explanation:** Regulatory penalties should produce a visible consumer benefit wherever the violation has caused consumer harm.

**Comments:** DCIF recommends that TRAI regulatory penalties should produce a visible consumer benefit wherever the violation has caused consumer harm.

### 19. False Reporting: Consumer Remedy

**Issue:** Where false or materially inaccurate QoS reporting results in consumers receiving a service materially different from the declared quality, should there be a consumer-facing remedy in addition to the financial disincentive imposed on the service provider?

**Explanation:** Protect consumers who relied on inaccurate service information.

**Comments:** DCIF recommends that TRAI protect consumers who relied on inaccurate service information.

### 20. Consumer Perception as an Early Warning Indicator

**Issue:** Should persistent consumer complaints or consumer-perceived degradation be treated as an early-warning indicator requiring verification by TRAI, even when the provider's reported technical QoS parameters remain within prescribed benchmarks?

**Explanation:** Consumer experience should be capable of triggering regulatory verification where persistent evidence indicates a possible gap in reported and experienced QoS.

**Comments:** DCIF recommends that TRAI consumer experience should be capable of triggering regulatory verification where persistent evidence indicates a possible gap in reported and experienced QoS.

### 21. Adequate human handled support availability

**Issue:** Should persistent consumer complaint be handled by automated preprogrammed help line, social media help, chat bots only?

**Explanation:** the adequate equipped human attended help line numbers should be prominently displayed in all communication channels.so that consumer can explain difficulty in flexible manner. Suggested closing position for the submission: The regulatory framework should progressively move from measuring network parameters alone to measuring the outcome experienced by the consumer. Technical QoS indicators, consumer service indicators and consumer perception should therefore operate together, with transparency, automatic consumer remedies and meaningful information for consumer choice forming integral parts of the framework.

**Comments:** DCIF recommends that TRAI the adequate equipped human attended help line numbers should be prominently displayed in all communication channels.so that consumer can explain difficulty in flexible manner. Suggested closing position for the submission: The regulatory framework should progressively move from measuring network parameters alone to measuring the outcome experienced by the consumer. Technical QoS indicators, consumer service indicators and consumer perception should therefore operate together, with transparency, automatic consumer remedies and meaningful information for consumer choice forming integral parts of the framework.

## 22. Minimum Assured / Declared Bandwidth

**Issue:** Can the framework ensure every tariff offering to declare, in a simple and standardised manner, a minimum assured bandwidth/speed that the consumer can reasonably expect, separately from the typical and/or maximum speed advertised by the service provider, particularly during busy hours?

**Explanation:** A consumer should be able to distinguish between advertised peak speed, typical speed and minimum assured service. The minimum assured level should be measurable and enforceable, rather than allowing a tariff to be sold primarily on a headline speed that may not be experienced in practice.

**Comments:** DCIF recommends that TRAI a consumer should be able to distinguish between advertised peak speed, typical speed and minimum assured service. The minimum assured level should be measurable and enforceable, rather than allowing a tariff to be sold primarily on a headline speed that may not be experienced in practice.

## 23. Declared Bandwidth and Net Neutrality

**Issue:** If differentiated bandwidth, priority or network-slice-based tariff offerings are permitted, should TRAI require that the declared bandwidth and minimum assured service level apply independently of the content, application, website, source, destination or lawful internet service being accessed, so that commercial differentiation between tariff tiers does not become discrimination between internet services or content?

**Explanation:** Permit differentiation of the access service purchased by the consumer, but preserve net neutrality at the application/content level. A premium tariff may provide a higher or more assured access capacity, but an ordinary tariff must not be artificially degraded, and no content, application or service should receive preferential blocking, slowing, throttling or treatment because of commercial arrangements.

**Comments:** DCIF recommends that TRAI permit differentiation of the access service purchased by the consumer, but preserve net neutrality at the application/content level. A premium tariff may provide a higher or more assured access capacity, but an ordinary tariff must not be artificially degraded, and no content, application or service should receive preferential blocking, slowing, throttling or treatment because of commercial arrangements.

## 24. Consumer Protection Before Premium Network Slicing

**Issue:** Before permitting premium or differentiated network-slice offerings, should TRAI require the service provider to demonstrate that the minimum assured bandwidth and QoS available to non-premium subscribers will remain above the prescribed consumer benchmark, including during busy hours and periods of congestion?

**Explanation:** Premium QoS should represent additional value created through additional capacity or efficient resource allocation, and should not become a mechanism for making the basic service deliberately inadequate. The proposed framework should distinguish clearly between (i) the bandwidth technically available to a network, (ii) the typical speed declared in a tariff, and (iii) the minimum service level assured to the consumer. The consumer should be able to compare these three values before purchase. Where network slicing or differentiated QoS is introduced, such differentiation should operate at the level of the access service purchased and should not permit discrimination among lawful internet content, applications or services. This approach would allow innovation in 5G and network

slicing while retaining the consumer protection objective of net neutrality: higher-priced services may receive additional assured capacity or differentiated technical characteristics, but ordinary users should not be forced to purchase a premium tier merely to obtain an adequate basic internet service.

**Comments:** DCIF recommends that TRAI premium QoS should represent additional value created through additional capacity or efficient resource allocation, and should not become a mechanism for making the basic service deliberately inadequate. The proposed framework should distinguish clearly between (i) the bandwidth technically available to a network, (ii) the typical speed declared in a tariff, and (iii) the minimum service level assured to the consumer. The consumer should be able to compare these three values before purchase. Where network slicing or differentiated QoS is introduced, such differentiation should operate at the level of the access service purchased and should not permit discrimination among lawful internet content, applications or services. This approach would allow innovation in 5G and network slicing while retaining the consumer protection objective of net neutrality: higher-priced services may receive additional assured capacity or differentiated technical characteristics, but ordinary users should not be forced to purchase a premium tier merely to obtain an adequate basic internet service.

**25. QoS should measure service outcome, not only network parameters**

**Issue:** Can the framework supplement network-side indicators such as PRB utilisation with end-to-end indicators including throughput, latency, packet loss, availability and, where appropriate, application-level performance?

**Explanation:** Treat network KPIs as engineering indicators and end-to-end service quality as the outcome.

**Comments:** DCIF recommends that TRAI treat network KPIs as engineering indicators and end-to-end service quality as the outcome.

**26. PRB utilisation should be correlated with congestion impact**

**Issue:** Where a cell exceeds the proposed 80% PRB utilisation threshold, should the provider demonstrate whether this affects throughput, latency or availability and whether corrective action improves performance?

**Explanation:** Use PRB utilisation as an early-warning and capacity-planning indicator, while retaining user-facing performance as the outcome.

**Comments:** DCIF recommends that TRAI use PRB utilisation as an early-warning and capacity-planning indicator, while retaining user-facing performance as the outcome.

**27. Busy-hour methodology should reflect real traffic**

**Issue:** Should the system-generated busy hour be dynamically derived from actual traffic patterns and separately identifiable for different cells?

**Explanation:** Retain the system-generated approach but require transparent, reproducible and auditable determination of the busy period.

**Comments:** DCIF recommends that TRAI retain the system-generated approach but require transparent, reproducible and auditable determination of the busy period.

**28. Network slicing should have slice-level monitoring**

**Issue:** Where multiple 5G slices are deployed, should TRAI require separate reporting of relevant QoS, resource-utilisation and capacity parameters for each slice, together with evidence that one slice has not degraded another service?

**Explanation:** Regulatory visibility should extend from cell level to slice level where slicing changes resource allocation.

**Comments:** DCIF recommends that TRAI regulatory visibility should extend from cell level to slice level where slicing changes resource allocation.

**29. Network slicing should preserve service isolation**

**Issue:** Can providers demonstrate technical isolation between network slices so that congestion, malfunction or resource exhaustion in one slice does not adversely affect another slice or shared network functions?

**Explanation:** Require measurable isolation, capacity protection and failure-containment mechanisms.

**Comments:** DCIF recommends that TRAI require measurable isolation, capacity protection and failure-containment mechanisms.

**30. 5QI and ARP should be mapped to measurable outcomes**

**Issue:** Where the same service is provided through multiple slices, should TRAI require evidence that prescribed 5QI and equal ARP values translate into comparable measurable service outcomes?

**Explanation:** Standards parameters should not by themselves be treated as proof of equivalent service.

**Comments:** DCIF recommends that TRAI standards parameters should not by themselves be treated as proof of equivalent service.

**31. Minimum assured bandwidth should be technically measurable**

**Issue:** Should the framework distinguish between peak speed, typical declared speed and minimum assured speed, with the minimum assured level measurable during defined assessment conditions including busy periods?

**Explanation:** Create an enforceable technical floor while retaining flexibility for higher-speed offerings.

**Comments:** DCIF recommends that TRAI create an enforceable technical floor while retaining flexibility for higher-speed offerings.

**32. Capacity augmentation should be evidence-based**

**Issue:** When a cell repeatedly exceeds the prescribed utilisation threshold, should the provider submit evidence of corrective action (radio optimisation, spectrum, backhaul or other capacity measures) and the resulting improvement?

**Explanation:** Move from reporting congestion to demonstrating a closed-loop capacity-management process.

**Comments:** DCIF recommends that TRAI move from reporting congestion to demonstrating a closed-loop capacity-management process.

### 33. Coverage maps should integrate prediction and field data

**Issue:** Should coverage-map systems continuously incorporate validated field measurements, crowdsourced measurements and network analytics so that published maps progressively reflect actual conditions?

**Explanation:** Treat coverage maps as living technical models rather than static filings.

**Comments:** DCIF recommends that TRAI treat coverage maps as living technical models rather than static filings.

### 34. Advanced propagation modelling

**Issue:** Can the framework permit or require advanced 3D digital-map and propagation modelling in dense urban environments where buildings materially affect radio propagation?

**Explanation:** Prescribe technology-neutral accuracy requirements and allow advanced modelling where it materially improves accuracy.

**Comments:** DCIF recommends that TRAI prescribe technology-neutral accuracy requirements and allow advanced modelling where it materially improves accuracy.

### 35. API interoperability and machine-readable regulatory data

**Issue:** Can the framework prescribe a version-controlled, machine-readable and interoperable API/data schema for coverage and QoS submissions, with defined validation rules?

**Explanation:** Build the regulatory data layer as an interoperable digital platform.

**Comments:** DCIF recommends that TRAI build the regulatory data layer as an interoperable digital platform.

### 36. Automated validation before regulatory ingestion

**Issue:** Should all QoS and coverage datasets submitted through APIs undergo automated checks for schema errors, geographic integrity, duplicates, missing fields, abnormal values and consistency with previous submissions?

**Explanation:** Introduce automated data-quality gates before regulatory data enters the central repository.

**Comments:** DCIF recommends that TRAI introduce automated data-quality gates before regulatory data enters the central repository.

### 37. Security of regulatory APIs

**Issue:** Since providers will transmit coverage information to TRAI through APIs, should mandatory controls cover authentication, authorisation, encryption in transit, credential management, rate protection and security logging?

**Explanation:** Treat regulatory API interfaces as critical systems and apply security-by-design.

**Comments:** DCIF recommends that TRAI treat regulatory API interfaces as critical systems and apply security-by-design.

**38. Integrity and authenticity of submitted QoS data**

**Issue:** Should every regulatory dataset carry verifiable provenance, timestamp, source-system identification and integrity protection so alteration is detectable?

**Explanation:** Establish a chain of trust from measurement system to regulatory database.

**Comments:** DCIF recommends that TRAI establish a chain of trust from measurement system to regulatory database.

**39. Role-based access to regulatory data**

**Issue:** Should access to coverage, QoS, analytics and audit information use role-based authorisation with separate privileges for submission, validation, correction, approval, audit and publication?

**Explanation:** Apply least-privilege and role-based access controls.

**Comments:** DCIF recommends that TRAI apply least-privilege and role-based access controls.

**40. Audit trail for changes**

**Issue:** Should all additions, corrections, updates and deletions to regulatory datasets maintain an immutable audit trail identifying the user/system, time, original value, revised value and reason?

**Explanation:** Make regulatory data changes fully traceable and auditable.

**Comments:** DCIF recommends that TRAI make regulatory data changes fully traceable and auditable.

**41. Protection against manipulation of coverage maps**

**Issue:** Can the framework ensure controls preventing unauthorised alteration of coverage datasets, GIS layers, prediction parameters or publication layers after validation, with independent verification of the published version?

**Explanation:** Protect the entire chain from measurement and modelling through publication.

**Comments:** DCIF recommends that TRAI protect the entire chain from measurement and modelling through publication.

**42. Security of crowdsourced measurements**

**Issue:** Where consumer feedback, speed tests or crowdsourced measurements are used for validation, should controls address authentication, integrity, duplicate submissions, location spoofing and automated manipulation?

**Explanation:** Treat crowdsourced data as valuable evidence with a defined trust and validation model.

**Comments:** DCIF recommends that TRAI treat crowdsourced data as valuable evidence with a defined trust and validation model.

### 43. Cyber incident reporting affecting QoS systems

**Issue:** Should significant cyber incidents affecting network-management systems, QoS measurement systems, coverage databases or regulatory interfaces be reported to TRAI within a defined period where they could affect regulatory information?

**Explanation:** Distinguish ordinary outages from cyber incidents that compromise integrity or trustworthiness of QoS information.

**Comments:** DCIF recommends that TRAI distinguish ordinary outages from cyber incidents that compromise integrity or trustworthiness of QoS information.

### 44. Security assurance for network slicing and virtualised functions

**Issue:** Can providers demonstrate appropriate isolation, access control, monitoring and incident-containment mechanisms so a security incident or resource exhaustion in one slice cannot propagate to other slices?

**Explanation:** Treat security isolation as an integral part of 5G slicing QoS and resilience. Outcome-based regulation: Technical network indicators should lead to measurable service outcomes.

**Comments:** DCIF recommends that TRAI treat security isolation as an integral part of 5G slicing QoS and resilience. Outcome-based regulation: Technical network indicators should lead to measurable service outcomes.

### 45. Make in India and Technological Sovereignty

**Issue:** Can the QoS regulatory framework also strengthen domestic capability, trusted technology development and sustainable value addition in India without compromising technology neutrality or service quality?

**Explanation:** QoS regulation increasingly depends on network software, analytics, measurement systems, APIs, GIS platforms, virtualised network functions and security infrastructure. These systems are becoming strategically important to the operation and supervision of telecom networks. The existing DCIF technology/security material already identifies Make in India, domestic value addition and trusted sources as relevant considerations.

**Comments:** DCIF recommends that TRAI, in coordination with the relevant Government policies and authorities, encourage meaningful Indian value addition in telecom network equipment, software, QoS measurement systems, security systems, regulatory interfaces and associated technologies. For critical systems, preference should be given to trusted and auditable technology sources, with appropriate Indian capability for development, support, maintenance and security assurance. The framework should avoid unnecessary vendor lock-in and should remain technology-neutral while creating conditions that strengthen India's long-term telecom technological capability and resilience.

# CONSOLIDATED DCIF RECOMMENDATION PRINCIPLES

A. **Consumer outcome:** QoS should measure what the consumer actually receives, not only what the network technically provides.

B. **Transparency:** Coverage, speed, QoE, outages and service limitations should be presented in a form that consumers can understand and compare.

C. **Automatic consumer remedy:** Where entitlement can be established from network or billing records, compensation and validity relief should be system-driven.

D. **Minimum assured service:** Peak, typical and minimum assured bandwidth/speed should be clearly distinguished and measurable.

E. **Net neutrality:** Commercial differentiation of access services should not become discrimination among lawful content, applications, websites, sources or destinations.

F. **Technology neutrality:** TRAI should prescribe outcomes, thresholds and assurance requirements without unnecessarily locking operators into a specific vendor or implementation.

G. **Slice-aware QoS and isolation:** 5G network slicing should be measurable at slice level and should not compromise other subscribers or shared network functions.

H. **Data integrity and auditability:** Regulatory data should have provenance, integrity protection, controlled access and a complete audit trail.

I. **Secure-by-design regulation:** APIs, GIS systems, crowdsourced measurement systems and regulatory databases should incorporate security from the architecture stage.

J. **Closed-loop compliance:** Identification of degradation should lead to corrective action, verification and evidence of restoration.

K. **Future readiness:** The framework should accommodate 5G/6G, virtualisation, automation and AI-driven network optimisation while maintaining appropriate sovereign control over critical government telecom and regulatory systems.

L. **Overall DCIF position.** The QoS framework should progressively move from a predominantly parameter-reporting model towards an outcome-based framework in which technical performance, consumer experience, transparency, resilience and security are assessed together. The framework should also support Make in India through meaningful domestic value addition and the development of trusted Indian capabilities in telecom equipment, software, network analytics, QoS measurement, cybersecurity and regulatory technology. For strategically critical systems, India should retain appropriate capability for development, support, maintenance, security assurance and control. This should be achieved without imposing unnecessary technology constraints or compromising QoS, competition or consumer interest.

Vipin Tyagi
Chairman, Technology Committee,
Digital Communication India Forum

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