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H-ACS/V2X/TRAI/393 Date: 27 May 2026

To,
Shri Akhilesh Kumar Trivedi
Advisor (Networks, Spectrum and Licensing)
Telecom Regulatory Authority of India (TRAI)
New Delhi

Subject: Submission of Stakeholder Comments on TRAI Consultation Paper No. 08/2026 – "Regulatory Framework for Vehicle-to-Everything (V2X) Communication Services in India"

Respected Sir,

Greetings from Central Institute of Road Transport (CIRT), Pune.

The Central Institute of Road Transport (CIRT), is a premier automotive testing and research institute as well as an Authorized Test Agency under CMVR Rules 124 & 126, functioning under the Ministry of Road Transport & Highways (MoRTH). CIRT has expertise in ITS, connected mobility, vehicle regulations, homologation, automotive cybersecurity, and advanced mobility technologies, supporting government and industry through testing, certification, policy support, and capacity building.

With reference to TRAI Consultation Paper No. 08/2026 on "Regulatory Framework for Vehicle-to-Everything (V2X) Communication Services in India", we are pleased to submit herewith the stakeholder comments of CIRT on the issues raised in the consultation paper.

Considering the transformative potential of V2X technologies in enhancing road safety, traffic efficiency, connected mobility, and intelligent transportation infrastructure, CIRT considers this initiative by TRAI as a highly significant and visionary step towards the future of mobility in India.

In this regard, CIRT has submitted detailed and technically focused responses to all the consultation questions (Q1 to Q26), covering aspects related to:

- Regulatory framework for V2X services
- NR-based C-V2X technology adoption
- Spectrum management and interoperability
- Cybersecurity and SCMS/PKI architecture
- Equipment certification and testing
- Financial and deployment framework for V2X ecosystem development

CIRT has also highlighted the importance of establishing robust testing, certification, interoperability validation, and cybersecurity compliance mechanisms for V2X deployments in India. Our submission further emphasizes the need for indigenous capability development and harmonization with global standards.

CIRT would be privileged to contribute further towards this noble national initiative through its technical expertise and institutional capabilities in automotive and intelligent transportation domains. In this context, we respectfully express our interest to be associated as a member of the Primary Authors /

Drafting Committee or any expert working group constituted for formulation of the V2X regulatory and technical framework in India.

We shall be pleased to provide any further technical clarifications or participate in stakeholder discussions/presentations as may be required by TRAI.

Thanking you.

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Stakeholder Response

Consultation Paper on Regulatory Framework for Vehicle-to-Everything (V2X) Communication Services in India

Chapter V: Issues for Consultation — Responses to Q1–Q26

Submitted by: CIRT (Central Institute of Road Transport), Pune

Date: 27 May 2026

This document presents the consolidated stakeholder response of **CIRT (Central Institute of Road Transport), Pune**. Responses are intentionally concise and actionable to support rapid policy formulation.

CLUSTER 1 — Authorisation Framework

Q1 to Q3

Q1	Should V2I communication service be authorised under Section 3(1)(a) of the Telecom Act, 2023?
Answer	YES. Formal authorisation is essential to create a structured ecosystem, ensure accountability, and mandate security/safety standards for V2I services.
(a) Eligibility	Registered Indian entities — government bodies (NHAI, municipalities, state PWDs), licensed telecom operators, and private ITS service providers — with demonstrated technical capability and minimum net worth.
(b) Validity	Initial authorisation period: 10 years. Renewal: 5-year blocks, subject to compliance audit.
(c) Service Area	Three tiers: National (pan-India), Regional (state/highway corridor), and Urban (city/smart city zone). Authorisation should specify tier and geographic boundary.
(d) Scope	Deployment and operation of RSUs; provision of V2I communication services including safety messaging, traffic management, and tolling integration.
(e) Tech/Security	Mandatory: ETSI ITS stack compliance, AIS-189/190 cybersecurity requirements, OBU MTCE certification, integration with India SCMS (IN-SCMS) PKI, and annual security audit.
(f) Other	CIRT should be designated the nodal authority for OBU type-approval under CMVR. All OBUs/RSUs must carry TEC/MTCE certification prior to deployment.

Q2	If Q1 is No — what alternative mechanism should regulate V2I communication?
Answer	Not applicable — CIRT recommends a formal authorisation regime (Q1 = Yes). However, for pilot/trial deployments, a lightweight registration-based notification regime with CIRT as nodal registrar is recommended as an interim measure.

Q3	Other suggestions relevant to V2I communication service authorisation.
1	Designate CIRT as the statutory nodal agency for V2X/V2I — covering OBU type-approval, RSU certification, and compliance oversight under CMVR Rule 126.

2	Mandate AIS-189/190 cybersecurity compliance for all authorised V2I entities and their deployed OBUs/RSUs from Day 1.
3	Create a V2X National Coordination Committee (MoRTH + DoT + MeitY) to ensure cross-ministry policy coherence.
4	All V2I authorisation conditions should reference and align with the forthcoming India C-ITS National Policy (MoRTH) to avoid regulatory fragmentation.

CLUSTER 2 — Technology Standards & Equipment Certification

Q4 to Q6

Q4	Should a specific technology (LTE/NR-based C-V2X) be prescribed for India?
Answer	YES — prescribe NR-based C-V2X (PC5 sidelink, 3GPP Rel.16+) as the mandated technology for new deployments, with LTE C-V2X permitted as a transitional technology for a defined sunset period (e.g., 5 years).
Rationale	NR-V2X delivers superior latency (<10ms), higher reliability, and supports advanced use-cases (autonomous driving, platooning). Korea, EU, and China have all converged on C-V2X. DSRC/IEEE 802.11p should not be adopted — it lacks a credible roadmap and PKI ecosystem.
Interop	Mandate ETSI ITS access-layer compliance for all V2X devices. Issue TEC interface specifications for dual-mode OBUs (LTE+NR) to ease transition.

Q5	Should OBUs and RSUs be brought under MTCE regime?
Answer	YES, unconditionally. OBUs and RSUs must be subject to Mandatory Testing and Certification of Telecom Equipment (MTCE) under TEC/DoT.
Scope	MTCE testing must cover: (i) EMI/EMC per ETSI EN 301 489, (ii) RF conformance per ETSI EN 302 571 (5.9 GHz), (iii) cybersecurity per AIS-189/190 and TEC security guidelines, (iv) V2X protocol conformance testing (BSM, SPAT, MAP, RSA message formats), and (v) ITS stack interoperability.
CIRT Role	CIRT to serve as the designated OBU type-approval authority under CMVR, coordinating with TEC for joint MTCE-plus-CMVR certification to avoid dual-testing burden on OEMs.

Q6	Should the ITS communication stack be standardised? Which standard?
Answer	YES. Adopt ETSI ITS stack (ETSI EN 302 665) as the reference layered communication framework for all layers above the C-V2X access layer. This directly aligns with the DoT Task Force on ITS recommendation for 5.9 GHz use.
Security Layer	Adopt ETSI TS 102 940 (ITS Security Architecture) with IEEE 1609.2 certificate format for V2X message signing. This integrates cleanly with the proposed India SCMS (IN-SCMS).
Application Layer	Mandate SAE J2735 / ETSI TS 102 637 message standards for safety applications (BSM, SPAT, MAP, RSA). Application layer standards for non-safety services to be defined by CIRT in collaboration with other stake holders.
Interoperability	Establish a V2X Plugfest programme under CIRT to certify RSU-OBU interoperability across vendors before field deployment.

CLUSTER 3 — Security Framework & V2X PKI

Q7

Q7	Is a security framework needed for ITS/C-V2X? Who should implement PKI? How to coexist with RCAI?
Answer	YES — a mandatory, sovereign security framework for ITS/C-V2X is essential. Safety messages must be cryptographically signed; unsigned messages must be rejected by all compliant devices.
(a) Framework	Adopt ETSI TS 102 940 as the base security architecture. Mandate: (i) pseudonym certificate-based V2X message signing (privacy-preserving), (ii) misbehaviour detection with certificate revocation capability, (iii) AIS-189/190 compliance for all OBUs/RSUs, and (iv) annual third-party security audits for authorised V2I entities.
(b) PKI Agency	MeitY (via CCA) should serve as the Root CA anchor for India SCMS. Operational layers — Enrolment CA (ECA), Pseudonym CA (PCA), and Misbehaviour Authority (MA) — should be operated by a designated government entity (MoRTH / NIC / C-DoT) with private sector participation permitted at the intermediate CA level.
(c) RCAI Coexistence	V2X PKI should operate as a distinct trust domain from the X.509/RCAI hierarchy. V2X uses IEEE 1609.2 implicit/explicit certificates (not X.509) for privacy-preserving pseudonymity. A cross-recognition agreement between IN-SCMS root and RCAI root allows mutual auditing without technical conflict. No V2X certificate should be issued under RCAI's X.509 chain.

CLUSTER 4 — Spectrum Management

NOTE: These are suggestions and Recommendations only from CIRT side.

Q8 to Q16

Q8	Regulatory framework for 5,875–5,905 MHz spectrum assignment — partitioning, interference, power limits, SACFA, roll-out?
(a) Partition	YES — partition the 30 MHz band: 20 MHz (5,875–5,895 MHz) exclusively for safety applications (Cooperative Awareness, Collision Avoidance, SPAT/MAP); 10 MHz (5,895–5,905 MHz) for operational/non-safety ITS applications.
(b) Sharing	Shared spectrum use (not exclusive allocation) — consistent with EU (ETSI EN 302 571), Korea, and Japan practice. Shared access enables faster nationwide deployment without spectrum hoarding.
(c) Interference	Prescribe: minimum RSU protection distance of 300m (urban) and 1km (highway); maximum transmit EIRP of 33 dBm for RSUs and 23 dBm for OBUs; OOBE limits per ETSI EN 302 571.
(d) RSU Deployment	Mandate SACFA-type prior approval for RSU installation in urban areas and sensitive locations. Simplified corridor notification (30-day deemed approval) for National Highway RSUs.
(e) Power Limits	Adopt DoT Task Force ITS recommendations: RSU max 33 dBm EIRP, OBU max 23 dBm, OOBE per ETSI EN 302 571 Table 4. These values are proven in deployed C-ITS networks globally.
(f) Antenna	RSU maximum antenna height: 10m above road surface for urban, 15m for highway. Directionality: minimum 90-degree beamwidth at 3dB level.
(g) Period	Maximum 10-year spectrum assignment for V2I authorised entities, with mandatory renewal review at Year 7.
(h) Roll-out	YES — prescribe roll-out obligations: minimum coverage of 500 km of National Highway corridors within Year 3; 5 major cities within Year 5 for national authorisation holders.
(i) Surrender	YES — mandatory spectrum surrender provision within 6 months of ceasing operations, with RSU decommissioning obligations.

Q9	Should timelines be prescribed for processing spectrum assignment applications?
Answer	YES. Prescribed timelines are essential to avoid deployment delays.
Timelines	New spectrum assignment application: 60 days from complete application receipt. Renewal: 30 days. DoT should publish standard application templates and a checklist to reduce back-and-forth. Deemed approval after 90 days of silence for highway/corridor applications.

Q10	Other suggestions on spectrum assignment for V2I entities.
1	Reserve 5 MHz within the 5.9 GHz band for future NR-V2X sidelink evolution (Rel.17+) to prevent re-farming costs as technology matures.
2	Coordinate spectrum plan with adjacent countries (Bangladesh, Nepal, Sri Lanka) via ITU to avoid border interference on cross-border highways.

3	Issue clear guidance on coexistence with adjacent Wi-Fi 6E (5.925–7.125 GHz) band to manage guard band interference at the boundary.

Q11	Other regulatory framework issues for V2X communication.
1	Create a V2X Regulatory Sandbox to allow field trials without full authorisation, limited to 50 km corridors, with data-sharing obligations to CIRT.
2	Mandate V2X infrastructure readiness in all new National Highway concession agreements (HAM, BOT) and Smart City Mission deployments from 2026 onwards.
3	Establish an India V2X Data Governance Framework (under MoRTH) to define data ownership, sharing rules, and privacy protections for V2X-generated data.
4	Issue a V2X Import/Export Control policy under DGFT to regulate inbound OBU/RSU devices — mandatory BIS/TEC certification before customs clearance.

Q12	Given V2X's public welfare nature, should spectrum charges be levied?
Answer	NO spectrum charges for safety-application spectrum (5,875–5,895 MHz). These are public safety communications equivalent to emergency services — levying charges creates a perverse disincentive to deploy life-saving infrastructure.
Non-safety	Minimal nominal charges for the non-safety/commercial band (5,895–5,905 MHz) only. A nominal administrative fee (not revenue-linked) would be appropriate.
Precedent	EU, US (FCC), and Korea do not levy spectrum charges on V2X safety band usage. India should adopt a consistent global approach to enable rapid OEM adoption.

Q13	Should spectrum charges follow the DoT 11.12.2023 charging methodology?
Answer	If charges are levied on non-safety spectrum (Q12 above), then yes — apply the DoT 11.12.2023 methodology. The appropriate reference class should be 'Other Wireless Networks / Exempt' — not mobile telecom, given the non-commercial public safety nature of V2X.

Q14	Should spectrum charges be levied as a percentage of AGR?
Answer	If charges apply at all (which CIRT opposes for safety spectrum), then for non-safety services only: maximum 0.5% of AGR. Safety-related revenues must be explicitly excluded from AGR before this calculation.

Q15	If Q13 and Q14 are negative — what is the appropriate spectrum charge methodology?
Answer	Flat annual fee per deployed RSU: Rs 5,000 per RSU/year for non-safety band use. This approach is transparent, proportional to actual deployment, administratively simple, and creates no disincentive to safety deployments.

Q16	Appropriate payment terms for V2I spectrum charges.
Answer	Annual payment cycle. For entities with more than 100 RSUs: quarterly advance billing. For small/startup operators: annual lump sum with 30-day grace. Upfront 3-year prepayment option at 10% discount to incentivise commitment.

CLUSTER 5 — Financial & Revenue Framework

Indicative Only

Q17 to Q26

Q17	What are potential revenue sources for a V2I authorised entity?
1	Value-added ITS services: real-time traffic management data licensed to municipalities, NHAI, and fleet operators.
2	OEM integration fees: V2X connectivity certification and SDK integration fees charged to vehicle OEMs.
3	Tolling and parking integration: V2I-enabled seamless tolling data services (FASTag V2X integration).
4	Emergency services integration: contracts with state governments for emergency vehicle signal preemption services.
5	Government procurement: NHAI/Smart City contracts for RSU deployment, operation, and maintenance.

Q18	Define GR, ApGR, and AGR for V2I authorised entities.
GR	Gross Revenue = All receipts from V2I communication services including subscription fees, data licensing, equipment rental, and integration service fees.
ApGR	Applicable Gross Revenue = GR minus: (i) interconnection charges paid to other operators, (ii) roaming pass-through payments, (iii) GST/indirect taxes collected on behalf of government.
AGR	Adjusted Gross Revenue = ApGR minus: (i) revenues from safety-critical V2X services (BSM, SPAT, collision avoidance), (ii) government grants and viability gap funding, (iii) proceeds from equipment sales (not services). AGR should be service-revenue only.

Q19	Revenue components to include/exclude from GR/ApGR/AGR for authorisation fees or spectrum charges.
Include	Subscription fees from commercial ITS services; data licensing revenue; OEM integration fees; tolling/parking integration fees; fleet management data revenue.
Exclude	Safety BSM/SPAT message service revenues; government grants and subsidies; equipment sales revenue; revenues from services outside the authorisation scope; passive infrastructure sharing receipts.

Q20	Should safety-related V2X revenues be excluded from AGR?
Answer	YES — unambiguously. Safety V2X services (BSM-based collision avoidance, SPAT/MAP intersection management, emergency vehicle preemption, road hazard warnings) are non-commercial public safety communications. Including them in AGR would penalise safety deployment.

Precedent	Emergency services (PSTN-to-PSAP calls) are similarly excluded from telecom operators' AGR. The same logic applies with equal force to V2X safety services.
Definition	DoT should publish a specific list of safety message types (referencing SAE J2735 DSRC Message IDs) whose associated revenues are AGR-exempt, to provide legal certainty.

Q21	Appropriate entry fee for V2I communication service authorisation.
National	Rs 1,00,000 (one lakh) for national V2I authorisation.
Regional	Rs 25,000 for state-level or corridor-specific authorisation.
Public sector	Nil entry fee for government entities (NHAI, municipalities, state PWDs) — consistent with their public mandate.
Rationale	Fees should be nominal to encourage ecosystem entry. V2X infrastructure is nascent; punitive entry fees would suppress deployment.

Q22	Appropriate bank guarantee terms for V2I communication service authorisation.
National	Performance bank guarantee: Rs 10,00,000 (ten lakh) for national authorisation.
Regional	Rs 2,00,000 for state/corridor authorisation.
Reduction	Bank guarantee reducible by 50% after 3 years of satisfactory operation and compliance audit. Full release upon authorisation expiry if no outstanding obligations.
Public sector	Government entities: no bank guarantee required.

Q23	Minimum equity and net worth requirements for authorised entities.
National (equity)	Minimum paid-up equity: Rs 2 crore.
National (net worth)	Minimum net worth: Rs 5 crore at the time of application.
Regional	Minimum equity: Rs 50 lakh; minimum net worth: Rs 1 crore.
Exemption	Government entities and PSUs: waived. Startups (<3 years old, DPIIT-recognised): 50% relaxation for regional authorisations.

Q24	Appropriate application processing fee for V2I authorisation.
National	Rs 10,000 per application.
Regional/Corridor	Rs 5,000 per application.
Government entities	Nil.
Renewal	Rs 5,000 flat (national); Rs 2,500 (regional). No escalation — fees should not create renewal barriers.

Q25	Appropriate authorisation fee rate for V2I communication service authorisation.
Safety-only	0% authorisation fee for entities providing exclusively safety V2X services.
Mixed/Commercial	0.5% of AGR per year for entities providing both safety and commercial V2I services.
3-year moratorium	Zero authorisation fee for all new entrants during first 3 years of authorisation, to catalyse ecosystem investment.
Rationale	V2X infrastructure competes with road construction investment — low fees are justified by the public good generated (accident reduction, fuel savings, emissions reduction).

Q26	Other financial terms and conditions for V2I communication service authorisation.
USO Fund	V2I authorised entities should be exempt from USO Fund contribution given their public safety mandate and thin commercial margins.
Investment incentive	Recommend DoT/MoRTH coordinate with MoF for capital subsidy or viability gap funding (VGF) for highway RSU deployments — analogous to telecom tower VGF in underserved areas.
Foreign investment	100% FDI under automatic route for V2I infrastructure entities, to attract global technology capital and technology transfer.
Make in India	Mandate a phased domestic value addition (DVA) target for OBUs and RSUs: 25% DVA by Year 3, 40% by Year 5 — linked to PLI scheme eligibility.

CIRT — Central Institute of Road Transport

This response is submitted in the public interest to advance India's V2X ecosystem. CIRT is available for technical clarifications and oral presentation before the regulator.