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Date: 4th June 2026

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Advisor (Networks, Spectrum and Licensing)
Telecom Regulatory Authority of India
4th, 5th, 6th & 7th Floor, Tower-F,
World Trade Centre, Nauroji Nagar,
New Delhi: 110029

Subject: **TRAI Consultation Paper on the Regulatory Framework for Vehicle-to-Everything (V2X) Communication**

Dear Sir,

Qualcomm sincerely thanks the Telecom Regulatory Authority of India (TRAI) for the timely release of its consultation paper on the Regulatory Framework for Vehicle-to-Everything (V2X) Communication dated 30th April 2026, and for inviting stakeholder input. This proactive step reinforces TRAI's commitment to shaping India's road safety future through informed and inclusive policymaking.

As a nation, India must refuse to treat road fatalities as inevitable. Every crash leaves a family shattered, and every loss is preventable with the right choices. What is required is disciplined execution of V2I, supported by predictable, uncompromising enforcement. As a global leader in wireless innovation and a pioneer in C-V2X technology, Qualcomm welcomes the opportunity to contribute to this consultation and ensure that TRAI's decisions are guided by global best practices, technical depth, and a forward-looking vision for India's road safety and ITS leadership.

Key recommendations in our attachments, in addition to the response to Questions, include

- V2I are predominantly road safety broadcast transmissions (beacons) and are part of ITS.
- M2M Registration Guidelines already include ITS as one of the categories of applications
- Consider safety of life on roads and improved traffic management, we have proposed modifications to the “Guidelines for Registration Process of M2M Service Providers(M2MSP) & WPAN/WLAN Connectivity Providers for M2M Services” to support Road Safety Beacon as ITS safety applications using V2I (Road Side Units) using ITS/V2X Spectrum identified in NFAP in license-exempt mode.

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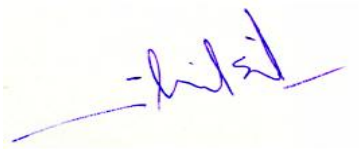
Kindly contact me at jitendra@qti.qualcomm.com (mob-9871115660) with any questions or if Qualcomm can be of further assistance.

Sincerely,



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Attachments:

- Attachment 1 - Executive Summary
- Attachment 2 - Response
- Attachment 3 - Proposed modifications to the M2M Registration Guidelines

ATTACHMENT 1

Explanatory Note on V2I (Road Safety Beacon)

Executive Summary:

- As a nation, India must refuse to treat road fatalities as inevitable. Every crash leaves a family shattered, and every loss is preventable with the right choices. What is required is disciplined, district-level execution of V2I - supported by predictable, uncompromising enforcement. When compliance becomes the norm, road safety will shift from aspiration to measurable outcomes.
- The decision to keep **On-Board Units (OBUs)** as **licence-exempt** is a significant welcome step. This is essential for rapid mass-market adoption, safety impact at scale, and interoperability. OBUs are part of V2V communications and the inter-ministerial committee has already taken a regulatory decision for that. This information is also reflected in Annexure I of TRAI consultation paper under discussion.

- For **Road Side Units (RSUs)**, which are expected to have the same transmit power levels, we recommend an approach similar to EU with **general authorization or license-exemption** for safety of life devices Further, a distributed model based on modified M2M Service Provider guidelines for **RSU** as a **light-touch authorisation control** (traceability, security governance, accountability and interference resolution), **without** conferring any geographic exclusivity or exclusive spectrum rights.

- Vehicle-to-Infrastructure (V2I) transmissions for **road safety needs** to operate in license-exempt spectrum recognizing the need to prioritize **safety of life**. **The M2M Service Provider Registration Guidelines issued by DoT vide No. 4-10/2015-NT dated 08.02.2022** may be appropriately amended to include a Road Safety Beacon (RSB) provider tailored for road safety needs. This approach eliminates traditional financial burdens, focusing only on compliance and registration. The result is a regulatory structure that supports fast, inclusive, and secure RSB deployment.

- A revised draft of ***"Guidelines for Registration Process of M2M Service Providers (M2MSP) & WPAN/WLAN Connectivity Providers & Road Safety Beacon Providers for M2M Services"*** is attached as an annexure for consideration of the Authority for an early implementation.

- **Key technical distinction (EIRP → range):** ITS RSUs are for **low(er) EIRP** and **short-range, high spatial reuse** along roads/intersections, so their interference footprint and effective service range are **drastically smaller** using omni-directional antennas and short duty-cycle (2-4%) transmissions than typical administratively licensed land mobile / maritime / broadcast systems designed for **wide-area coverage** with higher power, directional / beamformed and elevated antennas with high duty cycle transmissions. This fundamental difference warrants a **non-exclusive, shared-spectrum** regulatory treatment for RSUs.

- The **5.9 GHz ITS band** should be administered on a **shared, non-exclusive basis** with clear **technical conditions** (EIRP/OOBE, channel access/congestion control, standards conformance) as conditions attached to the **authorisation**, consistent with global ITS regulatory practice (CEPT/ECC, ACMA, FCC, Ofcom).

Detailed Explanatory Note

1 Technical Basis for RSU

This section provides technical basis to help understand the use-cases, typical emissions, coverage range and the implicit need to allow for overlapping coverage range.

1.1 C-V2X technical overview

For the purpose of this consultation paper, this section will focus only on short-range, low-power, direct mode of communication using the 3GPP PC5 interface operating in the 5.9 GHz. For the sake of completeness, there is a complementary mode of communication using traditional cellular network using the 3GPP Uu interface, but mostly useful for information (delay tolerant) messages.

The consultation paper background already acknowledges (in §2.4, 2.5 and 2.24) and highlights the two modes of communication as highlighted below:

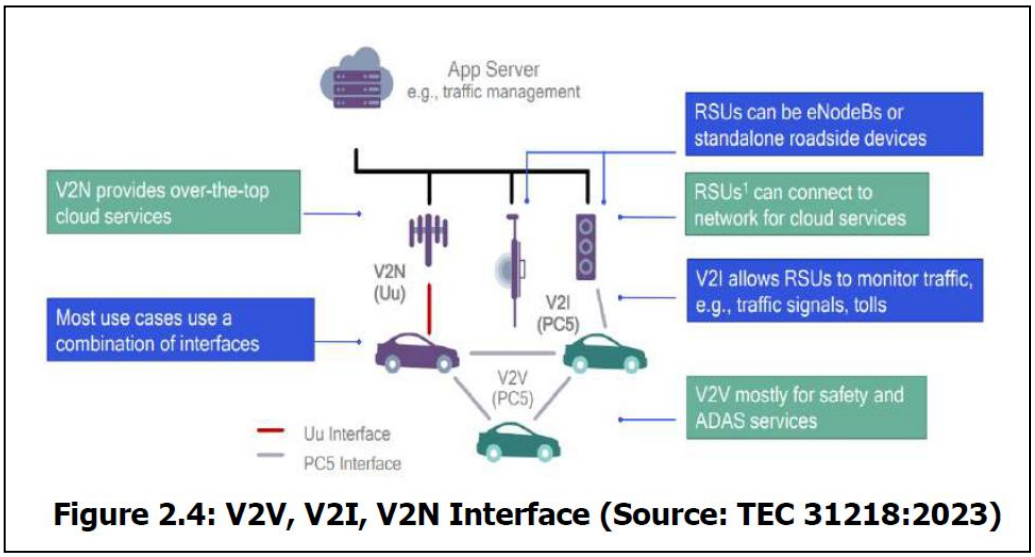

Figure 2.4: V2V, V2I, V2N Interface (Source: TEC 31218:2023)

Technically, both OBU (V2V) and RSU (V2I) follow similar device categories in 3GPP specifications.

1.2 Emission Limits (EIRP) and technical standards

- 3GPP TS 36.101 — E-UTRA User Equipment (UE) radio transmission and reception
  - Applies to both OBU and RSU when implemented as a UE-type device (sidelink-only UE).
  - This technical specification document specifies.
    - Maximum conducted transmit power (Power Classes)
    - Occupied bandwidth

        - Spectrum emission mask (SEM)
        - Adjacent Channel Leakage Ratio (ACLR)
        - Unwanted emissions / spurious emissions
        - Transmit signal quality (EVM)
    - Key point to consider is that
        - LTE-V2X OBUs and RSUs inherit only the UE power classes, not base-station power classes
        - Power limits are conducted power at antenna port, not EIRP
        - No RSU-specific higher-power class exists in 3GPP
- 3GPP TS 36.331 — RRC protocol specification
    - Applies to both OBU and RSU devices.
    - While this spec does not define limits, it controls how emissions are scheduled on aspects like:
        - Configuration of **sidelink resource pools**
        - Scheduling parameters for:
            - SPS
            - Autonomous sidelink transmission (Mode 4)
        - Time/frequency allocation affecting spectral usage
- 3GPP TS 36.213 — Physical layer procedures
    - Applies to both OBU and RSU
    - Specifies Emission relevant topics including procedural constraints that affect emissions:
        - Sidelink power control formulas
        - PSCCH / PSSCH transmission rules
        - Maximum power per subframe
        - Resource reservation procedures influencing channel occupancy
- 3GPP TS 36.521-1 — UE conformance tests for LTE-V2X
    - Verifies SEM, spurious emissions, ACLR, power. Basically translating the TS 36.101 requirements into measurable emission limits.

In summary RSUs are short-range sidelink UEs, emission-wise identical to OBUs. There is no technical basis grounded in 3GPP standards to subject RSUs to individual spectrum licensing or anything that looks-like base-station-class regulation. There is strong 3GPP standards evidence to treat OBU and RSU as identical, at-least from emission and conformance test perspective.

1.3 Coverage Range (distance)

Independent testing by Crash Avoidance Metrics Partners (CAMP) LLC in both Line of Sight and Non-Line of Sight situations has resulted in the following conclusions

- LoS range: 1175m
- Non-Line-of-Sight (NLOS) Blocker: ~ 625m

- Non-Line-of-Sight (NLOS) Intersection: 875m

Given the above, even at maximum permitted EIRP for RSU, the coverage range is typically of intersection-scale, corridor-scale and not comparable with ranges typically seen in PMRTS kind of systems that are much larger (e.g., city level).

1.4 Exclusivity of Coverage

RSUs are intentionally engineered as short-range broadcast nodes to support location-specific safety use-cases such as intersections, merges, and work zones. Limited RF range enables high spatial reuse in shared spectrum, ensures message relevance aligns with physical hazard zones, and avoids base-station-like wide-area behavior. Overlapping RSU coverage is both inevitable and desirable due to road geometry, occlusion, and multi-jurisdiction deployment ensuring correct message selection. Consequently, RSU deployment is hotspot-driven rather than nationwide blanket coverage, fully consistent with a shared, non-exclusive spectrum model.

A. RSU coverage is overlapping by design (radio + system architecture)

RSU coverage is inherently shared and overlapping because RSUs are short range broadcast beacons, optimized for spatial reuse, reliability under blockage, and geofenced messages (not exclusive service areas).

- RSUs broadcast localized safety/traffic messages (e.g., SPaT/MAP, work zones, merge alerts).
- Unlike cellular, there is no user association and no subscriber-coverage obligation;
- At 5.9 GHz (~2W EIRP), RSU footprints are typically hundreds of meters (intersection/segment scale), which enables dense deployments and spatial reuse
- Depending on situation, real roads face blockage and multipath (trucks, flyovers, curvature, foliage).

B. Use-case driven examples of overlapping RSU range (real road scenarios)

Real roads routinely require multiple RSUs with overlapping footprints (jurisdiction boundaries, merges, vertical separation, adjacent junctions, temporary work zones). Vehicles can receive multiple messages and apply them by location/context.

- For example, when a city road is closed for utility works and traffic diverts to a nearby highway on ramp, a RSU installed on the city-road can broadcast closure/detour for the specific driven road while an NH RSU provides ramp merge and queue warnings. Vehicles will hear both within the junction influence area
- As another example. work zone temporary RSU overlapping permanent RSU: During a short term lane closure (e.g., two weeks) on a patch of road that already has a permanent RSU, a portable work zone RSU may be added at the work zone start while the permanent RSU continues its normal messages.

C. Nationwide geographical RSU coverage is NOT required (by use-case logic)

RSUs are needed selectively—where infrastructure has actionable intelligence and risk hotspots exist. Ubiquitous national blanket coverage is unnecessary and operationally unrealistic.

1.5 Communication Mode – Predominantly broadcast

1.5.1 Networking Layer (GeoNetworking – EN 302 636-4-1)

GeoNetworking primarily operates using **GeoBroadcast**, where packets are disseminated to all nodes within a geographic area. Communication is driven by **location relevance rather than node-specific addressing**, resulting in predominantly **one-to-many broadcast transmission** aligned with safety use cases.

1.5.2 Transport Layer (BTP – TS 102 636-5-1)

BTP is a **connectionless, low-latency transport protocol** designed for **broadcast delivery**. It supports application multiplexing without session establishment or acknowledgements, reinforcing a **stateless, broadcast-oriented communication model**.

1.5.3 Application Layer (CAM/DENM – EN 302 637 series)

Applications are inherently **broadcast-based**:

- **CAM**: periodic broadcast of vehicle state
- **DENM**: event-driven broadcast of hazards
  Both are designed for **simultaneous reception by all nearby nodes**, with no reliance on unicast.

1.5.4 Radio Layer (3GPP LTE-V2X PC5)

LTE-V2X PC5 provides a **native broadcast/groupcast sidelink**, enabling **simultaneous multi-receiver communication** with scheduled resource allocation (Mode 3/4). It acts as a **broadcast bearer** for ETSI ITS messages.

In summary, across all layers—networking (GeoNetworking), transport (BTP), application (CAM/DENM), and radio access (LTE-V2X PC5)—the ITS architecture is **explicitly optimized for broadcast and geographically scoped multicast communication**, rather than point-to-point unicast. This ensures that safety-critical information is disseminated efficiently to all relevant participants within a given area, fully leveraging the broadcast capabilities of the underlying LTE-V2X sidelink. As a result, in the baseline Day-0/Day-1 deployments, and the entire protocol stack operates as a **broadcast-first system aligned with geographic relevance and collective situational awareness**.

1.6 Summary of technical considerations

Comparing this with other kinds of radio stations mentioned by TRAI Consultation Paper in its Annexure V:

System type	Typical regulatory power	Channel Bandwidth	Application	Spectrum Usage Model	Duty Cycle	Antenna height	Typical coverage range
ITS RSU (V2X safety)	≤ 2 W EIRP (33 dBm)	20 MHz	Low latency safety beacons	Shared (broadcast)	2-4 %	5–7 m	1 – 1.5 km
Vehicle-mounted LMRS / PMRTS radio	10–25 W conducted (40–44 dBm)	12.5 / 25 kHz	Voice + dispatch over long range	Coordinated / Exclusive	5-10%	1–2 m	2 – 10 km
PMRTS base / control station	25–100 W conducted (44–50 dBm)					15–50 m	10 – 40 km
Maritime VHF mobile (ship)	25 W conducted	25 kHz	Long range distress & coordination			5–20 m	20 – 50 km
Maritime coast station	25–50 W + high gain					30–100 m	50 – 100+ km
Community Radio Station (Broadcast)	25–100 W ERP (case by case	200 kHz (FM)	Local community broadcasting (education, public information)	Coordinated / Assigned (Exclusive within coverage)	100%	15–30 m AGL (typ. CRS limits)	5–15 km
Low-power Studio equipment (microphones / PMSE)	10–50 mW ERP (band dependent)	100 kHz – 200 kHz	Short-range audio links (broadcast, events, theatres)	Shared License exempt in notified bands / Coordinated in protected bands	100%	1-3m	50-200m

In summary, at a technical level, RSU operating at 2 W EIRP in a 10–20 MHz ITS/V2X channel provides only localized, intersection-scale coverage (≈ 100–600 m), comparable to vehicle OBUs constrained by low transmit power, elevated but limited antenna height, and wideband safety-oriented waveforms. In contrast, this is orders of magnitude smaller than licensed land-mobile or PMRTS systems. Such systems that may also have commercial usages, operate at significantly higher powers with elevated antennas, providing coverage over several kilometres to tens of kilometres and therefore necessitating coordinated, individually licensed spectrum.

From a pure radio-engineering perspective, ITS RSUs are fundamentally incapable of wide-area coverage and cannot be equated with PMRTS or maritime communication systems for licensing purposes.

This should be taken into account to technically preclude any need for individual spectrum licensing.

2 Regulatory considerations for low-power short range

2.1 Analysis of administratively licensed class of applications quoted in the TRAI Consultation Paper

2.1.1 PMRTS / land mobile radio trunking (LMR)

- PMRTS is a trunked two-way group communications model (push-to-talk, one-to-many), using dynamic channel allocation for spectrum efficiency—this is the canonical global "LMR trunking" design pattern for utilities, transport, industrial operations, and emergency coordination.
- TRAI's royalty illustration uses link-distance buckets (e.g., up to 30 km and 60 km) tied to per-channel charges—this is useful as a regulatory proxy for "typical engineered link spans" in PMRTS planning.
- PMRTS utilizes administratively assigned (channels assigned per geography / operator) with coordination expectations and licensing obligations.

2.1.2 Maritime mobile service: ship/coast VHF + GMDSS

- The maritime domain uses VHF radiotelephony and safety procedures integrated into the GMDSS architecture.
- DoT/WPC provides Maritime Mobile Station License (MMSL) for "owning and operating a Maritime Mobile Station" used on ships/vessels.
- ITU-R Recommendation M.489-2 specifies (for 25 kHz maritime VHF equipment): ship station carrier power ≤25 W (with a means to reduce to ≤1 W for short range), and coast station carrier power typically ≤50 W, along with 25 kHz channelization and FM emission characteristics.
- Range/coverage is primarily line-of-sight and thus driven by antenna heights; a generic LOS-range relationship is widely used in aviation VHF testing references and is directionally applicable to VHF LOS systems.
- Maritime comms is safety-critical: channels are shared operationally by many users but under strict procedures, priority, and licensing.

2.1.3 Aeronautical mobile service: VHF airband + aircraft station licensing

- Civil aviation uses VHF voice communication in 118.000–136.975 MHz, primarily AM, and is LOS-limited.
- DoT/WPC issues an Aero Mobile Station Licence (AMSL) for airborne communication systems on aircraft; and is required to ensure compliance with national/international aviation and telecom regulations.
- Typical commercial aircraft VHF output power is ~25 W and provides LOS range.

- Smaller/general aviation, commercial avionics may use ~16 W class radios.
- Aeronautical spectrum is highly coordinated and safety-critical; sharing is procedural (ATC channel reuse by geography/altitude).

2.1.4 Community Radio Service (CRS): licensing + technical constraints

- Community radio is typically low-power FM broadcasting intended to serve localized communities, often with restrictions on content/ownership and a focus on local participation—globally it sits in the broadcasting regime but is often "low-power" relative to commercial broadcasters.
- India's community radio guidance indicates that the Ministry of I&B processes applications and coordinates with WPC for frequency availability; after allotment, stations obtain SACFA clearance and a Wireless Operating Licence (WOL) from WPC.
- The (legacy) MIB guideline document states CRS licences will be granted for FM transmitters of 50 W or less and typically in a shared FM segment (document references 87.5–100 MHz).
- TRAI's low-power FM consultation paper (which discusses CRS context) notes that CRS interference management is tied to ERP and antenna height, and cites CRS guidelines allowing max ERP of 100 W (and potentially higher ERP up to 250 W case-by-case), with antenna height up to 30 m AGL (and minimum 15 m) in the CRS interference-avoidance context.
- CRS uses administrative channel assignment (frequency "spots" / separation distances / coordination), i.e., not open licence-exempt usage, because the service is broadcasting and interference impact is broad.

2.1.5 Low-power studio equipment (PMSE) — focusing on wireless microphones

- Studio/production wireless (PMSE) typically includes wireless microphones, in-ear monitors, talkback, etc. Globally, administrations often allocate shared PMSE sub-bands with coordination, and in some countries allow certain licence-exempt ultra-low-power mic bands.
- Where microphones operate in licence-exempt bands, the ETA pathway is central: DoT's ETA page explicitly includes microphones among commercial/finished short-range devices that may be approved for licence-exempt band operation via self-declaration (subject to conditions).

- Where microphones operate outside licence-exempt bands (e.g., in bands shared with broadcasting services)

2.1.6 UHF Short-Range Radio / SRDs

- This category covers "short range" devices used for IoT, RFID, telemetry, low-power communications, and certain personal/enterprise short-range radios.
- Within India, these often operate licence-exempt but under strict technical limits and non-interference / non-protection / non-exclusive conditions.
- Examples:
    - 865–867 MHz (RFID + other low-power devices): licence exemption applies on non-interference, non-protection, non-exclusive basis with max 1 W transmitter power, 4 W ERP, and 200 kHz carrier bandwidth.
    - Medical devices: 402–405 MHz medical implant / remote cardiac monitoring systems (licence exempt; SRD rules).
    - Automotive & transport: 433.05–434.79 MHz keyless entry / immobilisers (10 mW ERP; licence exempt).
    - Automotive radars: Draft rules for 77–81 GHz short range automotive radar for ADAS (formally de licensed by DoT; shared, non exclusive).

2.2 Regulatory consideration of Framework without requiring individual licensing for shared and non-exclusive spectrum use

2.2.1 Class Licence Framework

A Class Licence is a regulatory authorisation under which a defined class of users or devices is permitted to operate in specified frequency bands without the need for individual, site-specific, or frequency-specific licences, provided that all prescribed technical, operational, and compliance conditions are met.

Key characteristics may include:

- No individual spectrum assignment to users or installations
- Non-exclusive, shared spectrum access
- Uniform technical conditions (e.g., EIRP limits, duty cycle, emission masks, antenna constraints)
- No protection from interference, and obligation to accept interference from other compliant users
- Enforcement is achieved through equipment conformity, not spectrum licensing

Regulatory Objective The Class Licence framework is designed to:

- Enable mass-scale deployment of standardized technologies
- Minimise administrative burden and transaction costs

- Encourage innovation, interoperability, and rapid rollout, especially for consumer, industrial, and safety devices

Typical Applications

- Short-Range Devices (SRDs)
- IoT and sensor networks
- Automotive safety and radar systems
- Medical implants and assistive devices
- Intelligent Transport System (ITS) beacons
- Regulatory Principle

Under a class licence regime, compliance with technical rules substitutes for individual licensing, and spectrum discipline is achieved through technology design, not operator permission.

2.2.2. General Authorization (GA)

General Authorization is a regulatory framework under which any entity may operate wireless equipment in designated bands as a matter of right, subject only to ex-ante compliance with published rules, rather than ex-ante approval by the regulator.

Key Characteristics

- Automatic legal authorisation upon use (no licence grant event)
- Technology-neutral access, open to all compliant users
- Shared and non-exclusive spectrum use
- Emphasis on self-compliance and post-market enforcement
- Often accompanied by equipment conformity assessment or type approval

Regulatory Objective General Authorization is intended to:

- Treat spectrum access as a public permission, not an administrative entitlement
- Avoid regulatory bottlenecks where individual coordination provides no added value
- Support pan-regional harmonisation and economies of scale

Typical Applications

- Licence-exempt bands in CEPT/EU systems (SRDs, RLANs, ITS-G5)
- Automotive radar and vehicle safety sensors
- Fixed, low-impact safety infrastructure
- Wireless charging, RFID, and telemetry systems

Under General Authorization, spectrum access is presumed lawful by default, and regulatory intervention is limited to cases of non-compliance or harmful interference.

2.2.3. Licensed-by-Rule Framework

Licensed by Rule is a regulatory construct under which a licence is deemed to exist by operation of law, without issuance of an individual licence document or assignment, as long as the user operates strictly within the scope of predefined regulatory rules.

Key Characteristics:

- No individual application or grant, yet legally classified as “licensed”
- Rights and obligations are embedded in the rules themselves
- Shared spectrum access, often within a specific service category
- Allows regulators to retain service-level control without individual licensing

Regulatory Objective Licensed-by-Rule frameworks are used where regulators wish to:

- Preserve service identity or service classification (e.g., maritime, ITS)
- Avoid individual licensing overhead
- Maintain clarity of legal authority and enforcement

Typical Applications

- Certain shared land-mobile or transport safety services
- ITS-related operations in specific jurisdictions
- Transitional frameworks between licensed and licence-exempt regimes

Licensed-by-Rule preserves the legal character of licensing while eliminating the administrative mechanics of individual licences.

2.2.4. Comparison of different approaches

Aspect	**Class Licence**	**General Authorization**	**Licensed-by-Rule**
Individual licence required	❌	❌	❌
Licence exists in law	Notional	No	Yes (by rule)
Exclusivity	❌	❌	❌
Protection from interference	❌	❌	Limited / service-specific
Compliance focus	Equipment + use	Equipment + use	Rule-based service obligations
Best suited for	Mass-scale SRDs & safety devices	Open shared innovation bands	Shared services retaining service identity

To summarize, modern spectrum policy distinguishes between individual licensing, which is reserved for services requiring exclusivity, coordination, or operator-specific accountability,

and rule-based authorization frameworks—namely Class Licences, General Authorization, and Licensed-by-Rule—which enable shared, non-exclusive spectrum access through predefined technical and operational conditions.

These frameworks deliberately replace individual spectrum assignments with equipment conformity and rule compliance, and are globally recognised as the appropriate regulatory treatment for standardized, low-interference, and safety-critical technologies deployed at scale.

ATTACHMENT 2

Response to TRAI Consultation Paper on the Regulatory Framework for Vehicle-to-Everything (V2X) Communication

1 Examination of Issues Related to the Service Authorisation Framework and Assignment of Spectrum

Q1. Whether there is a need to introduce an authorisation for vehicle-to-infrastructure (V2I) communication service under Section 3(1)(a) of the Telecommunications Act, 2023? If yes, please provide input with respect to the following aspects:

(a) Eligibility conditions for the authorisation;

(b) Period of validity of the authorisation and conditions for its renewal;

(c) Service area of the authorisation;

(d) Scope of service of the authorisation;

(e) Technical, operating, security related conditions etc. of the authorisation;

(f) Any other related aspect. Kindly provide a detailed response with justification.

Response:

- RSUs should be enabled under a **General Authorisation** approach similar to ECC/DEC/(08)01 with **no individual station licensing**,
- **No** dedicated V2I/RSU **authorisation** in the sense of an **exclusive, geographically protected license** is **required**.
- RSUs should be enabled through an **implied-authorisation approach** under **Section 3(3) and Section 4(6) of the Telecommunications Act, 2023**, recognising that V2X safety messaging is inherently **broadcast** and the spectrum use is **shared and non-exclusive**.

> *Indian Telecommunications Act, 2023, Section 3(3):*
> *"3(3) The Central Government, if it determines that it is necessary in the public interest so to do, may provide exemption from the requirement of authorisation under sub-section (1), in such manner as may be prescribed."*
>
> *Indian Telecommunications Act, 2023, Section 4(6):*
> *"4(6) The Central Government, if it determines that it is necessary in the public interest so to do, may exempt,—*
> *(a) from the requirement of assignment under sub-section (2), in such manner as may be prescribed; and*

(b) by notification, specific usages within specified frequencies and parameters, from the requirements of sub-section (2).”

- International practice supports this: ITS is typically enabled through **general authorisation / class licensing** or **license-by-rule** constructs with **harmonised technical conditions** rather than per-site exclusive licensing (e.g., **CEPT/ECC Decision (08)01**; **ACMA ITS Class License**; **FCC ITS framework**; **Ofcom SRD license-exemption principles**).
- **This General Authorization is expressly without prejudice to shared access; it does not constitute assignment of spectrum conferring exclusivity or interference protection under the Telecommunications Act, 2023.**

Q2. In case your reply to Q1 is no, what should be the mechanism for enabling, facilitating and regulating vehicle-to-infrastructure (V2I) communication service in India? Kindly provide a detailed response with justification.

Response:

- This should be light-touch approval or permit framework to reduce ecosystem friction.
- **Mechanism:** Enable RSUs under a **Class Licence / General Authorisation** framework (no individual station licensing), with **published technical conditions** applicable to all compliant deployments.
- **Governance (not licensing):** Require **RSU registration** (operator + site details) in a M2M Service registry for governance, accountability. **Registration must not be considered as a permission step** and must not confer exclusivity.
- **Scope of any “permit”:** Any permissions should be limited strictly to **civil right-of-way / mounting / safety approvals by the road authority** (analogous to placing traffic signals/signage) and **must not be framed as telecom/spectrum authorisation**.
- **Eligibility:** Road authorities/road operators and their authorised integrators may register RSUs, consistent with RSUs being **road infrastructure** (not a telecom service).
- For the purpose of safety of life on roads, the M2M Service Provider guidelines by Ministry of Communication must be amended to introduce a new category of **Road Safety Beacon provider** that is applicable for Road Side Unit (RSU) deployments providing V2I application using the license-exempt (General Authorization) spectrum.
- **This registration is expressly without prejudice to shared access; it does not constitute assignment of spectrum conferring exclusivity or interference protection under the Telecommunications Act, 2023.**

Q3. Any other suggestions relevant to the authorisation for vehicle-to-infrastructure (V2I) communication service may be submitted with proper explanation and justification.

Response:

- Establish a registry-based governance mechanism under the **Class Licence / General Authorisation** framework:

    - RSU location (geo-coordinates/road segment), operator contact, device compliance attestation (EIRP/OOBE/standards), and security credential policy identifiers.
- Also, for future enablement of enhanced V2I traffic safety services (and applications from the cloud), having a unified framework and common standards is beneficial
- Establish a clear technical compliance test to ensure technical testing without requiring individual licensing.
- The registry, if any at local body level, must be expressly **non-rights-conferring**: registration shall **not** create any exclusive spectrum entitlement or protection claim; operation remains on a **shared, non-exclusive** basis subject to technical conditions.

Q4. Whether a specific technology (such as LTE-based C-V2X, NR-based C-V2X etc.) should be prescribed for the implementation of C-V2X in India? If yes, which technology should be adopted for the implementation of C-V2X? If no, in what manner, the issues related to inter-operability between different technologies should be addressed? Kindly provide a detailed response with justification.

Response:

- Avoid prescribing a single technology in the authorisation. Maintain **flexibility** while ensuring interoperability via standards, conformance profiles and testing.
- From an engineering maturity perspective, **LTE-V2X (20 MHz channels)** is well-suited for initial nationwide safety deployments.
- **NR-V2X** should be permitted for advanced use-cases, encouraging trials / pilots / and early implementation, with coexistence ensured via standards-based mechanisms.
- Interoperability between different vendors and implementations for **basic-safety** using **LTE-V2X** should be ensured by adopting **common message sets**, **security framework**, and **compliance test profiles**.

Q5. Whether there is a need to bring road-side units (RSUs) and on-board units (OBUs) under the regime of Mandatory Testing Certification of Telecom Equipment (MTCTE)? If no, in what manner, Electromagnetic Interference (EMI), Electromagnetic Compatibility (EMC), safety, technical and security requirements prescribed by TEC/ DoT may be ensured? Kindly provide a detailed response with justification.

Response:

- MTCTE is an important process.
- Focus on minimizing certification overheads.
- Preference for self-certification.
- Since it is expected that both OBUs and RSUs will be deployed in delicensed spectrum band, only Equipment Type Approval (ETA) by TEC should suffice.
- Focus on standards compliance and RF emission compliance.

Q6. To ensure inter-operability among different RSUs/ OBUs, whether there is a need to standardize the layered communication framework (stack) for higher layers (other than the access layer in which C-V2X will be used) of Intelligent Transportation System (ITS)? If yes, which standard for ITS

stack and security should be adopted? Specifically, whether the ETSI standard for ITS stack and security, as recommended by the Task Force on Intelligent Transportation System for the use of 5.9 GHz (mentioned at para 3.5 of this consultation paper) should be adopted? If no, in what manner, inter-operability among different RSUs/ OBUs can be ensured? Kindly provide a detailed response with justification.

Response:

- Yes. Interoperability requires standardization above the access layer (**message sets, facilities/networking, and security**).
- A common ITS stack avoids fragmented deployments and ensures that safety broadcasts are universally decodable by compliant receivers.
- Adopt the Task Force recommendations as baseline.
- Maintain conformance profiles and plugtests to validate multi-vendor interoperability across RSUs and ecosystems.
- Security should follow an internationally recognised V2X security framework (IEEE 1609.2 style) with clear certificate policies and misbehaviour reporting procedures, integrated with RSU registration for auditability.
- Agree with FINAL Report and Recommendation of Task Force on ITS
- Propose LTE-V2X for Radio Layer
- Propose ETSI TC ITS Rel.2 for support of 20 MHz for the message-set

Propose IEEE 1609.2 based SCMS with support of multiple root CAs for implementation flexibility.

Q7. Whether there is a need for prescribing a security framework for ITS/ C-V2X in India? If yes,

(a) What should be the security framework for ITS/ C-V2X?

Response:

- A national PKI framework for V2X consistent with the recommendation of Task Force on ITS is required.
- The framework should include: **PKI governance** (root-of-trust), **certificate policy**, enrolment/authorization credentials, **revocation**, and **auditability via RSU registration**.

(b) Which agency [such as Controller of Certifying Authorities (CCA), Ministry of Electronics & Information Technology (MeitY)] should implement the Public Key Infrastructure (PKI) framework for ITS/ C-V2X in India?

Response:

- The implementing agency should operate the national root of trust and policy controls, with operational delegation to accredited entities as required for scale and resiliency.

- CCA/RCAI under MeitY may be best-suited for central root of trust.
- Preferably have a national policy level recognition of IEEE 1609.2 based ITS Security Root CA

(c) How to ensure coexistence of V2X PKI certificates with the legacy PKI mechanism in India i.e. based on X.509, operated by Root Certifying Authority of India (RCAI)?

Response:

- Maintain a V2X-domain security architecture with defined interworking boundaries at policy/root level only, avoiding unnecessary coupling of end-device certificate processing; ensure governance is enforceable via certificate policy.
- Preferably have a national policy level recognition of IEEE 1609.2 based ITS Security Root CA
- Essential to have V2X Security certificates within the ITS-domain only based on V2X security. Interworking, if any, with X.509, to be limited only at Root CA level and not percolate to end-devices (e.g., RSUs).

Q8. What should be the regulatory framework for the assignment of frequency spectrum to the entities holding the proposed V2I communication service authorisation? Specifically,

(a) Whether there is a need for partitioning the 30 MHz spectrum (5,875-5,905 MHz) for specific applications such as "safety applications" and "operational applications (non-safety applications)"?

Response:

- Entire range to be harmonized in India for road safety applications.

(b) In case more than one authorised entity has to operate in the same geographical area, what should be the mechanism for simultaneous use of the spectrum? Specifically, whether the spectrum should be divided amongst the authorised entities in an exclusive manner, or should the authorised entities utilize the spectrum in a shared manner?

Response:

- Where more than one authorised entity operates in the same geography, spectrum use must be **shared and non-exclusive**. V2X is designed for coexistence; geographic exclusivity would impede interoperability and impose artificial scarcity.
- By design, technology supports shared use of spectrum. No geographical exclusivity. However, for implementation and operational reasons, a competent authority may decide on who is permitted within a segment of road governed by them.

(c) If your response to part (b) is "in an exclusive manner", what should be the minimum quantity of spectrum to be assigned to each entity holding the proposed V2I

communication service authorisation? If your response to part (b) is “in a shared manner”, whether there is a need to prescribe a mechanism for interference management?

Response: Interference management should be **registry-enabled**, non-exclusive assignment-based. Mandate conformance to technical limits (EIRP/OOBE), congestion control and security as **conditions of authorisation/registration**; use the RSU registry for traceability and remedial action.

(d) For interference management, whether there is a need to prescribe –

(i) minimum directionality of road-side unit (RSU), or

(ii) protection distance between the RSUs, or

(iii) maximum antenna height for RSUs? If yes, what should be such parameter(s)?

Response: Not applicable. Only EIRP limit is sufficient. It may not be necessary to prescribe rigid directionality/protection distance/antenna height as hard authorisation conditions. These are deployment-engineering choices that vary by intersection geometry and work-zones. A clear EIRP/OOBE envelope and standards compliance are sufficient; the registry may capture antenna height/type for audit where needed

(e) Whether there is need to mandate a mechanism for obtaining prior approval (analogous to SACFA clearance) for the establishment of RSUs by the entities holding the proposed V2I communication service authorisation? If no, in what manner, the establishment of RSUs should be regulated?

Response:

- **No** SACFA-analogous pre-clearance should be mandated for RSUs under telecom/spectrum regulation. RSUs should operate under **Class Licence / General Authorisation**.
- Any approvals should be limited to **civil/ROW/structural safety permissions** by the road owner (traffic signal/signage analogy), and must not be treated as spectrum authorisation or site licensing. This may be by a competent authority (e.g., entity governing the road and traffic.)

(f) For avoiding (i) interference between RSUs, (ii) interference between RSUs and OBUs, and (iii) interference between OBUs, whether the radiated power limits for OBUs and RSUs and OOBE limits, recommended by the Task Force on Intelligent Transportation System for the use of 5.9 GHz (mentioned at para 3.4 of this consultation paper) should be adopted? If no, what should be the radiated power limits for OBUs and RSUs and OOBE limits?

Response: 2W (33dBm) EIRP for both OBU and RSU. Adopt the OOBE limits agreed by Part 1 Recommendation of Task Force on ITS.

(g) What should be the maximum period of assignment of spectrum to the entities holding the proposed V2I communication service authorisation?

Response: Classical "exclusive assignment period" is not applicable under shared/non-exclusive access. RSU registration should be continuous (subject to compliance with conditions of authorisation), with periodic update obligations (e.g., every 5 years or upon change).

(h) Whether there is a need to prescribe roll-out obligations associated with the assignment of spectrum to the entities holding the proposed V2I communication service authorisation?

Response: An approach similar to US DOT V2X Implementation Roadmap strategy would be great to prioritize and incentivize early implementation of RSU on accident prone intersections and segments of roads. Roll-out obligations should not be spectrum-assignment based. Prefer national/State road-safety programmes to prioritise high-risk corridors/intersections and incentivise early RSU deployments.

(i) Whether there is a need to introduce a provision for the surrender of frequency spectrum? Kindly provide a detailed response with justification.

Response: Since there is no exclusivity, this concept of surrender of spectrum does not arise. Surrender of spectrum is not applicable as no exclusivity is conferred. Decommissioning is handled via registry updates and cessation of operation.

Q9. Whether there is a need for prescribing timelines for processing the applications for the assignment of spectrum to the entities holding the proposed V2I communication service authorisation? Kindly provide a detailed response with justification.

Response:

- **Not applicable** under the proposed Class Licence / General Authorisation regime because there is no individual spectrum assignment for RSUs
- Under the proposed registration model, per-site spectrum assignment processing is avoided. RSU establishment should be enabled via online registration with automated acknowledgement and defined exception-handling timelines only for flagged cases.
- If any approvals are retained, prescribe short timelines (e.g., 15–30 working days) to prevent safety deployments from being delayed by administrative processes.

Q10. Whether there are any other suggestions related to assignment of spectrum to the entities holding the proposed V2I communication service authorisation? Please provide a detailed response with justification.

Response:

- Explicitly make the ITS spectrum licence-exempt for RSUs in **shared** and **non-exclusive** manner; the RSU registry is for governance and accountability and does not create exclusive rights.

- Create a single national conformance and test regime (RF + protocol + security) to ensure interoperability across all deployments and States/ULBs.

Q11. Any other issues/suggestions relevant to the regulatory framework for V2X communication may be submitted with proper explanation and justification

Response:

- India should adopt global best practice for ITS safety spectrum: harmonised technical conditions, shared access, and proportionate authorisation for RSUs via a registry. This enables scale, interoperability, and rapid safety impact.
- Key international parallels (non-exhaustive): (i) CEPT/ECC Decision (08)01 (ITS in 5.9 GHz, general authorisation approach), (ii) ACMA Radiocommunications (Intelligent Transport Systems) Class Licence 2017 (no application/fees; compliance-based), (iii) FCC ITS framework in 5.9 GHz with differentiated governance for OBUs/RSUs, (iv) Ofcom SRD licensing principles supporting licence exemption for low interference risk devices.

2 Issues Related to Spectrum Charges and Other Financial Conditions

Q12. In view of the public welfare-oriented nature of V2X applications and the need to encourage the deployment of such infrastructure and services, should there be spectrum charges levied on spectrum assigned to the V2I communication service authorised entities under the proposed V2I communication service authorisation? Please provide detailed justification in support of your response.

Response:

- No spectrum usage charges should be levied.
- ITS/V2X safety applications are public-welfare oriented and delivered via shared, non-exclusive spectrum access.
- Imposing SUC will slow deployment and reduce safety benefits.
- International ITS frameworks typically rely on general authorisation/class licensing approaches that minimise cost/administrative barriers (CEPT/ECC, ACMA, Ofcom).

Q13. If answer to Q12 is affirmative, whether the spectrum charges for the V2I communication service authorised entities under the proposed V2I communication service authorisation should be determined based on the spectrum charging methodology prescribed by the Department of Telecommunications (DoT) vide its order dated 11.12.2023? If yes, then which of the radiocommunication services specified in the said order, should be taken as basis for calculation of spectrum Charges? Please provide detailed justification in support of your response.

Response:

- Not applicable. In a shared, non-exclusive safety band, spectrum charge methodologies based on exclusive licensed services are not appropriate for an application which is primarily for safety of life.

Q14. If answer to Q12 is affirmative, whether the spectrum charges for the V2I communication service authorised entities under the proposed V2I communication service authorisation should be levied as a percentage of Adjusted Gross Revenue (AGR)? If yes, are there any specific operational/ non-operational revenue items that should be included in/ excluded from AGR for the purpose of determination of spectrum charges? Please provide your response with detailed justification.

Response:

- Application of this spectrum band is for public good and safety of life. Charging, service providers for deploying V2I systems, will demotivate and discourage them from providing such services and the overall objective of reducing fatalities on roads gets defeated.
- RSU deployments are public infrastructure. The implementation agency in most cases would be a city / state / central government agency.
- AGR-linked charging may be conceptually misaligned and administratively burdensome.

Q15. If response to questions 13 and 14 is negative, then what should be the appropriate methodology for determination of spectrum charges for the V2I communication service authorised entities under the proposed V2I communication service authorisation? Please provide detailed justification in support of your response.

Response: This is for public good, there should be exemption from spectrum usage charges. The radio devices are low-power and use spectrum in shared manner.

Q16. For spectrum assigned to the V2I communication service authorised entities under the proposed V2I communication service authorisation, what should be the appropriate payment terms for spectrum charges, if any? Please provide your response with detailed justification.

Response: As mentioned above we do not recommend any spectrum usage charges.

Q17. What are the potential sources of revenue, if any, for an V2I communication service authorised entity under the proposed V2I communication service authorisation? Please provide your response with detailed justification.

Response: V2I safety services are predominantly non-commercial public-good functions (road safety, traffic efficiency, emergency response). Revenue-linked frameworks should not be presumed.

Q18. What should be the definitions of Gross Revenue (GR), Applicable Gross Revenue (ApGR), and Adjusted Gross Revenue (AGR) for V2I communication service authorised entity under the proposed V2I communication service authorisation? Further, what should be the relevant items of revenue, exclusions and deductions and consequent definitions of GR, AGR and ApGR? Please provide your response with detailed justification.

Q19. What revenue components should be included in, or excluded from, the computation of Gross Revenue (GR), Applicable Gross Revenue (ApGR) and Adjusted Gross Revenue (AGR) for the

purpose of determining authorisation fees or spectrum charges for the proposed V2I communication service authorisation? Please provide your response with detailed justification.

Q20. Whether revenue derived from safety-related V2X services under the proposed V2I communication service authorisation should be excluded from the computation of AGR, in view of their public interest and non-commercial nature? Please provide your response with detailed justification.

Response (Q18, 19, 20):

Not Applicable. Safety broadcasts are public interest functions and should not be burdened by revenue-based levies.

Q21. What should be the appropriate entry fee for V2I communication service authorised entities under the proposed V2I communication service authorisation? Please provide detailed justification in support of your response.

Response: Not applicable. No entry fees should be charged for V2I service authorization. Fees, if any, must be part of the revised M2M Service registration framework for ITS/V2X (Road Safety Beacon).

Q22. What should be the appropriate terms and conditions for bank guarantees for the proposed V2I communication service authorisation? Please provide detailed justification in support of your response.

Response: No bank guarantees since this is predominantly shared safety spectrum. RSU operation is shared and non-exclusive; the registry model focuses on compliance and enforcement rather than financial risk management.

Q23. What should be the applicable minimum equity and minimum net worth requirements for authorised entities under the proposed V2I communication service authorisation? Please provide detailed justification in support of your response.

Response: No such prohibitive criteria, since this is predominantly shared safety spectrum. Such criteria would exclude legitimate public road authorities and smaller contractors implementing safety infrastructure. Eligibility for authorisation should be based on competence and accountability, not balance-sheet thresholds.

Q24. What should be the applicable application processing fee for the proposed V2I communication service authorisation? Please provide detailed justification in support of your response.

Response: No fees, or nominal fees (if any) to ensure light-touch regulation in predominantly shared safety spectrum. If there is any nominal cost-recovery for RSU registration processing (online), the process should be automated to the maximum extent.

Q25. What should be the applicable rate of authorisation fee for proposed V2I communication service authorisation? Please provide detailed justification in support of your response.

Response: No fees, or nominal fees (if any) to ensure light-touch regulation in predominantly shared safety spectrum. If there is any nominal cost-recovery for RSU authorization processing (online), the process should be automated to the maximum extent.

Q26. Apart from the financial provisions discussed earlier, are there any other financial terms and conditions that should be made applicable for the proposed V2I communication service authorisation? Please provide detailed justification in support of your response.

Response: Additional financial terms should be avoided. If required, adopt fee waivers for government road-safety programmes and pilots, and ensure any cost-recovery fees are transparent, minimal, and strictly tied to registry/compliance operations.

3 References:

1. India WPC Gazette: Use of Low Power Equipment in 865–868 MHz for SRD (Exemption from Licence) Rules, 2021: https://www\.thc\.nic\.in/Central%20Governmental%20Rules/use%20of%20low%20power%20Equipment%20in%20the%20frequency%20band%20865%20to%20868%20MHz%20for%20Short%20Range%20Devices%20Exemption%20from%20Licence%20Rules,2021\.pdf
2. CEPT/ECC: ECC Decision (08)01 (ITS in 5875–5935 MHz) PDF: https://docdb\.cept\.org/download/b470d271\-048b/ECCDEC0801\.PDF
3. ACMA: Intelligent Transport Systems Class Licence overview: https://www\.acma\.gov\.au/licences/intelligent\-transport\-systems\-class\-licence
4. ACMA: Radiocommunications (Intelligent Transport Systems) Class Licence 2017 (compilation): https://www\.legislation\.gov\.au/Details/F2021C01285/fcde26d3\-5cbc\-4db8\-b473\-7b219b7e2772
5. FCC (USA): Federal Register final rule “Use of the 5.850–5.925 GHz Band” (ET Docket 19-138; FCC 24-123): https://www\.federalregister\.gov/documents/2024/12/13/2024\-28980/use\-of\-the\-5850\-5925\-ghz\-band
6. FCC (USA): eCFR 47 CFR Part 95 Subpart L (ITS OBUs; RSUs under Part 90): https://www\.ecfr\.gov/current/title\-47/chapter\-I/subchapter\-D/part\-95/subpart\-L
7. Ofcom (UK): SRD policy statement (licence exemption; includes ITS 5875–5925 MHz): https://www\.ofcom\.org\.uk/siteassets/resources/documents/consultations/category\-1\-10\-weeks/237161\-proposals\-to\-amend\-the\-authorisation\-conditions\-for\-the\-use\-of\-certain\-short\-range\-devices/associated\-documents/srd\-policy\-statement\.pdf

ATTACHMENT 3

Proposed modifications to the Guidelines for Registration Process of M2M Service Providers(M2MSP) & WPAN/WLAN Connectivity Providers for M2M Services

Guidelines
for
Registration Process of
M2M Service Providers(M2MSP)
&
WPAN/WLAN Connectivity Providers
&
Road Safety Beacon Providers
for M2M Services

Contents

CHAPTER I DEFINITIONS

The terms used in this document, unless the context otherwise requires, have the following meaning:

a) **"Applicant"** means either M2M Service Provider (M2MSP) or WPAN/WLAN– Connectivity Provider or Road Safety Beacon Provider who is applying for the registration under these guidelines.

b) **"Authority"** means Department of Telecommunications or its designated field units.

c) **"Authorized Telecom Licensee"** means Indian Telecom Service Provider and/or Virtual Network Operator (VNO) who have been awarded License to provide service(s) authorized under the License, within the geographical boundaries of the specified Service Area.

d) **"License"** means a License granted or having effect as if granted under section 4 of the Indian Telegraph Act 1885 and Indian Wireless Telegraphy Act 1933.

e) **"LPWAN":** Low Power Wide Area Networks (LPWAN) is a new type of WAN that is suited for M2M communication because of characteristics that render themselves more compatible.

f) **"Machine to Machine (M2M) Communication"** refers to a communication between two or more entities (object/devices/things) based on existing & evolving communication technologies that do not necessarily need any direct human intervention.

g) **"M2M Services"** means the services offered through a connected network of objects/devices, with unique identifiers, in which Machine to Machine (M2M) communication is possible with predefined back end platform(s) either directly or through some gateway. Road Safety Beacon is an application for road safety and does not involve any communication with end objects/devices and only includes transmission and reception of broadcast beacons and the definition for same is provided in sections (o) and (p).

h) *Explanation: M2M services involve communication of end device/ object with predefined back end platform(s) either directly or through some gateway. Examples of M2M services include fleet management, supply chain management, agriculture automation, smart utilities including power, water, gas etc. The M2M end devices/ objects and the platform(s) collecting and analyzing information from these devices/ objects are controlled by some organization*

"M2M Service Provider" (M2MSP) is an Indian company, registered under the Indian Companies Act, 2013 or an LLP (Limited Liability Partnership) registered under LLP Act, 2008 or a partnership firm which provides M2M services to third parties using telecom resources. Provided that

(a) such third parties utilising M2M services from registered M2MSP in connection with its products or as part of its offerings to its end customers as a product or service, and

(b) any organization which intends to provide M2M services for its own use (captive use) and not for commercial purpose, shall also be covered under this definition."

i) **"Registrant**" means either M2M Service Provider (M2MSP) or WPAN/WLAN Connectivity Provider or Road Safety Beacon Provider which or Road Safety Beacon Provider which has been granted a registration under these guidelines.

j) **"Telecom Resource"** means Telecom facilities provided by Authorized Telecom Licensee having valid license under Indian Telegraph Act, 1885 and used by the M2MSP & WPAN/WLAN Connectivity Providers including, but not limited to Public Switched Telecom Network (PSTN), Public Land Mobile Network(PLMN), Integrated Services Digital Network (ISDN), Leased Lines or Satellite connectivity to carry traffic, the telecom bandwidth etc.

k) "**Third Party**" means an individual or organization other than the Department of Telecommunications (or its designated field units), Applicant and the Authorized Telecom Licensee.

l) "**WPAN"**: A Personal Area Network (PAN) is a network used for data transmission among personal devices such as computers, phones, personal digital assistants, wearables, etc. Wireless PAN or WPANs can be used for communication among the personal devices (intra-personal communication), or for connecting to a higher level network and the Internet (an uplink). Technologies used in PAN are Bluetooth, Z-Wave, ZigBee, RFID etc.

m) "**WLAN"** means a wireless network whereby a user can connect to a local area network (LAN) through a wireless (radio) connection, as an alternative to a wired local area network. An example of a Wireless LAN is Wi-Fi.

n) **"WPAN/WLAN Connectivity Provider"** is an Indian company, registered under the Indian Companies Act, 2013 or an LLP (Limited Liability Partnership) registered under LLP Act, 2008 or a partnership firm which uses WPAN/WLAN technologies for providing M2M connectivity for commercial purposes, operating in unlicensed spectrum. *Further, any organization which intends to use*

WPAN/WLAN for M2M connectivity for captive, non- commercial use, shall also be covered under this definition.

o) **"Road Safety Beacon (RSB)"** means radio technologies used for short-range or proximity-based beacon transmissions without requiring any SIM/e-SIM in the unlicensed or license-exempt spectrum for ITS/V2X as defined in NFAP, including but not limited to V2X interfaces such as 3GPP PC5 interface. These radio beacons are broadcast transmissions intended for safety/traffic efficiency, where recipient devices may not be under the control of any network node or device. These V2X applications provide non-exclusive, non-commercial safety beacons.
Explanation: Road Safety Beacon deployments are neither network-based systems nor communication services, but involve individual V2X Road Side Units (RSUs) broadcasting safety beacons, with only the RSU infrastructure endpoints being under the organizational control of the Applicant or Registrant.

p) **"RSB Provider"** means any Government entity (central government, state government, local body), Indian company, LLP, or partnership firm which uses Road Safety Beacon technologies for enabling road safety applications using unlicensed or license-exempt spectrum for ITS/V2X as defined in NFAP.

CHAPTER II GENERAL TERMS & CONDITIONS

1. M2MSP Registration may be granted to any Company registered under Indian
Companies Act-2013, as amended from time to time or any LLP (Limited Liability Partnership) registered under LLP Act-2008, as amended from time to time or a partnership firm to provide M2M Services who fulfils the terms and conditions prescribed by the Authority.

2. WPAN/WLAN Connectivity Providers Registration may be granted to any Company registered under Indian Companies Act-2013, as amended from time to time OR any LLP registered under LLP Act-2008, as amended from time to time or a partnership firm to provide connectivity for M2M services who fulfils the terms and conditions prescribed by the Authority.

2A Road Safety Beacon Provider Registration may be granted to a Government entity (central government, state government, local body), or any Company registered under Indian Companies Act-2013, as amended from time to time OR any LLP registered under LLP Act-2008, as amended from time to time or a partnership firm to enable road safety applications who fulfils the terms and conditions prescribed by the Authority.

3. Applicant shall submit the Certificate of Incorporation at the time of registration.

4. Registrant shall not infringe upon the jurisdiction of any Authorized Telecom Licensee and they shall provide only those services for which this registration is granted to them.

5. In case any Authorized Telecom Licensee wishes to provide M2M Services to third parties, it can do so under current licensing framework without requiring to register for M2MSP or WPAN/WLAN Connectivity Providers.

6. Registrant shall provide the details of location of their IT setup/ core network at the time of registration. However, if there are any changes in location of their IT setup/ core network at a later point of time, the same shall be intimated to the Authority within 15 days of shifting the operation to the next location. This shall not be applicable to Road Safety Beacon Provider. The RSB provider shall maintain the database of all deployed RSB (RSUs) in its jurisdiction. Such database shall store geocoordinates, specific road parameters and status of such RSUs. *Examples of RSB database could include following -*

Road Safety Beacon NHAI (Dausa Section)												
Ser. No.	Beacon No.	RSU Ser. No.	RSU MAC	Make	Location	Geo Coordinates (Northings)	Geo Coordinates (Eastings)	Height (Mtrs)	Purpose	Date of Installation	Status	Remarks
1	2345	ABA11234	00:08:08:5A:1B:32	ABCZ	Peechupara	27.059908	76.631621	6.2	Crossing Warning	dd/mm/yyyy	Working	Underpass Crossing
2	2346	ABA11981	00:01:42:XX:YY:ZZ	ABCZ	Bandikui	26.980489	76.533729	10	Jaipur Exit	dd/mm/yyyy	Working	Bandikui Jaipur Interchange
3	2347	ABA11783	00:0B:4D:XX:YY:ZZ	AKL	Gadarwara	26.964614	76.502965	10	Exit Roadside Facilities	dd/mm/yyyy	Working	Exit to Roadside facilities area
4	2348	ABA15232	00:90:E8:XX:YY:ZZ	AMN	Dhigariya Tappa	26.961140	76.496379	10	Entry from Roadside Facilities	dd/mm/yyyy	Under Repair	Entry from Roadside facilities area
5	2349	ABA19971	00:0C:6D:XX:YY:ZZ	DEG	Banganga Bridge	26.947410	76.472051	6	Warning Lane maintatince	dd/mm/yyyy	Working	Temporary deployment to warn Left Lane work in progress
6	2350	ABA14433	00:90:E8:VV:WW:XX	XXY	Bane Ka Barkhera	26.941326	76.461507	10	Street Light	dd/mm/yyyy	Working	Street Light warning and Timer

7. A non-refundable processing fee of Rs. 5,000/- shall be payable separately for M2MSP registration and WPAN/WLAN Connectivity and Road Safety Beacon Providers registration along with the application form for registration in the form of online payment.

8. Registrant shall inform the Authority, with supporting documents, if there is change in the name or address or contact details of the company as stated in the performa submitted at the time of registration.

9. Registrant shall intimate to the Authority within 30 days, if there is any change in the designated partners, authorized signatory and/ or Memorandum and Article of Association.

10. In case of merger/acquisition, the registration granted cease to exist and the new entity has to re-register.

11. The registration certificate shall be issued online within 15 days of the submission of the application form complete in all respects and the Applicant shall be informed accordingly by the Authority.

12. The registration certificate issued to the Registrant shall be non-transferrable.

13. The Authority reserves the right to suspend the operation of this Registration at any time, if, in the opinion of the Authority, it is necessary or expedient to do so in public interest or in the interest of the security of the State or for the proper conduct of the Telegraphs. The Authority shall issue a show cause notice of 21 days to the Registrant prior to such suspension. However, if situation so warrants, it shall not be necessary for the Authority to issue a notice for seeking comments of the Registrant for this purpose and the decision of the Authority shall be final and binding. The Authority shall not be responsible for any damage or loss caused or arisen out of aforesaid action.

14. Registrant may surrender the Registration, by giving notice to the Authority of at least 30 calendar days in advance.

15. Breach of non-fulfillment of Registration conditions may come to the notice of the Authority through complaints or as a result of the regular monitoring. Wherever considered appropriate, Authority may conduct an inquiry either suo-moto or on complaint to determine whether there has been any breach in compliance of the terms and conditions of the Registration by the Registrant and upon such inquiry the Registrant shall extend all reasonable facilities and shall endeavor to remove the hindrance of every type.

16. Any dispute, with regard to the provision of Service shall be a matter only between the aggrieved party and the Registrant, who shall duly notify this to all before providing the Service. And in no case, the DoT shall bear any liability or responsibility in the matter. Registrant shall keep the DoT indemnified for all claims, cost, charges or damages in the matter.

CHAPTER III TECHNICAL CONDITIONS

1. M2MSP shall take the Telecom Resources from an Authorized Telecom Licensee having valid license under Indian Telegraph Act, 1885. In addition, M2MSP is authorized to use WPAN/WLAN technologies in unlicensed spectrum/frequency exempt band to provide M2M services. In case of use of WPAN/WLAN technologies in unlicensed spectrum/frequency exempt band, the network has to mandatorily connect to licensed telecom operators network for backhaul connectivity.

2. WPAN/WLAN Connectivity Providers is authorized to use WPAN/WLAN technologies in unlicensed spectrum/frequency exempt band to provide connectivity for M2M services. The WPAN/WLAN Connectivity Providers network has to mandatorily connect to licensed telecom operators network for backhaul connectivity

2A Road Safety Beacon Provider is authorized to broadcast short range road safety beacon in the unlicensed spectrum band for ITS/V2X as defined in NFAP for road safety applications.

3. Registrant shall adhere to Know Your Customer (KYC) and related guidelines issued by the Authority to Authorized Telecom Licensee from time to time for all Telecom resources including SIM enabled devices and numbering resources. The Authority reserves the right to call for such details as and when required For Road Safety Beacon, the relevant authority shall maintain the database of all RSU deployments in its jurisdiction including supplier details and their KYC.

4. The details of all the customers of M2M services i.e., physical custodian of machines fitted with SIMs, shall be maintained by M2MSP. Up-dated information regarding (a) details of M2M end device i.e. IMEI, ESN etc., (b) Make, Model, Registration number etc. of the machines (i.e. Cars, Utility Meters, POS etc.) & (c) corresponding physical custodian's name and address shall be made available to Authorized Telecom Licensee and designated Authority by M2MSP. Any changes in customers and machines details shall be updated. Since Road Safety Beacon deployments are primarily meant for safety of life on roads and traffic management, there are no commercial customers. Provided that for V2X RSU deployments, where OBUs are not under the control of the Registrant, the requirement to maintain physical custodian and device-specific details of end devices shall not apply to OBUs. Instead, the Registrant shall maintain an RSU Asset Registry including location, identity, operator details, and connectivity characteristics of deployed RSUs

5. Registrant shall provide the details of Authorized Telecom Licensee from which connectivity has been sourced for providing M2M Services. In case of modification of details of Authorized Telecom Licensee, same shall be intimated to the authority.

6. In future, Authority may identify critical services in M2M sector and instructions issued in this regard shall be binding on Registrant.

7. Any instructions regarding permanent international roaming as notified from time to time by the government shall be binding on M2MSP.

8. DoT has issued the instructions permitting the use of e-SIMs with both single and multiple profile configurations with Over the Air(OTA) subscription update facility as per prevailing Global Specifications and Standards. M2MSP shall adhere to these instructions as amended from time to time.

9. Registrant shall ensure the Quality of Service (QoS) as may be prescribed by the Authority or Telecom Regulatory Authority of India (TRAI). The Registrant shall adhere to such QoS standard and provide timely information as required therein.

10. For all devices sold in India which have SIM inside the device, the packaging/ instructions/ supporting leaflet shall include instruction that "*This device is having SIM inside. At the time of re-sale/ loss/ transfer of this device, change of ownership details shall be shared with respective M2M Service provider/* Authorized Telecom Licensee*."*

M2MSP shall create awareness amongst the end customers about the requirement stipulated in the clause. In case, end customer does not comply with the instructions he/she shall be liable in case of any misuse of the SIM fitted in the device.

CHAPTER IV SECURITY CONDITIONS

1. Registrant shall take necessary measures to prevent objectionable, obscene, unauthorized or any other content, messages or communications infringing copyright, intellectual property etc., in any form, from being carried on the network, consistent with the established laws of the country. Once specific instances of such infringement are reported to the Registrant by the enforcement agencies, the Registrant shall ensure that the carriage of such material on the network is prevented immediately.

2. Registrant shall make available on demand to the person authorized by the Authority, full access to their equipments for technical scrutiny and for inspection, which can be visual inspection or an operational inspection.

3. Registrant shall provide necessary facilities depending upon the specific situation at the relevant time to the Government to counteract espionage, subversive act, sabotage or any other unlawful activity.

4. Registrant shall ensure protection of privacy of communication and data as per applicable law in force and as notified/amended from time to time.

5. Registrant shall ensure that their equipment installations should not become a safety hazard and is not in contravention of any statute, rule or regulation and public Policy.

6. Registrant shall provide decryption facility for the content riding on its network as and when required by the Authority or any authorized agencies. The entity who is encrypting the content shall be responsible for its decryption.

7. Registrant shall induct only those devices/equipment in the network which meet TEC standards and certifications, wherever specified as mandatory by the Authority from time to time and in the absence of mandatory TEC standard, the Registrant may deploy those devices/ equipment that meet the relevant Indian standards set by National and International standardization bodies, such as ITU, ETSI, IEEE, ISO, IEC etc. or set by International Fora, such as 3GPP,3GPP-2, IETF, MEF, WiMAX, Wi-Fi, IPTV, IPv6, OneM2M etc. The entity who is inducting the devices/equipment in the network shall be individually responsible for complying the requirement stipulated in the clause.

8. The Indian Telegraph (Amendment) Rules, 2017, provides that telecom equipments must undergo prior mandatory testing and certification. Accordingly, the equipment/ devices used in M2M services shall comply with these instructions as issued by the Authority from time to time.

9. Registrant shall take all necessary steps so as to maintain security of the network & confidentiality of the data of the end user as per the Information Technology Act, 2000 as amended from time to time. Existing security & encryption related regulation in IT Act as amended from time to time or any other rules framed in this regard should be adhered.

10. The services provided by Registrant should apply requisite security controls to protect sensitive information and data collected by various sensors and actuators. In this regard, Registrant shall comply with the provisions enshrined in Information Technology Act, 2000 and Information Technology (Reasonable security practices and procedures and sensitive personal data or information) Rules, 2011 as amended from time to time.

11. Registrant shall have a mechanism in place to isolate the network or part of the network(sensor(s) / Device(s) / IT Setup etc.) whenever required by Authority to maintain law and order and to protect from cascading effects of failures in the system due to malicious remote execution codes, denial of service attacks, malware/spyware attacks etc.

12. Registrant shall ensure that the data logs, event logs, system logs etc. handled by the system are tamper-proof and preserved at least for one year. The Authority reserves the right to call for these logs and also inspect them at site.

13. Registrant shall ensure that M2M devices should use only genuine IMEIs & ESNs. Non-genuine, duplicate and fake IMEIs & ESNs should not be allowed in the M2M devices. The M2M devices must be identifiable and traceable on the basis of IMEI/ ESNs in the M2MSP network. The prevailing IMEIs guidelines issued by Authority for handset will be applicable in case of M2M devices as well. For RSB Providers, there is no SIM/e-SIM involved in the system, and therefore this requirement does not apply.

14. Registrant shall adhere to the guidelines / instructions in force and as notified/amended by the Authority from time to time in respect of security by the Government from time to time. In areas which are sensitive from security point of view, as may be notified from time to time by the Authority, installation of any equipment or execution of project shall be taken up only after the Authority's approval.

15. Registrant shall adhere to the instructions in force and as notified/amended by the Authority from time to time prescribing restrictions for provision of services in areas falling near International Border/Line of Control/Line of Actual Control of India or any other areas.

16. For Road Safety Beacon (RSB) Providers operating V2X RSUs that solely transmit broadcast safety transmissions are non-encrypted, non-addressed beacons in unlicensed or license-exempt spectrum, and where there is no direct communication, session establishment, or data exchange between the RSU network and individual client/OBU devices, the above security requirements related to user communication, content carriage, decryption, and device traceability (e.g., IMEI/ESN) do not apply. These RSU deployments are limited to public safety and traffic improvement broadcasts, and do not constitute telecommunication services or involve customer/captive device management. However, RSB Providers must still ensure that their RSU infrastructure complies with general safety, technical standards (like ETA), and any other applicable regulatory obligations for network elements under their direct control.

ANNEXURE I

GOVERNMENT OF INDIA
MINISTRY OF COMMUNICATIONS
DEPARTMENT OF TELECOMMUNICATIONS

APPLICATION FORM FOR REGISTRATION OF M2M SERVICE PROVIDER (M2MSP) & WPAN/WLAN Connectivity Provider & Road Safety Beacon (RSB) Provider for M2M Services

Note: All Fields in this form are mandatory.

1. Type of Company	A government entity (in case of RSB Provider) or Company registered under Indian Companies Act-2013, as amended from time to time or LLP Act-2008, as amended from time to time or A partnership firm	
2. Name of Applicant Company/LLP		
3. CIN/LLPIN		
4. Upload certificate of incorporation		
5. Corporate Office Address: Telephone: Fax: E-Mail:		
		Website:
6. Registered Office Address: Telephone: Fax: E-mail		
		Website:

7. Communication Address: Telephone: Fax: E-mail		
8. Name of Authorized Signatory: Designation Full address for Communication: Mobile No. Alternate Mobile No. Telephone no.(Landline) Fax Email		
9. Upload Letter of authorization		

10. Services for which authorization sought:

☐ **WPAN/WLAN** ☐ **M2M Services** ☐ **RSB**

S.No.	Name of the Service	Remark, if any

11. Choose the LSA Name where Applicant want to register for processing of their application

Note: In case of Multiple geographical area of operations, M2M Service provider may select any one LSA for registration.

12. Location of Core Network Elements

S.No.	Core Network Element Name	Location of Core Network Elements	Remark, if any

13. Note on Nature of Business/ activities proposed to be undertaken by M2MSP

14. Spectrum Band in which M2M Services shall be provided:

☐Unlicensed Band (including ITS/V2X) ☐Licensed Band

If Licensed Band, provide the details of media connectivity taken from Authorized Telecom Licensee DoT:

15. Do you intend to provide services using SIM

☐ Yes ☐ No ☐ Not Applicable (e.g., ITS/V2X)

If yes,

Indian Telecom Service Provider SIM ☐

Foreign Telecom Service Provider SIM ☐

If using Indian TSP SIM:

i) Name of Indian Telecom Service Providers:

ii) If using Foreign TSP SIM: Name of Foreign Telecom Service Provider

Name of Indian Roaming partner TSP

☐ **Declaration:** I/we, hereby, declare that details of foreign SIM viz-a-viz IMEI, MSISDN and make of device, details of devices etc. have been declared at the port of entry.

16. Details of payment of one time (non-refundable) processing fee (Challan Copy) to be uploaded

17. Certificates/Undertakings

i. I/We hereby certify that I/We have carefully read the guidelines/terms and conditions, for the registration under M2M Service Provider category/ WPAN/WLAN Connectivity Provider / Road Safety Beacon Provider for M2M Services category and I/We undertake to comply with the terms and conditions therein as issued by DoT from time to time.

ii. I/We understand that this application if found incomplete in any respect and/or if found with conditional compliance shall be summarily rejected.

iii. I/We understand that processing fee is non-refundable irrespective of whether or not the proposal is registered.

iv. I/We understand that if at any time any averments made or information furnished for obtaining the registration is found incorrect then my application and the registration if granted thereto on the basis of such application shall deemed to be cancelled.

v. I/We undertake to intimate to the License Service Area in which it is registered for any change in the registration details, without delay to the concerned LSA. I/We would provide unhindered access to the premises and the system(s) to the DoT Authorities for checking compliance to the terms & conditions of the guidelines.

vi. I understand that all matters relating to the application or registration if granted to me will be subject to jurisdiction of courts/Tribunal(s) in LSA Headquarters under which the registration has been applied.

Date Signature and name of the

Place Authorized Signatory with Company's/LLP's seal

ANNEXURE II

List of specified M2M Services to be provided by M2MSP & WPAN/WLAN Connectivity Provider & Road Safety Beacon Providers

1. Automotive
2. Fleet management
3. Supply chain management
4. Healthcare
5. Agriculture
6. Smart City
   i) Street Lighting
   ii) ii) Waste Management
   iii) Smart Parking
   iv) Smart Water Management
   v) Connected Charging Stations
7. Intelligent Transport System
   i) V2X RSU (Safety Beacon)
8. Smart Home
9. Smart Building
10. Safety and Surveillance
    i) Woman Safety
    ii) Public Security
11. Portable Consumer Electronics
12. Wearable Devices
13. Financial/Retail
    i) POS
    ii) ATM
    iii) Smart Kiosk
14. Smart Utilities
    i) Smart Grid
    ii) Gas
    iii) Garbage Disposal
    iv) Smart Metering
15. Any other (Please mention)