

Amendment No. 2 (5th December 2018)
To
**AIS-140: Intelligent Transportation Systems (ITS) - Requirements for Public
Transport Vehicle Operation**

1. Page 3, Clause No 2.2.1,

Substitute following text for existing text:

Device Approval: Approval provided at Device level for compliance to this standard. These approved devices can be fitted / retro-fitted by manufacturer/ dealer/ permit holder/system integrator in any vehicle model provided it shall meet installation requirements as mentioned in Clause No. 5 of this standard.

2. Page 4 , First paragraph

Substitute following text for existing text:

Table below (Table 4A) contains the listing of fields that the vehicle tracking devices would be required to send to the Backend Control Centre. The first 3 fields (Start character, Header for VLT with Emergency Buttons and Vendor ID, who has supplied the device) must be fixed in position as well as format (Header part of frame). Rest all other fields are required to be present in the location data sent by the devices to the backend, but can be in any sequence and with any separator between fields. The data value can be either in American Standard Code for Information Interchange (ASCII) or in HEX format. Device must transmit the Login message whenever it establishes (re-establishes after disconnection) its connectivity with Server with the specified fields. Login Message will carry following information:

3. Page 5, Clause 3.1.1.1, Sub clause ‘a’

Substitute the following text for the existing text:

- a.** Device shall be capable for operating in L and/or S band and include support for NAVIC/IRNSS (Indian Regional Navigation Satellite System) for devices installed on vehicles on or after 1st April 2019. However VLT devices shall be compliant as per other GNSS constellation in the interim period.

4. Page 16, Clause 5.0

Substitute following text for existing text:

CONSTRUCTION AND INSTALLATION

5. Page 16, Clause 5.1

Substitute the following test for the existing text:

Requirements on vehicle interface for VLT with Emergency Button

(This requirement is only a guideline for fitment and shall not be checked during component approval or on vehicle)

Connector for Power

The requirements for interface shall be as agreed between vehicle manufacturer and device manufacturer

6. Page 16, Clause 5.2

Substitute the following test for the existing text:

Requirement of Emergency System

(To be verified on component level)

Emergency button shall be one time press type. Separate release action from authorized server shall be required to bring back the emergency button to normal mode or clear emergency flag.

7. Page 16, Clause 5.3

Substitute the following text for the existing text:

Physical Mounting

(This requirement is only a guideline for fitment and shall not be checked during component approval or on vehicle)

The VLT system shall be mounted in a suitable location such a way that it is not easily accessible /exposed to passengers.

This requirement shall not be applicable in case of combined systems VLT with HMI (Human Machine Interface) display in front of driver.

Emergency button(s) shall be fitted in such a way that every passenger including driver shall be able to access the Emergency button(s).

Passenger Car shall have at least one emergency buttons on each passenger row easily accessible by each of the passenger. There shall also be one dedicated emergency button for the driver row.

Passenger Transport bus shall have emergency buttons at locations easily visible & accessible to all the passengers such as every 2 meters on both the sides on passenger seating area. For seats reserved for ladies there shall be a dedicated panic button for each row.

It shall be permissible to have a single emergency button for two successive ladies' rows on both sides of the vehicle provided each lady passenger in either rows are able to reach and operate the emergency button.

In case of passenger transport bus which has a glass window covered between two pillars having pitch 2m or more, the emergency buttons shall be provided on each pillar

National Permit Trucks, shall have one dedicated emergency button for the driver row.

8. Page 17, Clause 5.4

Substitute the following test for the existing text:

Power Supply

(The requirements related to vehicle are only a guideline for fitment and shall not be checked during component approval or on vehicle)

The vehicle tracking device will be installed on vehicles in which the power supply voltage from vehicle battery is widely varying (12V, 24V etc.) and also the power supply is not as stable as that in case of fixed locations, especially during engine start-up and braking when the voltage can fall to as low as 9V. Typically electronic devices are very sensitive to power surges and spikes, and equipment may fail if they do not receive stable power supply. The devices will need to have a resilient power supply unit that can withstand such fluctuations and the devices also need to have power backup so that they continue to function for some duration when the vehicle battery is not functional or is disconnected from the devices.

Vehicle power interface shall have

- One common ground linked to vehicle chassis
- One permanent power Supply (12/24V) connected to the vehicle battery (+Vbat).
- One non-permanent power line (12/24V) connect to the battery after ignition (IGN).

9. Page 17, Clause No 6.1, 6.1.1, 6.1.2

Delete these clauses and renumber subsequent clauses.

10. Page 18, Clause No 6.2.1.3

Substitute following text for existing text:

The system shall transmit Emergency request information to one IP and PVT information to other IP of backend Control Center at user configurable frequency (minimum 5 seconds) via GSM/Cellular

11. Page 18

Add following new clause 6.2.1.6 and 6.2.1.7 after clause 6.2.1.5 :

- 6.2.1.6 System shall communicate to control center on the occurrence of the alerts captured in Communication Protocol Section 4.
- 6.2.1.7 When Emergency Button is pressed, emergency request message shall be sent from the system and received at the control center.

12. Page 31 ,Clause No 7.0

Add Below Text at the end of first paragraph

The Communication from Device to backend should happen on a Secure channel over TCPIP protocol preferably on socket based connections where sessions are managed to send commands over the same connection to the device and are authenticated, identifiable, so as to prevent spoofing on IMEI/ Unique ID.

13. Page 33

Add following new clause 8.0 after clause 7.0:

8.0 CODE OF PRACTICE for Implementation of Vehicle Location Tracking (VLT) Device, Emergency Button(s) and Command and Control Centres

This Code of Practice for AIS-140 has been formulated for facilitating smooth Implementation of Vehicle Location Tracking (VLT) Device, Emergency Button(s) and Command and Control Centres for the guidance of the stakeholders concerned.

8.1 General

- a. The VLT device manufacturers will get their devices tested and certified from the testing agencies referred to in rule 126 of the CMVR for compliance to the rule 125 H of CMVR
- b. The Backend System shall mean the backend Command and Control Centre set up/ authorized by State/UT or VLT manufacturers, providing interface to various stakeholders/systems such as State emergency response centre, the transport department or Regional Transport Offices, Ministry of Road Transport and Highways and its designated agency, Vahan (or any other State/UT system used for registration of vehicles and/or issuance of permits), VLT device manufacturers and their authorised dealers, testing agencies, permit holders, etc. In the absence of State/UT backend system, the registration, activation, health check and alert updates of VLT devices shall be through a common layer for updation in Vahan.

The details of each VLT device (VLT device manufacturer code, device serial number, IMEI number, IccID number and other details as notified by the Central Government/State Government) shall be uploaded on the Vahan directly or through backend system by the VLT device manufacturer using its secure authenticated access.

The VLT device manufacturers or their authorised dealers shall install the VLT devices in vehicles and register/activate the devices along with details

of vehicle and permit holder on the corresponding backend systems in real-time as per the process set out below.

The backend system/common layer will update the details of device in the Vahan system against the respective vehicle record at the time of installation and registration/activation of VLT device.

- c. The VLT device manufacturers or their authorised dealers, at the time of installation of VLT device in vehicles, shall configure the IP address and SMS gateway details in the device for sending emergency alerts to the emergency response system of the State/UT concerned.
- d. The VLT device manufacturers or their authorised dealers, at the time of installation of VLT device in vehicles, shall configure the configuration parameters mentioned in AIS-140 in the device such as IP address and SMS gateway details for sending required data to the backend system.
- e. The VLT device manufacturers shall ensure that a control mechanism is established for the secure data transfer from VLT to the backend system and that only the authorized devices transfer data to the backend system. The VLT device manufacturers shall also ensure that the mechanism for authenticating the vehicle owner and devices is followed as per the protocol specified in AIS-140 or such additional requirements as specified by the States/UTs. Authentication of vehicle shall be done through an OTP sent on vehicle owner's mobile number from the corresponding backend system.
- f. In case of press of an emergency button, the VLT device will send data directly to the emergency response system of the respective State/UT. In addition, the backend system will send the alert to the respective permit holder, as decided by the State/UT.
- g. VLT device manufacturers shall get their devices tested for conformity of production every year from the date of first certification, from the testing agencies referred to in rule 126 of the CMVR.
- h. VLT device manufacturers shall get their backend systems certified for the States/UTs from the testing agencies referred to in rule 126 of the CMVR/STQC/NIC.
- i. The VLT device manufacturers or their authorised dealers, at the time of installation of VLT devices in vehicles, shall configure the VLT device to send a secure authenticated activation message directly to the State/UT backend system/common layer as per the details provided in this section 8
- j. The VLT device manufacturers shall ensure that the Health Check parameters are configured in the VLT device to send Health Check messages, on request from the State/UT backend system/common layer, to the respective backend system through SMS as per reference protocol mentioned in this section 8
- k. VLT device manufacturers or their authorised dealers shall provide comprehensive warranty/maintenance support for the VLT device and facilitate cellular connectivity in accordance with the guidelines issued by

central government vide Motor Vehicles (Vehicle Location Tracking Device and Emergency Button) Order, 2018 as amended from time to time.

1. The testing agencies will verify the conformity of production for the VLT devices as prescribed in section 8.5.

8.2 Installation, Registration, Activation and Service Process for VLT Device

- a. VLT device manufacturers or their authorised dealers shall install VLT devices on permit holder's vehicles (only tested and approved model).
- b. VLT device manufacturers shall ensure necessary uploading/integration of the installation/activation data to the backend system/Vahan.
- c. In case of any problem in updating Vahan, it will be VLT device manufacturer's responsibility to resolve the same.
- d. VLT device manufacturers or their authorised dealers will also provide necessary print of installation/activation report to permit holder from the respective backend system.
- e. Regional Transport Offices shall be able to verify the registration/activation/functional status of VLT device in the Vahan/corresponding backend system at the time of fitness testing.
- f. The permit holder will have option to check the installation and device working status in the Vahan.
- g. The VLT device manufacture may offer value added services, in addition to the mandatory performance requirements to the permit holders as per the mutual agreement between them. Mandatory performance requirements shall mean the following:
 - i. Uploading device data in Vahan
 - ii. Updating registration and activation data of VLT device
 - iii. Sending device health status to the backend system
 - iv. Sending emergency alerts to the corresponding State/UT emergency response system
 - v. Sending over speeding alerts to the backend system
 - vi. Other performance requirements as per AIS 140 and as notified by central government vide Motor Vehicles (Vehicle Location Tracking Device and Emergency Button) Order, 2018 as amended from time to time.

- h. The VLT device manufacturers may create their own system to monitor their supplied devices, emergency button/s & connectivity working / non-working status for managing warrantee / AMC and Cellular services.
- i. The VLT device manufacturers or their dealers will update the SIM numbers and their validity/renewal details in the backend system.

8.3 VLT Device Manufacturers Backend Application/System Requirements

In case VLT device manufacturer offers to provide its backend system for State/UT, the same will need to meet the following requirements, in addition to those specified in Clause 7 of AIS 140:

- a) The application will provide the ability to locate a vehicle at a given time.
- b) Facility to track defined vs. actual movement of vehicles, capture deviations if any. (For vehicles where scheduled movement can be defined on GIS map)
- c) The application should provide ability to track vehicle location on map. The map engine and data should comply with applicable regulations including guidelines as set out by Survey of India from time to time.
- d) Facility for users to access and view position / location information on GIS maps near real-time through web interface with historic data displayed on maps.
- e) Facility for providing current information location on demand.
- f) Facility for playing back the recorded details of the vehicle movement along the authorized route (where applicable).
- g) Provide facility of alert generation
 - i. Ability to define new alerts on specific events
 - ii. From the on-board devices in case of tampering
 - iii. Speed exceeds the permissible limit
 - iv. Vehicle moves out of its designated route or area
 - v. Data feed not received from the on-board device
- h) Provide facility to define rules for alerts/ notification and their delivery mode like SMS, email, pop-up etc.
- i) Management of notifications to various stakeholders by way of email or SMS e.g. permit holders, RTO about device not working, over-speed etc.
- j) Notification to the permit-holder through SMS in case any device stops functioning/sending data to the application.

- k) Capability to update the on-board devices' firmware from the backend.
- l) Capability to configure on-board device parameters from the backend.
- m) The tracking data will be kept live in the system for at least 90 days. Utilities will be provided to support archive and restore functions for older data. Alerts/reporting shall be available for one year in the backend.
- n) The backend will store VTS time-related data at the same resolution as received in the live application. The archived data after 90 days can also be restored using utilities provided.
- o) From a security perspective, the devices will not communicate to any IP address located outside India whether it be the manufacturer's application or for purposes of configuration or firmware updates.
- p) Firmware of the device needs to be available for auditing to notified testing agencies. Firmware binary should be made available with version matching one in the device as well as binary size & modification timestamp and/ or checksum should match for the binary provided and one installed on device. Backend System should be able to remotely read the existing version number of the firmware via an OTA configuration read command. A new version of the firmware should be pushed over the air from the VLT manufacturer's application. This shall be verified by the backend system remotely reading the new version number of the firmware in the device via and OTA configuration read command.
- q) The device will communicate only to whitelisted set of IP addresses located in India and will receive communication and commands also from whitelisted set of IP addresses located in India.
- r) The application and all key components like device management, firmware control, GIS map shall be hosted at a data centre/ cloud in India and it will be available for auditing by regulatory agencies.
- s) The system shall provide > 99% availability and adhere to Infrastructure Security, Vulnerability Assessment and Penetration Testing guidelines as set out by Ministry of Electronics, Information and Technology, GoI.
- t) No data should flow out of the country under any circumstances in compliance with applicable laws/regulations/guidelines.
- u) The common layer shall be got tested from the testing agencies specified in CMVR Rule 126/STQC/NIC for the following minimum functionalities:
 - i. Registration and activation of the device(s) fitted on the vehicle, including the details of vehicle registration number, engine number, chassis number, vehicle make and model, device make and model, and connectivity details (telecom service provider's name, ICCid, SIM Nos., IMSI, date of validity, etc.).

- ii. Publish VLT device details in the Vahan/ any other State/UT system used for registration of vehicles and/or issuance of permits
- iii. Re-registration/re-activation of the device(s) fitted on the vehicle in case of any change in device or telecom service provider, etc.
- iv. Periodic health check of the device(s) fitted on the vehicle through SMS, as per section 8.4.
- v. Receiving alerts from VLT devices in case of defined deviations by vehicle such as over-speeding, etc. Publish alerts and health check received from VLT device in the Vahan/ any other State/UT system used for registration of vehicles and/or issuance of permits.
- vi. Provide interface to Vahan, respective State/UTs, RTOs, testing agencies, VLT device manufacturer's and their dealers.

8.4 Activation message and Health Check Message Protocol

The protocols for activation message and health check message are given below. Device shall send the activation and health check messages on request as specified below directly to the backend system (i.e. backend Command and Control Centre set up/ authorized by State/UT or a Common Layer system providing interface to VLT device manufacturers' backend applications).

A. Activation SMS Format from Backend System to Device

For completion of the installation process, the VLT device shall undergo Activation process as per below:

- Activation Message Request Format from the Backend System to the Device (Through SMS): ACTV, Random Code, Reply SMS Gateway no.
- Activation Message Reply Format from Device to the Backend System (Through SMS) as per Table 1 below:

Table-1: Activation & Health Check Response SMS Format from Device to Backend System			
Field Name	Characters	Activation Example	Health Check Example
Header	5	ACTVR	HCHKR
Separator	1	,	,
Random code	6	343434	474747

Separator	1	,	,
Vendor ID	4		
Separator	1	,	,
Firmware version	6	V1.6.1	V1.6.1
Separator	1	,	,
IMEI	15	012345678912345	012345678912345
Separator	1	,	,
Alert ID	2	1	1
Separator	1	,	,
Latitude	12	14.034533	14.034533
Separator	1	,	,
direction	1	N	N
Separator	1	,	,
Longitude	12	79.32045	79.32045
Separator	1	,	,
Direction	1	E	E
Separator	1	,	,
GPS fix	1	1	1
Separator	1	,	,
Date and Time	15	16112018 120317	16112018 120317
Separator	1	,	,
Heading	6	263.19	263.19
Separator	1	,	,
Speed	4	25.4	25.4
Separator	1	,	,
GSM Strength	2	23	23
Separator	1	,	,
Country Code (MCC)	3	404	404
Separator	1	,	,
Network Code (MNC)	4	10	10
Separator	1	,	,
LAC	4	d6d6	d6d6
Separator	1	,	,
Main Power	1	1	1
Separator	1	,	,
IGN Status	1	1	1
Separator	1	,	,

Battery Voltage	4	24.6	24.6
Separator	1	,	,
Frame Number	6	100000	100000
Separator	1	,	,
Vehicle mode	2	ID	ID
Total Characters	139		

B. Health Check Random Messages from Backend System to Device

Frequency: Twice Daily (Recommended),
Health Check Message Request Format from the Backend System to the Device (Through SMS): HCHK, Random Generated ID, Reply SMS Gateway no.
Health Check Message Reply Format from Device to Backend System (Through SMS): As per Table 1 above.

C. Publish Data to Common Layer by VLT Device Manufacturers' Applications (Sample)

Requirement to be complied with by VLT device manufacturers' applications

Application shall publish the data to common layer in a specified frequency and format as mentioned below

Services to publish data to the common layer

a. Push Offence Details

Type	REST web service
Data Type	JSON Array
Frequency	1 Hour

A single request may contain JSON Array of maximum 500 JSON Objects of the following format.

SI No	Key	Value Length in bytes	Description
In Parameters			
1.	oftyp	2	Offence Type OS= Overspeed
2.	vno	16	Vehicle number without any delimiter like hyphen (-) or space.
3.	imei	15	IMEI number.
4.	date	8	Date in format DDMMYYYY
5.	time	6	UTC in format hhmmss

6.	lat	12	Latitude,decimal not less than 6 places
7.	latd	1	Latitude Direction. N=North, S=South
8.	lon	12	Longitude,decimal not less than 6 places
9.	lond	1	Longitude Direction. E=East, W=West
10.	spd	6	Speed in km/hrs, Upto One Decimal Value.
11.	loc		Location (Reverse Geo-coded)
12.	rto		RTO Code
13.	state		State Code
Response			
14.	resp		OK/ Error

b. Push Alert Details	
Type	REST web service
Data Type	JSON Array
Frequency	1 Hour

A single request may contain JSON Array of maximum 500 JSON Objects of the following format.

SI No	Key	Value Length in bytes	Description
In Parameters			
1.	alrtid	2	Alert ID as per AIS-140
2.	vno	16	Vehicle number without any delimiter like hyphen (-) or space.
3.	imei	15	IMEI number.
4.	date	8	Date in format DDMMYYYY
5.	time	6	UTC in format hhmmss
6.	lat	12	Latitude,decimal not less than 6 places
7.	latd	1	Latitude Direction. N=North, S=South
8.	lon	12	Longitude,decimal not less than 6 places

9.	lond	1	Longitude Direction. E=East, W=West
10.	spd	6	Speed in km/hrs, Upto One Decimal Value.
11.	loc		Location (Reverse Geo-coded)
12.	rto		RTO Code
13.	state		State Code
Response			
14.	resp		OK/ Error

8.5 Conformity of Production - Testing Parameters

- a. The VLT device manufacturers will get their devices tested and certified for conformity of production from the testing agencies referred to in rule 126 of the CMVR for compliance to the rule 125 H of CMVR every year from the date of first certification. The parameters for testing shall be as specified in Table 1 of this section.
- b. The VLT device manufacturers shall get their backend applications audited from the testing agencies referred to in rule 126 of the CMVR/STQC/NIC or by the agencies specified by States/UTs every year from the date of first certification. The parameters for auditing shall be as specified in Table 2 of this annexure.
- c. The testing agencies shall provide the details of the VLT devices and backend applications certified by them to the States/UTs by uploading the same on the respective backend systems or any other means.

Table 1:	
Test for COP of VLT Device and Emergency Buttons	
Sl. No.	Test Details (As per AIS-140)
1.	Emergency button functionality (Clause No. 3.1.2.4)
2.	SMS fall back (Clause 3.1.5)
3.	Table 6A: Functional Testing (Sr. No. 1-9, Clause 6.3.1)
4.	Performance Parametric Test of Table 6B (Clause 6.3.2, Sr. No.10)
5.	Protocol & alerts verification as per -Clause No 4.1 and Table no 4A, -Clause No 4.2 and Table no 4B, 4C -Clause No 3.1.4 & Table no 3B - OTA Commands verification
6.	Ingress Protection (IP) Test as per Sr. No. 3 of Table 6B

Table 2:	
Test Parameters for Auditing of VLT Device Manufacturer's Backend Application/System	
Sl. No.	Test Details
1.	Firmware over the air update. Backend application should be able to remotely read the existing version number of the firmware via an OTA configuration read command. A new version of the firmware should be pushed over the air. This should be verified by reading the new version number of the new firmware in the device via and OTA configuration read command.
2.	Application availability test to be conducted over a 7 days' period by periodic check of availability randomly or at specified intervals in an automated or manual manner.
3.	Test functionality of application to allow user to map & un-map a device to a vehicle.
4.	Test functionality to track a vehicle on a map over a period of 8 hours given either a device ID or vehicle registration number. The device ID and vehicle should be mapped beforehand.
5.	Test replay of a vehicles location by specifying a start and end date and time and device ID or vehicle registration number. The start and end date and time should be from within the last 3 months at date of test. In case 3 months of historical data is not available, the VLT manufacturer can pre-populate test data for the duration.
6.	Firmware binary should be made available with version matching one in the device as well as binary size & modification timestamp and/ or checksum should match for the binary provided and one installed on device.
7.	Test to confirm geographical location of IP addresses, the device communicates with by IP Geolocation for all IPs configured into the device to confirm they are in India. The IPs configured should be read from the firmware configuration via configuration read command and also separately confirmed against a list of IPs provided by the VLT manufacturer.
8.	VLT manufacturer to provide a certificate, statement or affidavit certifying the location of data centre/ cloud hosting region in India for user, device and vehicle data.
9.	VLT manufacturer to provide a Vulnerability Analysis and Penetration Testing report from a 3 rd party test agency authorised by CERT-In/STQC.

14. Page 34 ANNEXURE A

Delete clause no 6.2

15. Page 35 ANNEXURE B

Substitute the following test for the existing text:

ANNEXURE B: CRITERIA FOR EXTENSION OF TYPE APPROVAL

B1.0 In case of following changes, Functional, Performance, Durability and Environmental Tests which are necessary for establishing compliance are listed below

	Changes in System	Tests to be conducted
B1.1	Change in Make, Model, Type, accompanied with or without a Part No of Vehicle Location Tracking (VLT) and Vehicle Health Monitoring.	Applicable tests as per Section 6 and Functional verification at system integration level or component level as applicable
B1.2	Change in software of ITS System	Functional verification at system integration level.
B1.3	Change in wiring harness	Wiring harness requirements specified in this standard

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UNDER

CENTRAL MOTOR VEHICLES RULES - TECHNICAL STANDING COMMITTEE
SET-UP BY

MINISTRY OF ROAD TRANSPORT & HIGHWAYS
(DEPARTMENT OF ROAD TRANSPORT & HIGHWAYS)
GOVERNMENT OF INDIA

5th December 2018

Amendment 1 (11th December 2017)

To

AIS-140: Intelligent Transportation Systems (ITS) - Requirements for Public Transport Vehicle Operation

1. Page 2

Replace Clause 1.B.7, Substitute the following text for the existing text:

1.B.7 **“Global Navigation Satellite System (GNSS)”** refers to a space-based radio navigation system. It provides positioning, navigation and timing services to military and civilian user on a continuous basis.

2. Page 2

Add new sub clause 1.B.12:

1.B.12 **“SIM/UICC”** refers to Subscriber Identification Module (SIM)/ Universal integrated circuit card (UICC) as per GSMA guidelines / DoT (TEC) Guidelines. Embedded SIM/UICC is a PCB soldered SIM/UICC/eUICC.

3. Page 2

Add new sub clause 1.B.13:

1.B.13 **“Cellular Technology”** such as GPRS/UMTS/HSPA/LTE etc.

4. Page 5

Clause 3.1.1.1. a, Substitute the following text for the existing text:

a. Device shall be capable for operating in L and/or S band and include support for NAVIC/IRNSS (Indian Regional Navigation Satellite System) for devices installed on vehicles on or after 1st October 2018. However VLT devices shall be compliant as per other GNSS constellation in the interim period.

5. Page 5

Clause 3.1.1.1. d, Substitute the following text for the existing text:

d. Device shall have an acquisition sensitivity of minimum (-) 145 dBm with GNSS/ (-) 140 dBm with IRNSS (NAVIC as applicable).

6. Page 5

Clause 3.1.1.1. e, Substitute the following text for the existing text:

e. Device shall have a tracking sensitivity of minimum (-) 160 dBm with GNSS / (-) 153 dBm with IRNSS (NAVIC as applicable).

7. Page 5

Clause 3.1.1.1. f, Substitute the following text for the existing text:

f. Device shall have an internal antenna; however, if in case of Integrated systems with vehicle OEM fitted kits if the fitment location prevents the internal antenna from functioning, then additional external antenna may be provided.

8. Page 5

Clause 3.1.1.2, Substitute the following text for the existing text:

3.1.1.2 Device shall support standard minimum I/Os as mentioned: 4 Digital, 2 Analog Input and 1 Serial Communication (e.g. RS232) for interfacing external systems (E.g. Digital input for Emergency request button interfacing).

9. Page 5

Clause 3.1.1.3, Substitute the following text for the existing text

3.1.1.3 Device shall be capable of transmitting data to Backend Control Server (Government authorized server) via Wide Area (Mobile) Communications network (Cellular) as per Communication Protocol in Section 4.

10. Page 5

Clause 3.1.1.4, Substitute the following text for the existing text :

3.1.1.4 Device shall be capable of transmitting Position, Velocity and Time (PVT data) along with heading (direction of travel) to a Backend Control Server (Government authorized server) at configurable frequency as per Communication Protocol of Section 4.

The fixed frequency shall be user configurable. Highest data transmission rate shall be 5 sec during vehicle operation and not less than 10 minutes in sleep/IGN OFF) as per the protocol defined in Communication Protocol of Section 4.

11. Page 5

Clause 3.1.1.6, Substitute the following text for the existing text :

3.1.1.6 On pressing of Emergency button, the system implementing VLT function shall send emergency Alert (Alert ID 10 as mentioned in Sub-section 4.2.1 of Communication Protocol Section 4) to the configured IP address(s) as per the Communication Protocol mentioned in Section 4. In the absence of Cellular network, the emergency alert shall be sent as SMS message along with vehicle location data to configured control center number(s). The SMS shall consist parameters as given in Sub-section 4.2.2.

12. Page 6

Clause 3.1.1.12, Substitute the following text for the existing text:

3.1.1.12 The Device shall have a unique identifier for identifying the VLT device and data. The unique ID shall be stored in a read only memory area so that it cannot be altered or overwritten by any person. The unique identifier is IMEI (International Mobile Station Equipment Identity) Number.

13. Page 6

Clause 3.1.1.14, Substitute the following text for the existing text:

3.1.1.14 Device shall have an Embedded SIM/UICC.

14. Page 6

Clause 3.1.1.15, Substitute the following text for the existing text:

3.1.1.15 Device shall be designed to operate 12V DC and or 24 V DC.

15. Page 6

Clause 3.1.1.16, Substitute the following text for the existing text:

3.1.1.16 Device shall have a sleep mode current ≤ 50 mA.

16. Page 6

Clause 3.1.1.18, Substitute the following text for the existing text:

3.1.1.18 The Device shall support:

- Location on Cellular /SMS
- Non-volatile memory to store min 40,000 positional log
- Configurable backup SMS facility in case of Cellular failure
- Capability to send serving and adjacent cell ID as well as network measurement report (NMR)

17. Page 7

Clause 3.1.1.19, Substitute the following text for the existing text:

3.1.1.19 The VLT Device shall have:

- The capability of Hot start < 10s
- The capability of Warm start : < 60 s
- The capability of Cold start < 120 s

18. Page 7

Clause 3.1.1.20, Substitute the following text for the existing text:

3.1.1.20 Device shall support data Outputs as per protocol covered in this standard.

19. Page 7

Clause 3.1.1.21, Substitute the following text for the existing text:

3.1.1.21 The Device Cellular module shall have:

- Multi slot Cellular with In – built Quad-band Cellular module/Modem
- Cellular class 10 or above
- Support Embedded SIM/UICC to cater to the operational requirement such as vibration, temperature and humidity and provide long life span with at least 10 years life and more than 1 million read/write cycles
- Cellular module & Embedded SIM/UICC shall support
 - SMS, Data (Cellular, TCP/IP) and
 - Support multiple network OTA switching (on-demand / automatic) capabilities.

20. Page 7

Clause 3.1.1.23, Substitute the following text for the existing text:

3.1.1.23 Device shall be manufactured by manufacturer whose quality management system has been certified for compliance to ISO / TS 16949 or ISO 9001 or any equivalent National or International standard.

21. Page 8

Clause 3.1.2.3, Substitute the following text for the existing text:

3.1.2.3 The Emergency Buttons will be such that disconnection between switch and controller should be detected through controller logic or 'Normally Closed' (NC) Type Switch. For Emergency button, there shall be indication of its working status visible for passengers in Ignition ON Condition. The form factor of Emergency Buttons will be such that the button is easy to press in the case of an emergency, and simultaneously also minimizes the possibility of accidental or unintended press thereby causing a false alert.

22. Page 8

Clause 3.1.2.4, Substitute the following text for the existing text :

3.1.2.4 On pressing of Emergency button, the system implementing VLT function shall send emergency Alert (Alert ID 10 as mentioned in Sub-section 4.2.1 of Communication Protocol Section 4) to the Backend Control Server (Government authorized server) as per the Communication Protocol mentioned in Section 4. In the absence of Cellular network, the alert shall be sent as SMS message along with vehicle location data to configured control center number. The SMS shall consist of parameters as given in Sub-section 4.2.2.

23. Page 8

Clause 3.1.2.5, Substitute the following text for the existing text :

3.1.2.5 In absence of both Cellular and GSM networks and on pressing of Emergency Button, the system implementing VLT function shall store the emergency Alert (Alert ID 10 as mentioned in Sub-section 4.2.1 of Communication Protocol Section 4). Once the Cellular or GSM is available, this alert information shall be sent on high priority to the configured IP addresses as per the communication protocol mentioned in Section 4 or as SMS message along with vehicle location data to configured control center number. The SMS shall consist of parameters as given in Sub-section 4.2.2.

24. Page 8

Clause 3.1.3, Substitute the following text for the existing text :

3.1.3 Configuration of Device Parameters Over the Air (OTA)

The device shall support at least the below parameters to be configurable over the air (through SMS and Cellular). The updation/ configuration shall be allowed only over an 'authenticated' channel:

1. Setting/ Change of the Primary or Secondary IP and port number
2. Setting/ Change of the APN
3. Set configuration parameter like sleep time, over speed limit, harsh braking, harsh acceleration, rash turning threshold limits etc.
4. Emergency control SMS Centre Number(s)
5. Configuring the vehicle registration number

6. Configuring the frequency of data transmission in normal / Ignition state / OFF state sleep mode/ Emergency state, etc.
7. Configuring the time duration for Emergency state
8. Capability to reset the device
9. Command to get the IMEI of the device Configurable commands must involve the following features:
 - 9.1. SET: For setting the parameters.
 - 9.2. GET: For enquiring regarding the parameters such as mobile number, GSM strength, vehicle number and other important parameters.
 - 9.3. CLR: For clearing certain commands, alarms, alerts etc. except emergency alert

After each SET, GET, CLR command the device should send alert to Backend Control Centre, as mentioned in Section 4 Alert 12, giving the details of Mode, mobile no/ IP of control center sending commands.

25. Page 9

Clause 3.1.5, Substitute the following text for the existing text :

3.1.15 In case of emergency state, (i.e. on pressing of Alert button), the device will shift to the SMS mode in case Cellular connectivity is not available. In such case, the device will send the Alert message and tracking data through SMS mode. Since SMS has the limitation of sending only 160 characters, so the tracking data to be sent in one SMS will have fields - IMEI, Latitude, Direction, Longitude, Direction, location fix, speed, Cell ID, LAC (Location Area Code), Date and Time as per emergency alert . The details is provided in Sub-section 4.2.2.

26. Page 12

In Table 4 A , for the item Checksum and entries thereof, substitute the following:

Checksum	Ensures No error in transmission (optimal)	16
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27. Page 13

In Table 4 B, for the item – Alert Id 2. Location Update (history) and entries thereof, substitute the following:

2.	Location Update (history)	Would be sent, if Cellular is not available at the time of sending the message in protocol format Zero, BLANK, NIL, etc.
----	---------------------------	--

28. Page 14

Clause 4.2.2, For first paragraph substitute the following text for the existing text:

4.2.2 In case of emergency alert, the alert message shall be sent to 2 different IP addresses hence the device shall support minimum 2 IP addresses (1 IP address for regulatory purpose (PVT data) and 1 IP address for Emergency response system other than the IP's required for Operational purpose. The PVT data will send the emergency alert to the system. Only Primary alert data will go to the emergency response Backend Control Centre (NERS/ MHA) as may be notified by the Government of India in the schema below:

29. Page 14

Substitute the following Table 4 C for existing Table 4 C :

Table 4C:		
Indicative Format for Alert to Emergency Response System		
Attribute	Value / Description	Size
Start Character	\$	1 Byte
Packet Header	EPB, The unique identifier for all messages from VLT	Character, 3 bytes
Packet Type	Message Types supported. Emergency Message (EMR) or Stop Message (SEM)	Character, 3 bytes
IMEI Number	Unique ID of the Vehicle (IMEI Number)	Character, 15 bytes
Packet Status	NM – Normal Packet, SP – Stored Packet	Character, 2 bytes
Date	Date and time of location the location obtained from the data in DDMMYYYY hhmms format	Character, 14 bytes
GPS Validity	A – Valid, V – Invalid	Character, 1 byte
Latitude	Latitude in decimal degrees - dd.ddddd format	Double, 12 bytes
Latitude Direction	N – North, S – South	Character, 1 byte
Longitude	Longitude in decimal degrees - dd.ddddd format	Double, 12 bytes
Longitude Direction	E – East W – West	Character, 1 byte
Altitude	Altitude in meters (above sea level)	Double, 12 bytes
Speed	Speed of Vehicle as Calculated by GPS module in VLT. (in km/hr)	Float, 6 bytes
Distance	Distance calculated from previous GPS data	Float, 6 bytes

Provider	G - Fine GPS N - Coarse GPS or data from the network	Character, 1 byte
Vehicle Regn. No	Registration Number of the Vehicle	Character, 16 bytes
Reply Number	The mobile number to which Test response needs to be sent. (Emergency Mobile No. as specified by MHA/MoRTH/States.)	0 Note: No number needs to be sent. This field will with value 'zero'
End Character	*	1 byte
Check sum	Ensure no error in transmission	8 bytes
*Above format is indicative only. These Format will be notified by the Government of India time to time.		

30. Page 15

In Clause 4.3, for the words:

“• CLR: For clearing certain commands, alarms, alerts etc.”

Substitute the following text:

“• CLR: For clearing certain commands, alarms, alerts etc. except emergency alert.”

31. Page 16

Clause 5.1, Substitute the following text for the existing text :

5.1 Requirements on vehicle interface for VLT with Emergency Button

Connector for Power

The requirements for interface shall be as agreed between vehicle manufacturer and device manufacturer.

32. Page 16/17

Clause 5.3, Substitute the following text for the existing text :

5.3 **Physical Mounting**

The VLT system shall be mounted in a suitable location such a way that it is not easily accessible /exposed to passengers.

This requirement shall not be applicable in case of combined systems VLT with HMI (Human Machine Interface) display in front of driver.

Test agency to verify this on vehicle level approval.

Emergency button(s) shall be fitted in such a way that every passenger including driver shall be able to access the Emergency button(s).

Passenger Car shall have at least one emergency buttons on each passenger row easily accessible by each of the passenger. There shall also be one dedicated emergency button for the driver row.

Passenger Transport bus shall have emergency buttons at locations easily visible & assessable to all the passengers such as every 2 meters on both the sides on passenger seating area. For seats reserved for ladies there shall be a dedicated panic button for each row.

It shall be permissible to have a single emergency button for two successive ladies' rows on both sides of the vehicle provided each lady passenger in either rows are able to reach and operate the emergency button.

Test agency to verify this on vehicle level approval.

33. **Page 17**

Clause 5.4, Substitute the following text for the existing text :

5.4 The vehicle tracking device will be installed on vehicles in which the power supply voltage from vehicle battery is widely varying (12V, 24V etc.) and also the power supply is not as stable as that in case of fixed locations, especially during engine start-up and braking when the voltage can fall to as low as 9V. Typically electronic devices are very sensitive to power surges and spikes, and equipment may fail if they do not receive stable power supply. The devices will need to have a resilient power supply unit that can withstand such fluctuations and the devices also need to have power backup so that they continue to function for some duration when the vehicle battery is not functional or is disconnected from the devices.

Vehicle power interface shall have

- One common ground linked to vehicle chassis
- One permanent power Supply (12/24V) connected to the vehicle battery (+Vbat).
- One non-permanent power line (12/24V) connect to the battery after ignition (IGN).

34. **Page 17**

Clause 6.1.1.2, Substitute the following text for the existing text :

6.1.1.2 System transmits PVT information to Backend Control Center (2 different IPs) at user configurable frequency (minimum 5 seconds) via GSM / Cellular.

35. Page 18

Clause 6.2.1.1, Substitute the following text for the existing text :

6.2.1.1 Standard connector provided for Power and other signals as per clause no 5.1.


36. Page 18

Clause 6.2.1.5, Substitute the following text for the existing text :

6.2.1.5 Updating of the firmware of the system from Backend Control Centre only.

37. Page 19

Substitute the following Table 6 A for existing Table 6 A :

Table 6A:		
Functional Testing		
Sl. No	Test	Test Procedure
1	Tracking Functionality Test	<p>The test shall be conducted on VTL to determine the proper functioning of VLT with Emergency Button by testing its connectivity to Backend Control Centre (Government authorized server).</p> <p>Procedure: The VLT with Emergency Button shall be connected to vehicle battery to switch it on. The VLT with Emergency Button shall be tested for the connectivity to server and its capability to send two location messages</p>
2	Location Accuracy Test	<p>This test shall be conducted on VLT with Emergency Button.</p> <div style="text-align: center;">  </div> <p>The receiver is placed into a cold start state – usually by a command sent to the receiver through a test connection – and then a fairly strong navigation signal simulating in L and/or S band is sent. The time it takes for the receiver to determine its first good location fix is recorded. Test is done many times (>15 times) over many conditions and the results are averaged.</p> <p>Acceptance Criteria: 2.5 m CEP or 6 m 2DRMS.</p>

3	Acquisition Sensitivity Test	<p>This test shall be conducted on VLT with Emergency Button.</p> <p>Procedure: Set the simulator to output navigation signal simulating L and/or S band to a particular location with a very level so that the tracking is not possible. Gradually increase the signal level that allows the receiver to successfully perform a cold start TTFF. The minimum signal level that allows acquisition is referred as to the acquisition sensitivity.</p> <p>Acceptance Criteria: The acquisition sensitivity shall be minimum (-)145 dBm with GNSS/ (-) 140 dBm with IRNSS (NAVIC as applicable.).</p>
4	Tracking Sensitivity Test	<p>This test shall be conducted on VLT.</p> <p>Procedure: The device under this test is locked on to the simulator's output frequency (navigation signal simulating L and/or S band) and the simulator power output is lowered until the lock is lost. Multiple repetition of the test with different satellite geometries ensures that an accurate average measure is recorded.</p> <p>Acceptance Criteria: The tracking sensitivity shall be equal to or better than (-) 160 dBm with GNSS / (-) 153 dBm with IRNSS (NAVIC as applicable).</p>
5	Cold-Start Time to First Fix (TTFF) Test	<p>The device in this test is placed into a cold start state. The time it takes for the device to determine its first good location fix is recorded. The cold start test is performed several times and the results are averaged.</p> <p>Acceptance Criteria: The cold start TTFF shall be less than 120 seconds at Open Sky condition or (-) 130 dBm.</p>
6	Warm-Start Time to First Fix Test	<p>In this test the device is started in warm start mode and time taken by device to determine the first valid location fix is recorded. This is done several times and results are averaged.</p> <p>Acceptance Criteria: The warm start TTFF shall be less than 60 seconds at Open Sky condition or (-) 130 dBm.</p>

7	Hot-Start Time to First Fix Test	<p>In this test the device is started in Hot start mode and time taken by device to determine the first valid location fix is recorded. This test is performed several times and results are averaged.</p> <p>Acceptance Criteria: The hot start TTFB shall be less than 10 seconds.</p>
8	Embedded SIM/ UICC Test	<p>This test is to check the suitability of the embedded SIM/ UICC and communication module. The test shall be conducted to determine the effectiveness and operation of the Cellular module with OTA network switching capabilities on demand as well as automatically in real-time. The test consist of two type of testing as below:</p> <ol style="list-style-type: none"> 1. The device would be tested to perform as per the protocol using an embedded SIM/UICC. 2. The Cellular module & embedded SIM/UICC, shall support: <ul style="list-style-type: none"> o SMS, Data (Cellular, TCP/IP) and o Support multiple network OTA switching capabilities (On Demand as well as Automatic Switching on real-time basis) <p>Acceptance Criteria: In the testing, vendors has to demonstrate the embedded SIM/UICC based tracking and multiple network OTA switching capabilities (On Demand as well as Automatic Switching on real-time basis) for effective network management and transmission.</p>
9	Functional Endurance Test	<p>VLT device shall be operated for 96 hours with external power supply and internal battery connected to device. PVT data monitoring will be done for complete duration of test with data frequency defined after IGN switch ON mode. VLT device shall function successfully during and after test.</p>
10	On Vehicle Dynamic Location Test	<p>VLT devices will be mounted on any target vehicle connected with vehicle battery. Target vehicle with VLT devices will be run for 10 km on pre-defined track/route to verify dynamic location test. VLT device PVT data shall be within 12 meter for more than 90% of the fixed location data (as arrived using DGPS device on the same route). VLT device PVT data shall be super imposed on followed route map to check its correctness of followed route.</p>

38. Page 23

In Table 6 B, for the Sl. No. 5 and entries thereof, substitute the following:

5	Battery Backup Test	<p>Battery backup is the amount of time that the device battery can support sending the data without being connected to the power source. This test will be performed by disconnecting the input charging voltage to the device. On disconnecting the external supply, battery would use its charge capacity to send data through Cellular. Time duration between external power disconnect to the last data packet time denotes the battery backup time.</p> <p>Acceptance Criteria: Device shall be able to work in active mode for a period of 4 hours or more at the polling/ transmission rate of 60 sec</p>
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39. Page 19

Substitute the following Table 6 C for existing Table 6 C:

Table 6C:		
Device Level Environmental Test		
Sl. No	Test	Test Procedure
1	Dry Heat / High Temperature Test	<p>The high temperature test is used to evaluate effects of high temperature conditions on safety, integrity, and performance of the device. The test shall be carried out in accordance with Indian Standard IS: 9000 (Part 3/Sec 5) the device shall be subjected to temperature of $70 \pm 2^{\circ}\text{C}$ for 16 h in high temperature. Test with device in working condition. The recovery period shall be 2 h.</p> <p>Acceptance Criteria: Device during and after the high temperature test the device shall be required to meet the provisions of Functional Test Number 1 as listed in Table 6A.</p>

2	Cold Test	<p>The test shall be carried out in accordance with IS 9000 (Part 2/Sec 4 – 1977). The device under test shall be subjected to temperature of $-10 \pm 2^{\circ}\text{C}$ for 2 h with device in working condition. The recovery period shall be 2 h.</p> <p>Acceptance Criteria: Device during and after the cold test, the device shall be required to meet the provisions of Functional Test Number 1 as listed in Table 6A.</p>
3	Damp Heat Test	<p>The device under test shall be tested according to IS 9000 (Part 5/Sec 2 – 1981). The test is carried out at $+25^{\circ}$ to $+55^{\circ}$ C, Humidity 95%. Six cycles (each test cycle of 24 h) shall be run with device in off condition. Functional test shall be carried out with power in ‘On condition’ at start of 2nd, 4th and 6th cycle.</p> <p>Acceptance Criteria: Device during and after the test the device shall be required to meet the provisions of Functional Test Number 1 as listed in Table 6A.</p>
4	Temperature Shock	<p>Temperature shock test is carried out to determine if the device can withstand sudden changes in the temperature of the surrounding atmosphere without experiencing physical damage or deterioration in performance. The device shall be tested as per IS 9000 (Part 14/Sec 2) – 1978. Exposure time at temperature extremes -10°C and 70°C would be 3 hours/cycle and number of cycles would be two.</p> <p>Acceptance Criteria: Device after the test the device shall be required to meet the provisions of Functional Test Number 1 as listed in Table 6A.</p>
5	Salt Spray Test	<p>The salt spray test is conducted to check corrosion resistance of device. The device shall be tested according to Clause 4.8 of IS 10250 for 96 h.</p> <p>Acceptance Criteria: The device shall be required to meet the provisions of Functional Test Number 1 as listed in Table 6A.</p>
6	High Voltage Test	<p>The test is conducted to ensure service life requirements & functionality. The device under test shall be operated for 60 minutes at 18 V for 12 V systems & 36 V for 24 V systems. This test is as per ISO 16750-2:2010</p>

		Acceptance Criteria: Device during and after the test the device shall be required to meet the provisions of Functional Test Number 1 as listed in Table 6A.
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40. Page 27

In Table 6 D; for item Packet Type and Alert ID and entries thereof, substitute the following text for existing text :

Packet Type	Specify the packet type – NR = Normal EA = Emergency Alert TA = Tamper Alert (Optional) HP = Health Packet IN = Ignition On IF = Ignition Off BD = Vehicle Battery Disconnect BR = Vehicle Battery Reconnect BL = Internal Battery Low HB= Harsh Braking HA= Harsh Acceleration RT= Rash Turning
Alert ID	02 Character

41. Page 29

After Table 6 D; for paragraph (a), substitute the following text for existing text

- a) The device shall support 40000 or more positional logs/packets. This is a functional test and the device will be simulated to be in non – Cellular coverage area and the logs will be maintained. The capacity of logging will be checked by monitoring the logs on the device.

42. Page 29

In Table 6 E; for Alert ID 2 and entries thereof, substitute the following text for existing text :

2.	Location Update (history)	Would be sent, if Cellular is not available at the time of sending the message
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43. Page 30

Substitute the following Table 6 F for existing Table 6 F:

Table 6F:		
Message Format		
Start Character	\$	1 byte
Packet Header	EPB, The unique identifier for all messages from VLT	Character, 3 bytes
Packet Type	Message Types supported. Emergency Message (EMR) or Stop Message (SEM)	Character, 3 bytes
IMEI Number	Unique ID of the Vehicle (IMEI Number)	Character, 15 bytes
Packet Status	NM – Normal Packet, SP – Stored Packet	Character, 2 bytes
Date	Date and time of the location obtained from the location data in DDMMYYYY hhmmss format	Character, 14 bytes
GPS Validity	A – Valid, V – Invalid	Character, 1 byte
Latitude	Latitude in decimal degrees - dd.mmmmmm format	Double, 12 bytes
Latitude Direction	N – North, S – South	Character, 1 byte
Longitude	Longitude in decimal degrees - dd.mmmmmm format	Double, 12 bytes
Longitude Direction	E – East W – West	Character, 1 byte
Altitude	Altitude in meters (above sea level)	Double, 12 bytes
Speed	Speed of Vehicle as Calculated by GPS module in VLT. (in km/hrs.)	Float, 6 bytes
Distance	Distance calculated from previous GPS data	Float, 6 bytes
Provider	G - Fine GPS N – Coarse GPS or data from the network	Character, 1 byte
Vehicle RegnNo	Registration Number of the Vehicle	Character, 16 bytes
Reply Number	The mobile number to which Test response need to be sent. (Emergency Mobile No. as specified by MHA/MoRTH/States.)	0
End Character	*	1 byte
Check sum	Ensure no error in transmission.	8 bytes

44. Page 31

In Clause no. 7 for first paragraph substitute the existing text with following text :

The VLT device would transmit data to the Backend Control Centre using Cellular wireless connectivity (with SMS fall back) as per the protocol provided in respective sections (Sub-section 6.3.4). The data from the devices would travel over the wireless telecom service provider network and finally get delivered at the Backend Control Centre. Since the permit holders/Device suppliers would require to have a valid communication plan on embedded SIM/UICC cards on the devices and would avail services from multiple telecom service providers, the data would be transmitted to the Backend Control Centre using the networks of multiple telecom service providers.

45. Page 31

In Clause no. 7 for second paragraph substitute the existing text with following text :

A suitable control mechanism would be established for the data transfer from VLT to Backend Control Centre, as only the authorized devices should be able to transfer data to the Backend Control Centre and a mechanism for authenticating the devices/ embedded SIM/UICC shall also be put into place.

46. Page 36

Delete Annexure C :

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ON BEHALF OF

AUTOMOTIVE INDUSTRY STANDARDS COMMITTEE
UNDER

CENTRAL MOTOR VEHICLES RULES - TECHNICAL STANDING COMMITTEE
SET-UP BY

MINISTRY OF ROAD TRANSPORT & HIGHWAYS
(DEPARTMENT OF ROAD TRANSPORT & HIGHWAYS)
GOVERNMENT OF INDIA

11th December 2017

AUTOMOTIVE INDUSTRY STANDARD

**Intelligent Transportation Systems
(ITS) - Requirements for Public
Transport Vehicle Operation**

PRINTED BY
THE AUTOMOTIVE RESEARCH ASSOCIATION OF INDIA
P.B. NO. 832, PUNE 411 004

ON BEHALF OF
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GOVERNMENT OF INDIA

October 2016

Status chart of the Standard to be used by the purchaser for updating the record

Sl. No.	Corrigenda	Amendment	Revision	Date	Remark	Misc.

General remarks:

INTRODUCTION

The Government of India felt the need for a permanent agency to expedite the publication of standards and development of test facilities in parallel when the work on the preparation of the standards is going on, as the development of improved safety critical parts can be undertaken only after the publication of the standard and commissioning of test facilities. To this end, the erstwhile Ministry of Surface Transport (MoST) has constituted a permanent Automotive Industry Standards Committee (AISC) vide order No. RT-11028/11/97-MVL dated September 15, 1997. The standards prepared by AISC will be approved by the permanent CMVR Technical Standing Committee (CTSC). After approval, the Automotive Research Association of India (ARAI), Pune, being the secretariat of the AIS Committee, will publish this standard.

Intelligent Transport Systems (ITS) are globally proven systems to optimize the utilization of existing transport infrastructure and improve transportation systems in terms of efficiency, quality, comfort and safety. Having realized the potential of ITS, Government bodies and other organizations in India are presently working towards implementing various components of ITS across the country.

The first step taken for creation and implementation of ITS was holding a National Workshop titled “User Requirements for Interactive ITS Architecture”, which was conducted as a collaboration between SIAM and ASRTU on 26th & 27th February 2015. This was primarily focused on ITS in Public Bus Transportation. Nonetheless, the workshop helped to create the outline for “National Intelligent Transport System Architecture and Policy for Public Transport (Bus)”, which was submitted by ASRTU and SIAM to the government

In the 44th & 45th CMVR-TSC, Chairman had directed - standardization activities to be initiated on Intelligent Transportation Systems (ITS) - Vehicle Location Tracking, Camera Surveillance System and Emergency Request Button. The committee intended to extend the above user requirements to all public transportation namely – buses, taxis, etc. The current document covers the requirements for Vehicle Location Tracking and Emergency Button. The other ITS components like PIS, CCTV system, Fare collection etc. are deliberated and would be addressed in later phase and could be added as separate parts to the current document..

Based on these directions, the AISC Panel on ITS has prepared this AIS-140 titled, “Intelligent Transportation Systems (ITS) - Requirements for Public Transport Vehicle Operation”

The panel has also deliberated and identified the necessary elements for an effective implementation of vehicle level ITS system.

This standard has been prepared by considering inputs received from all stake holders on ITS, mainly -

- a. Directions of CMVR-TSC
- b. Detailed Specification Document on Vehicle Tracking Devices (dated 4th March 2015, published by MoRTH)
- c. Report of Department of Telecom (Telecom Engineering Centre) Automotive Working Group on M2M enablement in Intelligent Transport System (ITS)

This AIS on ITS, has been provisioned for device level approval; including construction and target vehicle level approval. Device level approval is needed to enable retro-fitment of ITS systems on in-use vehicles. This will ensure ITS Backend Control Centre infrastructure already presents with the STUs can be more fully utilized and make the investment in the Backend Control Centre infrastructure more viable.

As per the direction of CMVR-TSC which needed the Communication Protocol and Backend Control Centre requirement for tracking and handling the alerts to be detailed, the same has been addressed in Section 6 & 7, as detailed below.

- The devices would transmit data to the Backend Control Centre using 2G/3G/4G wireless connectivity (with SMS fall back) as per the protocol provided in respective sections (Section 6).
- The data from the devices would travel over the wireless telecom service provider network and finally get delivered at the Backend Control Centre. The detail about Device to Backend Communication Mechanism is mentioned in Section 7.

BIS and AIS both have panels which are formulating standards on ITS. It is our belief that taking the AIS route for the 1st implementation would give the faster time for adoption. Experts in the BIS panel and in DIMTS who are working on these subjects have been co-opted and invited to work in the AIS panel to make the AIS as robust as possible. Once implemented and all implementation problems in this emerging technology have been eliminated, BIS standard can be made with further inclusions if any resulting from consultations with the wider stakeholder community. Because of these reasons, we recommend the AIS route for regulation creation and first implementation.

One of the major concerns which has been raised during the panel meetings is on the issue of privacy encroachments by ITS systems. Some overseas member countries of the 1958 agreement have been continuously emphasizing in WP29 forums that the regulated ITS system must not encroach on privacy. Towards this, the panel has submitted a document titled 'Data Privacy in Transportation ITS' To help the system developers deal with these issues. Further, system developer can also take guidance from 'IS/ISO/TR 12859: 2009 - Intelligent Transport Systems — System Architecture — Privacy Aspects in ITS Standards and Systems' while developing their systems to meet the requirements of this standard. The Panel and the Automotive Industry Standards Committee (AISC) responsible for preparation of this standard are given in Annexure-D and Annexure -E respectively.

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Intelligent Transportation Systems (ITS) - Requirements for Public Transport Vehicle Operation

1.0 SCOPE

1.A.0 This standard applies to both individual components as well as system environment intended to be used in Public transport vehicles.

1.A.1 INTELLIGENT TRANSPORTATION SYSTEMS-VLT WITH AN EMERGENCY SYSTEM

Requirements on ITS devices and functions - Vehicle Location Tracking and Emergency Button.

1.B.0 DEFINITIONS:

For the purpose of this standard, definitions are given below:

1.B.1 “Acquisition sensitivity” refers to the minimum signal level at which the device is able to successfully perform a cold start TTFF. The acquisition sensitivity test is a simulated signal test.

1.B.2 “Assisted GPS (A-GPS)” is a system allowing satellite receivers to obtain information from communication network resources to assist in acquiring satellite location. A-GPS system is especially useful when the receiver is in a location where it is difficult for the satellite signals to penetrate. In addition to providing better coverage, A-GPS also improves the start-up time, which is the time required by the satellites and the receivers to establish a reliable connection.

1.B.3 “Circular Error Probability (CEP)” is defined as the radius of a circle centered on the true value that contains 50% of the actual GPS measurements. So a receiver with 5 meter CEP accuracy will be within 5 meter of the true measurement 50% of the time. The other 50% of the time the measurement will be in error by more than one meter.

1.B.4 “Dilution of Precision (DOP)” is the degree of proximity of the location data to their mean value. The relative position of satellites affects the accuracy of location calculation by the locating module. Location coordinates computed when the satellites are clustered together suffer from dilution of precision (DOP), a factor that multiplies the associated errors. The DOP for an ideal satellites constellation arrangement equals close to 1, which does not magnify the underlying errors.

1.B.5 “Distance Root Mean Square (DRMS also called RMS, 1Sigma)”

This is computed as square root of the average of the squared horizontal position errors with 65% probability. The position expressed has the probability of being within a circle with radius with 65% probability. A locating module with 6 metre DRMS accuracy would be within 6 meters of its actual position 65% of the time.

- 1.B.6 **“Emergency Button”** A button provided in vehicle for passengers or crew members to send specialized data packet /SMS to Centralized regulatory server to indicate safety/panic situation caused by human or natural disaster or vehicle accident etc.
- 1.B.7 **“Global Positioning System (GPS)”** is a space-based radio navigation system. It provides positioning, navigation, and timing services to military and civilian users on a continuous basis.
- 1.B.8 **“Sensitivity”** refers to the minimum signal strength level at which locating module can successfully perform a location fix. A GNSS locating module has two different sensitivity levels – acquisition sensitivity and tracking sensitivity.
- 1.B.9 **“Time to First Fix (TTFF)”** describes the time required for a tracking device to acquire adequate satellite signals and related data (almanac and ephemeris data) to compute location.
- 1.B.10 **“Tracking Sensitivity”** refers to the minimum signal level at which the device is able to successfully maintain the location fix. The acquisition sensitivity test is a simulated signal test.
- 1.B.11 **“Vehicle Location Tracking (VLT)”** device uses satellite based location technology to determine and record the precise location of a vehicle at regular intervals. The location data so determined can be stored within the device, and/or can be transmitted to the Backend Control Centre using a wireless communication modem built in the device.

1.C REFERENCES:

The References are listed below.

- 1.C.1 National Level Vehicle Security and Tracking System – Detailed Specification Document on Vehicle Tracking Devices (GPS) (Published by MoRTH MoRTH).
- 1.C.2 APTA TCIP - American Public Transportation Association (APTA) Standard for Transit Communications Interface Profiles (TCIP)
- 1.C.3 EBSF - European Bus System of the Future
- 1.C.4 ISO 11898-1:2003 Road vehicles — Controller area network (CAN)
- 1.C.5 SAE J 1939 Recommended Practice for a Serial Control and Communications Vehicle Network.
- 1.C.6 Bus-FMS-Standard
- 1.C.7 SAE USCAR 18 / USCAR18-3 - FAKRA SMB RF CONNECTOR SUPPLEMENT
- 1.C.8 National ITS Architecture - U.S. Department of Transportation
- 1.C.9 ISO 17185-1:2014 - Intelligent transport systems — Public transport user information — Part 1: Standards framework for public information systems

- 1.C.10 Trans model Standard (CEN/TC 278 WG3/SG4, Reference Entity-Relationship Data Model for Public Transport) - European reference data model for Public Transport operations developed within several European Projects - EN 12896:2006
- 1.C.11 Specification for Entity-Relationship for describing the main fixed objects in Public transport CEN/TC 278, 2008 - EN 28701:2012
- 1.C.12 RTIG (Real Time Information Group Ltd) - Digital Air Interface Protocol
- 1.C.13 SIRI (Service Interface for Real Time Information) European Technical Specification (TS) - CEN/TS 15531
- 1.C.14 NeTEx-Network Exchange European Technical Specification (TS) CEN/TS 16614
- 1.C.15 NaPTAN (National Public Transport Access Node)
- 1.C.16 ISO 15638-15:2014 Intelligent transport systems – Framework for cooperative telematics applications for regulated vehicles (TARV) – Part 15: Vehicle location monitoring
- 1.C.17 ISO 15638-5:2013 Intelligent transport systems – Framework for collaborative Telematics Applications for Regulated commercial freight Vehicles (TARV) – Part 5: Generic vehicle information
- 1.C.18 NMEA-0183: The NMEA 0183 standard defines an electrical interface and data protocol for communications between marine instrumentation.
- 1.C.19 IS/ISO/TR 12859:2009 – Intelligent Transport System-System Architecture-Privacy Aspects in ITS standards and systems
- 1.C.20 Report of Department of Telecom (Telecom Engineering Centre) Automotive Working Group on M2M enablement in Intelligent Transport System (ITS)
- 1.C.21 URL: <http://tec.gov.in/pdf/M2M/M2M%20Enablement%20in%20ITS.pdf>

2.0 APPLICATION FOR CMVR TYPE APPROVAL

- 2.1 The application for CMVR device level approval shall be accompanied by information on the system specification as mentioned in Annexure A.
- 2.2 Type approval shall involve following steps:
 - 2.2.1 **Device Approval:** Approval provided at Device level for compliance to this standard.

These approved devices can be fitted / retro-fitted by manufacturer/ dealer/ permit holder/system integrator in any vehicle model provided it shall meet installation requirements as mentioned in Clause No. 5 of this standard. For manufacturers seeking vehicle level approval with approved VLT with Emergency Buttons fitted shall only require installation approval as per the provisions of Clause 5 and Sub-Clause 6.1 of Clause 6.

2.3 Modifications and Extension of Approval

2.3.1 Every modification pertaining to the information, even if the changes are not technical in nature declared in accordance with clause 2.1, shall be intimated by the VLT with Emergency Button Manufacturer to the test agency.

2.3.1.1 If the changes are in parameters not related to the provisions, no further action need be taken.

2.3.1.2 If the changes are in parameters related to the provisions, the test agency, which has issued the certificate of compliance, may then consider, based on the justification provided by the VLT with Emergency Button Manufacturer and reviewed by the test agency, whether,

The model with the changed specifications still complies with provisions;

Or,

Any further verification is required to establish compliance.

2.3.2 In case of 2.3.1.2, tests for only those parameters which are affected by the modifications need be carried out based on Criteria for extension of type approval as per Annexure B.

2.3.3 In case of fulfilment of criterion of clause 2.3.1.1 or after results of further verification as per clause 2.3.1.2 are satisfactory, the approval of compliance shall be extended for the changes carried out.

3.0 ITS FUNCTIONS AND REQUIREMENTS

The list of ITS functions envisaged from this device type is set out below in Table 3A –

Table 3A: List of ITS Functions and Sub Functions	
Function	Sub Functions
Safety and Security	Emergency Buttons
	Vehicle Location Tracking (VLT)

The above functions and their requirements shall be met by only single device that can be interfaced by external emergency buttons. The communications to Backend Control Server (Government authorized server) shall be done by device as per the protocol and functionalities defined below.

3.1 Vehicle Location Tracking (VLT) With Emergency Button

3.1.1 Functional Requirements for VLT

- 3.1.1.1 Device shall be capable of obtaining position information using Global Navigation Satellite System (GNSS). GNSS receiver specifications are as follows:
- a. Device shall be capable for operating in L and/or S band and include support for NAVIC/IRNSS (Indian Regional Navigation Satellite System) for devices installed on or after 1st April, 2018.
 - b. The Device shall support GAGAN, the Indian SBAS (Satellite Based Augmentation System).
 - c. Device shall have a position accuracy of minimum 2.5 m CEP or 6 m 2DRMS.
 - d. Device shall have an acquisition sensitivity of minimum (-) 148 dBm.
 - e. Device shall have a tracking sensitivity of minimum (-) 165 dBm.
 - f. Device shall have an internal antenna; however if in case of Integrated systems with vehicle / aftermarket OEM approved kits if the fitment location prevents the internal antenna from functioning, then external antenna shall be provided.
- 3.1.1.2 Device shall support standard minimum I/Os as mentioned: 4 Digital, 2 Analogue and 1 Serial Communication (e.g. RS232) for interfacing external systems (E.g. Digital input for Emergency request button interfacing).
- 3.1.1.3 Device shall be capable of transmitting data to Backend Control Server (Government authorized server) via Wide Area (Mobile) Communications network (GSM/GPRS) as per Communication Protocol in Section 4.
- 3.1.1.4 Device shall be capable of transmitting Position, Velocity and Time (PVT data) along with heading (direction of travel) to a Backend Control Server (Government authorized server) at configurable frequency as per Communication Protocol of Section 4.
- The fixed frequency shall be user configurable, minimum frequency shall be 5 sec during vehicle operation and not less than 10 minutes in sleep/IGN OFF) as per the protocol defined in Communication Protocol of Section 4.
- 3.1.1.5 Device shall be capable of transmitting data to minimum 2 different IP addresses (1 IP address for regulatory purpose (PVT data) and 1 IP address for Emergency response system other than the IP's required for Operational purpose).
- 3.1.1.6 On pressing of Emergency button, the system implementing VLT function shall send emergency Alert (Alert ID 10 as mentioned in Sub-section 4.2.1 of Communication Protocol Section 4) to the configured IP address(s) as per the Communication Protocol mentioned in Section 4. In the absence of GPRS network, the emergency alert shall be sent as SMS message along with vehicle location data to configured control center number(s). The SMS shall consist parameters as given in Sub-section 4.2.2.

- 3.1.1.7 Device shall have an internal back-up battery to support 4 hours of normal operations (to be tested for positional record transmission at a frequency of 60 sec).
- 3.1.1.8 Device shall be capable of transmitting alerts to the Backend Control Server (Government authorized server) directly. The applicable list of alerts is given in Section 4.2 (Alert ID 3 to 12) of Section 4.
- 3.1.1.9 Device shall support over the air software and configuration update.
- 3.1.1.10 Device shall support basic standard configuration (Mobile communications network settings, Backend Control Server (Government authorized server) details, data frequencies, alert thresholds etc.) as per configuration specification defined in Section 4.
- 3.1.1.11 Device shall support store and forward mechanism for all type of data (periodic data and alerts) meant for backend transmission. The system shall store data in internal memory during communication network unavailability and transmit the data when the connection resumes in last in first out (LIFO) manner. The live data shall be given higher priority for transmission than back log (stored data) at any point in time.
- 3.1.1.12 The Device shall have a unique identifier for identifying the VLT device and data. The unique ID shall be stored in a read only memory area so that it cannot be altered or overwritten by any person. The unique identifier may be Vehicle Identification number or IMEI (International Mobile Station Equipment Identity) Number.
- 3.1.1.13 Device shall store/write the registration number of the vehicle in the internal nonvolatile memory.
- 3.1.1.14 Device shall have an Embedded SIM.
- 3.1.1.15 Device shall be designed to operate between 8VDC and 32VDC using vehicle battery input voltage range 12 /24Volts.
- 3.1.1.16 Device shall have a sleep mode current ≤ 20 mA (If the function is implemented in a dedicated system/device).
- 3.1.1.17 Device shall support any operational GNSS system with 12 (minimum) acquisition channels.
- 3.1.1.18 The Device shall support:
- Location on GPRS/SMS
 - Non-volatile memory to store min 40,000 positional log
 - Configurable backup SMS facility in case of GPRS failure
 - Capability to send serving and adjacent cell ID as well as network measurement report (NMR)

- 3.1.1.19 The Device GNSS module shall have:
- The capability of Hot start <5s
 - The capability of Warm start : < 30s
 - The capability of Cold start < 40 s
- 3.1.1.20 Device shall support Outputs as per NMEA 0183
- 3.1.1.21 The Device GPRS module shall have:
- Multi slot GPRS with In - built Quad-band GPRS module/Modem
 - GPRS class 10 or above
 - Support Embedded SIM to cater to the automotive operational requirement such as vibration, temperature and humidity and provide long life span with at least 10 years life and more than 1 million read/write cycles
 - GPRS module & SIM shall support
 - SMS, Data (GPRS, TCP/IP) and
 - Support multiple network OTA switching (on-demand/automatic) capabilities.
- 3.1.1.22 Device shall be dust, temperature, vibration, water splash resistant, IP 65 rated or better, tamper proof as per Section 6.
- 3.1.1.23 Device shall be manufactured using processes as per quality management standard for automotive industries i.e. ISO/TS 16949 updated from time to time.
- 3.1.1.24 Device shall support A-GPS (Assisted GPS).
- 3.1.1.25 Device shall have provision of secured data transmission to the Backend Control Centre from the devices through secured channel (e.g. secured dedicated APN).
- 3.1.1.26 Device shall have 3 axis accelerometer and 3 axis gyroscope for getting the alerts on harsh breaking harsh acceleration, and rash turning.
- 3.1.2 **Functional Requirement for Emergency System**
- 3.1.2.1 Passengers or in-vehicle crew present in the vehicle shall be able to make an emergency request by pressing the emergency button provided.
- 3.1.2.2 The emergency request function shall not exist as standalone. The function shall be part of Vehicle Location Tracking (VLT) system. An alert shall be sent to the Backend Control Server (Government authorized server) when emergency request is raised. De-activation shall always be from authorized government server who receives alert message i.e. NERS system as mentioned in Sub-section 4.2.2.

- 3.1.2.3 The Emergency Buttons will be 'Normally Closed' (NC) type. The form factor of Emergency Buttons will be such that the button is easy to press in the case of an emergency, and simultaneously also minimizes the possibility of accidental or unintended press thereby causing a false alert.
- 3.1.2.4 On pressing of Emergency button, the system implementing VLT function shall send emergency Alert (Alert ID 10 as mentioned in Sub-section 4.2.1 of Communication Protocol Section 4) to the Backend Control Server (Government authorized server) as per the Communication Protocol mentioned in Section 4. In the absence of GPRS network, the alert shall be sent as SMS message along with vehicle location data to configured control center number. The SMS shall consist of parameters as given in Sub-section 4.2.2.
- 3.1.2.5 In absence of both GPRS and GSM networks and on pressing of Emergency Button, the system implementing VLT function shall store the emergency Alert (Alert ID 10 as mentioned in Sub-section 4.2.1 of Communication Protocol Section 4). Once the GPRS or GSM is available, this alert information shall be sent on high priority to the configured IP addresses as per the communication protocol mentioned in Section 4 or as SMS message along with vehicle location data to configured control center number. The SMS shall consist of parameters as given in Sub-section 4.2.2.

3.1.3 **Configuration of Device Parameters Over the Air (OTA)**

The device shall support at least the below parameters to be configurable over the air (through SMS and GPRS). The updation shall be allowed only over an 'authenticated' channel:

1. Setting/ Change of the Primary or Secondary IP and port number
2. Setting/ Change of the APN
3. Set configuration parameter like sleep time, overspeed limit, harsh braking, harsh acceleration, rash turning threshold limits etc.
4. Emergency control SMS Centre Number(s)
5. Configuring the vehicle registration number
6. Configuring the frequency of data transmission in normal / Ignition state / OFF state sleep mode/ Emergency state, etc.
7. Configuring the time duration for Emergency state
8. Capability to reset the device
9. Command to get the IMEI of the device

Configurable commands must involve the following features:

- SET: For setting the parameters.
- GET: For enquiring regarding the parameters such as mobile number, GSM strength, vehicle number and other important parameters.
- CLR: For clearing certain commands, alarms, alerts etc.

After each SET, GET, CLR command the device should send alert to

Backend Control Centre, as mentioned in Section 4 Alert 12, giving the details of Mode, mobile no/ IP of control center sending commands.

3.1.4 Tracking Device Health Monitoring Parameters

The device shall send status of health parameters at configurable interval and this threshold value shall also be configurable over the air. It shall be possible for health parameters to be fetched on demand via command as set out below in Table 3B.

Sl. No.	Field	Description
1	Start Character	\$
2	Header	The header of the packet/ identifier
3	Vendor ID	Vendor identification header
4	Firmware Version	Version details of the Firmware used in EX.1.0.0
5	IMEI	Identified of the sending unit. 15 digit standard unique IMEI no.
6	Battery percentage	Indicates the internal battery charge percentage
7	Low battery threshold value	Indicates value on which low battery alert generated in percentage
8	Memory percentage	Indicates flash memory percentage used
9	Data update rate when ignition ON	Indicates Packet frequency on ignition ON
10	Data update rate when ignition OFF	Indicates Packet frequency on ignition OFF
11	Digital I/o status	Inputs connected to the device.
12	Analog I/o status	Analog input status
13	End character	*

3.1.5 SMS Fall Back

In case of emergency state, (i.e. on pressing of Alert button), the device will shift to the SMS mode in case GPRS connectivity is not available. In such case, the device will send the Alert message and tracking data through SMS mode. Since SMS has the limitation of sending only 160 characters, so the tracking data to be sent in one SMS will have fields - IMEI, Latitude, Direction, Longitude, Direction, location fix, speed, Cell ID, LAC (Location Area Code), Date and Time as per emergency alert . The details is provided in Sub-section 4.2.2.

4.0 COMMUNICATION PROTOCOL

4.1 Data Frame Format

Table below (Table 4A) contains the listing of fields that the vehicle tracking devices would be required to send to the Backend Control Centre. The first 3 fields (Start character, Header for VLT with Emergency Buttons and Vendor ID, who has supplied the device) must be fixed in position as well as format (Header part of frame). Rest all other fields are required to be present in the location data sent by the devices to the backend, but can be in any sequence or with any separator between fields. The data value can be either in American Standard Code for Information Interchange (ASCII) or in HEX format. Device must transmit the Login message whenever it establishes (re-establishes after disconnection) its connectivity with Server with the specified fields. Login Message will carry following information:

- \$DeviceName – Vehicle number on which the device is installed.
- \$IMEI – 15 Digit IMEI number.
- \$Firmware – Version of the firmware used in the hardware.
- \$Protocol -Version of the frame format protocol.
- \$LastValidLocation – Last location info saved at the device.

Field	Description	Sample Data
Start Character	\$	\$
Header	The header of the packet/ identifier	
Vendor ID	Vendor identification header	
Firmware Version	Version details of the Firmware used in EX.1.0.0	1.0.0
Packet Type	Specify the packet type NR = Normal EA = Emergency Alert TA = Tamper Alert (Optional) HP = Health Packet IN = Ignition On IF = Ignition Off BD = Vehicle Battery Disconnect BR = Vehicle Battery	Depending upon the context, every frame from tracking device must carry a qualification code. This helps to determine the state in which vehicle is at that time.

	Reconnect BL = Internal Battery Low	
Packet Status	L=Live or H= History	L
IMEI	Identified of the sending unit. 15 digit standard unique IMEI no.	123456789012345
Vehicle Reg. No	Mapped vehicle registration number	DL1PC9821
GPS Fix	1 = GPS fix OR 0 = GPS invalid	1
Date	Date value as per GPS date time per GPS date time (DDMMYYYY)	220714
Time	Time value as per GPS date time in UTC format (hhmmss)	050656
Latitude	Latitude value in decimal degrees (not less than 6 places)	28.758963
Latitude Dir	Latitude Direction. Example N=North, S= South	N
Longitude	Longitude value in decimal degrees (not less than 6 places).	77.6277844
Longitude Dir	Longitude Direction. E=East, W= West	W
Speed	Speed of Vehicle as Calculated by GPS module in VLT. (in km/hrs.) (Upto One Decimal Value)	25.1
Heading	Course over ground in degrees	310.56
No of Satellites	Number of satellites available for fix	8
Altitude	Altitude of the device in meters	183.5
PDOP	Positional dilution of precision	
HDOP	Horizontal dilution of precision	
Network Operator	Name of Network	INA Airtel

Name	Operator	
Ignition	1= Ignition On , 0 = Ignition Off	1
Main Power Status	0 = Vehicle Battery disconnected 1= Vehicle Battery reconnected	1
Main Input Voltage	Indicator showing source voltage in Volts.(Upto One Decimal Value)	12.5
Internal Battery Voltage	Indicator for level of battery charge remaining. (Upto One Decimal Value)	4.2
Emergency Status	1= On , 0 = Off	0
Tamper Alert (Optional)	C = Cover Closed, O = Cover Open	C
GSM Signal Strength	Value Ranging from 0 – 31	25
MCC	Mobile Country Code	404
MNC	Mobile Network Code	10
LAC	Location Area Code	00D6
Cell ID	GSM Cell ID	CFBD
NMR (Network Measurement Report) Neighbouring Cell ID	Neighbouring 4 cell ID along with their LAC & signal strength	
Digital Input Status	4 external digital input status (Status of Input 1 to Input 3 (0=Off; 1=On))	0001
Digital Output Status	2 external digital output status (0=Off; 1=On)	01
Frame Number	Sequence Number of the messages (000001 to 999999)	000005
Checksum	Insures No error in transmission (optimal)	16
End Character	Indicated End of the frame	*

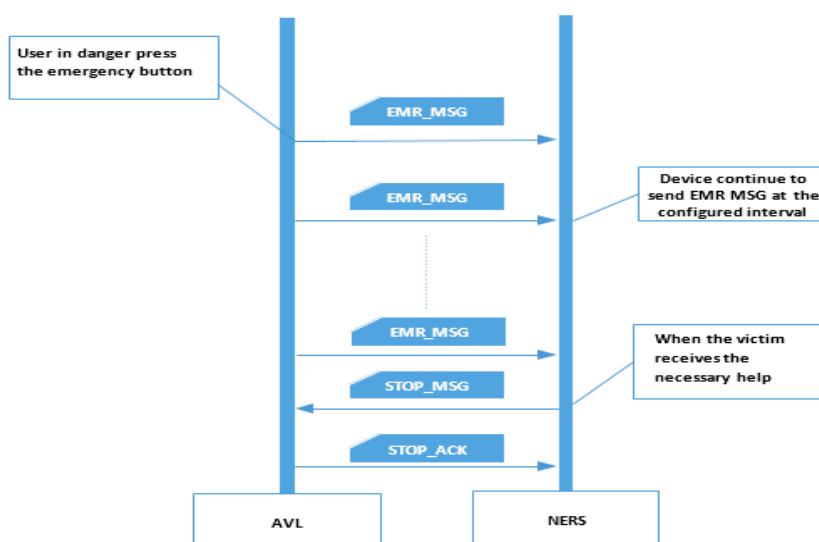
4.2 Messages & Alerts from Devices

4.2.1 Table below (Table 4B) contains the listing of alerts that need to come from the tracking devices. These alerts are applicable for both live packets as well as the history packets.

Alert ID	Message & Alerts	Remarks
1.	Location Update	Default message coming from each device
2.	Location Update (history)	Would be sent, if GPRS is not available at the time of sending the message in protocol format Zero, BLANK, NIL, etc.
3.	Alert – Disconnect from main battery	If device is disconnected from vehicle battery and running on its internal battery
4.	Alert – Low battery	If device internal battery has fallen below a defined threshold
5.	Alert – Low battery removed	Indicates that device internal battery is charged again
6.	Alert – Connect back to main battery	Indicates that device is connected back to main battery
7.	Alert – Ignition ON	Indicates that Vehicle's Ignition is switched ON
8.	Alert – Ignition OFF	Indicates that Vehicle's Ignition is switched OFF
9.	Alert – GPS box opened (Optional)	Optional message would be generated indicating GPS box opened
10.	Alert – Emergency state ON*	When any of the emergency button is pressed
11.	Alert – emergency State OFF	When emergency state of vehicle is removed
12.	Alert Over the air parameter change	When any parameter is changed over the air. Shall include the name of parameter changed and source of command
13.	Harsh Braking	Alert indicating for harsh braking.
14.	Harsh Acceleration	Alert indicating for harsh acceleration.

15.	Rash Turning	Alert indicating for Rash turning.
16	Device Tempered	Alert Indicating Emergency button wire disconnect/ wire cut etc.

4.2.2 In case of emergency alert, the alert message shall be sent to 2 different IP addresses hence the device shall support minimum 2 IP addresses (1 IP address for regulatory purpose (PVT data) and 1 IP address for Emergency response system other than the IP’s required for Operational purpose. The PVT data will send the emergency alert to the system. Primary alert will go to the emergency response Backend Control Centre (NERS/ MHA) as may be notified by the Government of India in the schema below:



Primary alert will go to the emergency response Backend Control Centre as notified by the Government of India in the indicative format below (Table 4C):

Attribute	Value / Description	Size
Packet Header	EPB, The unique identifier for all messages from VLT	Character, 3 bytes
Packet Header	EPB, The unique identifier for all messages from VLT	Character, 3 bytes
Message Type	Message Types supported. Emergency Message (EMR) or Stop Message (SEM)	Character, 2 bytes
Vehicle ID	Unique ID of the Vehicle (IMEI Number)	Character, 15 bytes
Packet Type	NM – Normal Packet, SP – Stored Packet	Character, 2 bytes

Date	Date and time of location the location obtained from the data in DDMMYYYY hhmss format	Character,14 bytes
GPS Validity	A – Valid, V – Invalid	Character, 1 byte
Latitude	Latitude in decimal degrees - dd.mmmmmm format	Double, 12 bytes
Latitude Direction	N – North, S – South	Character, 1 byte
Longitude	Longitude in decimal degrees - dd.mmmmmm format	Double, 12 bytes
Longitude Direction	E – East W – West	Character, 1 byte
Altitude	Altitude in meters (above sea level)	Double, 12 bytes
Speed	Speed of Vehicle as Calculated by GPS module in VLT. (in km/hr)	Float, 6 bytes
Distance	Distance calculated from previous GPS data	Float, 6 bytes
Provider	G - Fine GPS N - Coarse GPS or data from the network	Character, 1 byte
Vehicle RegnNo	Registration Number of the Vehicle	Character, 16 bytes
Reply Number	The mobile number to which Test response needs to be sent. (Emergency Mobile No. as specified by MHA/MoRTH/States.)	0
CRC	The 32 bit checksum of all the characters from the header up to the CRC field	8 bytes

*Above format is indicative only. These Format will be notified by the Government of India time to time.

4.3 **Testing of Configuration of Device Parameters Over the Air (OTA)**

The following testing will be done for

1. Setting/ Change of the Primary or Secondary IP and port number
2. Setting/ Change of the APN
3. Set configuration, parameter like sleep time for speed, harsh braking, rash turns, etc.

4. Emergency SMS Centre Number
5. Configuring the vehicle registration number
6. Configuring the frequency of data transmission in normal / Ignition state / OFF state sleep mode, Emergency state, etc.
7. Configuring the time duration for Emergency state
8. Capability to reset the device
9. Command to get the IMEI of the device

Configurable commands must involve the following features:

- SET: For setting the parameters.
- GET: For enquiring regarding the parameters such as mobile number, GSM strength, vehicle number and other important parameters.
- CLR: For clearing certain commands, alarms, alerts etc.

5.0 CONSTRUCTION AND INSTALLATION

(To be verified on component level and target vehicle level approval)

5.1 Requirements on vehicle interface for VLT with Emergency Button

Connector for Power

The requirements for interface shall be as below or as agreed between vehicle manufacturer and device manufacturer.

Standard connectors conforming to ISO 15170 shall be used at vehicle side. Connector requirements shall be as per Annexure – C, Clause 1.1 (Sl. No 1 - Low power systems 1)

However, Device/System side connector/s shall be pre-agreed with equipment manufacturer by

- Vehicle OEM in the case of OE fitment of the systems
- System supplier in case of retro fitment in aftermarket.

These requirements do not apply to integrated systems with vehicle where integration is done by vehicle manufacturer and /or System Integrator.

5.2 Requirement of Emergency System

Emergency button shall be one time press type. Separate release action from authorized server shall be required to bring back the emergency button to normal mode or clear emergency flag.

5.3 Physical Mounting

The VLT system shall be mounted in a suitable location such a way that it is not easily accessible /exposed to passengers.

This requirement shall not be applicable in case of combined systems VLT with HMI (Human Machine Interface) display in front of driver.

Test agency to verify this on vehicle level approval.

Emergency button(s) shall be fitted in such a way that every passenger including driver shall be able to access the Emergency button(s).

Passenger Car shall have 2 emergency buttons on each passenger row easily assessable by each of the passenger. There shall also be one dedicated emergency button for the driver.

Passenger Transport bus shall have emergency buttons at locations easily visible & assessable to all the passengers such as every 2 meters on both the sides on passenger seating area. For seats reserved for ladies there shall be a dedicated panic button for each row.

Test agency to verify this on vehicle level approval.

5.4 **Power Supply**

The vehicle tracking device will be installed on vehicles in which the power supply voltage from vehicle battery is widely varying (12V, 24V etc.) and also the power supply is not as stable as that in case of fixed locations, especially during engine start-up and braking when the voltage can fall to as low as 9V. Typically electronic devices are very sensitive to power surges and spikes, and equipment may fail if they do not receive stable power supply. The devices will need to have a resilient power supply unit that can withstand such fluctuations and the devices also need to have power backup so that they continue to function for some duration when the vehicle battery is not functional or is disconnected from the devices.

Vehicle power interface shall have

- One common ground linked to vehicle chassis
- One permanent power Supply (12/24V) connected to the vehicle battery
- One non-permanent power line (12/24V) connect to the battery after ignition

5.4.1 **Electrical Wiring**

The wiring harness used in the device shall be tested for flammability as per IS 2465.

6.0 **FUNCTIONAL, PERFORMANCE, DURABILITY, ENVIRONMENTAL AND PROTOCOL TESTS**

6.1 **Vehicle Level Functional Tests**

Following functionalities for each of the systems shall be demonstrated at the vehicle, in case system is provided by the vehicle OEM.

6.1.1 **Vehicle Location Tracking With Emergency Button**

6.1.1.1 Vehicle OEM shall only provide/ installed devices approved under component level testing.

6.1.1.2 System transmits PVT information to Backend Control Center (2 different IPs) at user configurable frequency (minimum 5 seconds) via GSM/GPRS.

6.1.1.3 System to communicate to control center on the occurrence of the alerts captured in Communication Protocol of Section 4.

6.1.2 **Emergency Request**

Emergency request function - When the emergency buttons (as applicable) placed anywhere in the vehicle is pressed by any passenger / crew, make sure that the emergency request message is send/received at the control center.

6.2 **Component Level Functional Tests**

Following functionalities for each of the systems shall be demonstrated. At the choice of the manufacturer, these functionalities can also be alternately demonstrated at the vehicle level and shall be deemed to be complied with at component level as well.

6.2.1 **Vehicle Location Tracking**

6.2.1.1 Standard connector provided for Power and other signals as per Annexure C.

6.2.1.2 Configuration of device as per the standard format mentioned in Section 4.

Local configuration upload shall be verified.

Configuration upload from control center shall be verified.

6.2.1.3 Vehicle Location data transmission to Backend Control Center.

6.2.1.4 Backend Control Centre shall be able to check the version of firmware loaded on the system.

6.2.1.5 Update the firmware of the system from Backend Control Centre

6.3 **Device Level Functional, Performance & Durability Tests**

The tests to be performed for device level approvals are as listed below. These functionality check will be performed after each test as acceptance criteria –


Tested systems shall satisfy general functional requirements at all the specified ranges during the test and after the test.

Following to be checked after testing:

- i) Tracking functionality shall be checked via Backend Control Centre for the VLT system (Functional Test number 1 as per “Table 6A Functional Testing”.

6.3.1 **Functional Testing**

Functional Testing as described in the Table 6A below shall be done with the acceptance criteria in Table 6A after completion of all the Performance & Durability Tests as listed in Table 6B.

Table 6A: Functional Testing		
Sl. No	Test	Test Procedure
1	Tracking Functionality Test	<p>The test shall be conducted on VTL to determine the proper functioning of VLT with Emergency Button by testing its connectivity to Backend Control Centre (Government authorized server).</p> <p>Procedure: The VLT with Emergency Button shall be connected to vehicle battery to switch it on. The VLT with Emergency Button shall be tested for the connectivity to server and its capability to send two location messages</p>
2	Location Accuracy Test	<p>This test shall be conducted on VLT with Emergency Button.</p> <div style="text-align: center;">  </div> <p>The receiver is placed into a cold start state – usually by a command sent to the receiver through a test connection – and then a fairly strong navigation signal simulating in L and/or S band is sent. The time it takes for the receiver to determine its first good location fix is recorded. Test is done many times (>15 times) over many conditions and the results are averaged.</p> <p>Acceptance Criteria: 2.5 m CEP or 6 m 2DRMS</p>
3	Acquisition Sensitivity Test	<p>This test shall be conducted on VLT with Emergency Button.</p> <p>Procedure: Set the simulator to output navigation signal simulating L and/or S band to a particular location with a very level so that the tracking is not possible. Gradually increase the signal level that allows the receiver to successfully perform a cold start TTFF within a specified time frame. The minimum signal level that allows acquisition</p>

		<p>is referred as to the acquisition sensitivity.</p> <p>Acceptance Criteria: The acquisition sensitivity shall be minimum (-) 148 dBm.</p>
4	Tracking Sensitivity Test	<p>This test shall be conducted on VLT.</p> <p>Procedure: The device under this test is locked on to the simulator's output frequency (navigation signal simulating L and/or S band) and the simulator power output is lowered until the lock is lost. Multiple repetition of the test with different satellite geometries ensures that an accurate average measure is recorded.</p> <p>Acceptance Criteria: The tracking sensitivity shall be equal to or better than (-) 165 dBm.</p>
5	Cold-Start Time to First Fix (TTFF) Test	<p>The device in this test is placed into a cold start state. The time it takes for the device to determine its first good location fix is recorded. The cold start test is performed several times and the results are averaged.</p> <p>Acceptance Criteria: The cold start TTFF shall be less than 40 seconds at Open Sky condition or (-) 130 dBm.</p>
6	Warm-Start Time to First Fix Test	<p>In this test the device is started in warm start mode and time taken by device to determine the first valid location fix is recorded. This is done several times and results are averaged.</p> <p>Acceptance Criteria: The warm start TTFF shall be less than 30 seconds at Open Sky condition or (-) 130 dBm.</p>
7	Hot-Start Time to First Fix Test	<p>In this test the device is started in Hot start mode and time taken by device to determine the first valid location fix is recorded. This test is performed several times and results are averaged.</p> <p>Acceptance Criteria: The hot start TTFF shall be less than 5 seconds.</p>
8	SIM Test	<p>This test is to check the suitability of the SIM and communication module. The test shall be conducted to determine the effectiveness and operation of the GPRS module with OTA network switching capabilities on demand as well as automatically in real-time. The test consist of two type of testing as below:</p>

		<p>1. The device would be tested to perform as per the protocol using an embedded SIM.</p> <p>2. The GPRS module & SIM, shall support:</p> <ul style="list-style-type: none"> ○ SMS, Data (GPRS, TCP/IP) and ○ Support multiple network OTA switching capabilities (On Demand as well as Automatic Switching on real-time basis) <p>Acceptance Criteria: In the testing, vendors has to demonstrate the embedded SIM based tracking and multiple network OTA switching capabilities (On Demand as well as Automatic Switching on real-time basis) for effective network management and transmission.</p>
9	Interference Test	<p>Interference testing is a type of test, in which Cold Start/Hot Start test are performed with device exposed to interfering signals and the performance as recorded. In this test, the GPS receiver is turned on and allowed to achieve a location fix. The jamming signal is then added to the GPS signal at a level that is detectable to the GPS receiver. The jamming signal power level is increased in 1 dB increments until the first degradation of the GPS receiver is noticed. This is typically a dropped satellite. The jamming signal power level is again slowly increased until the GPS receiver loses its 3D navigation fix.</p> <p>Acceptance Criteria: The Interference shall not result in any degradation of the Cold Start/Hot Start TTFB times. In addition, it shall not result in any degradation of the absolute location accuracy required and the same shall be 2.5 m CEP or 6 m 2DRMS.</p>
10	Multipath Test	<p>This test is a simulated frequency test conducted to determine the effect of multipath signals. The signal from a single satellite is simulated to arrive at the device via two or more paths. One path is typically a direct path, and other paths are typically a reflection of the same signal from building or structure. Multipath testing is a kind of a meta-test in that some of the above tests are done with the addition of multi-path simulation of one or more satellites by the GPS signal simulator.</p>

		<p>Acceptance Criteria: The multipath shall not result in any degradation of the Cold Start/Hot Start TTF times. In addition, it should not result in any degradation of the absolute location accuracy required and the same shall be 2.5 m CEP or 6 m 2DRMS.</p>
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6.3.2 Performance & Durability Test

The Performance & Durability Test is listed in Table 6B.

Table 6B: Performance & Durability Test		
Sl. No	Test	Test Procedure
1	Shock Test	<p>Shock test is performed to provide a degree of confidence that the device can physically and functionally withstand the relatively infrequent, non-repetitive shocks encountered in transportation environments. This test provides an assessment of the effect of the shocks on the performance of the device. The test shall be performed as per IS 9000-part 7 – 2006. Severity Level = 15g, Impact duration = 11ms, Impact Type = Half sine, Total number of impact = 9 (3 on each axis)</p> <p>Acceptance Criteria: Device after the shock test shall be required to meet the provisions of Functional Test Number 1 as listed in Table 6A.</p>
2	Vibration Test	<p>This test is performed to check that the device the device can physically and functionally withstand the vibration exposures in the life cycle typically encountered in a vehicular environment. The test shall be performed as per IS 9000-part 8 – 1981. The test specimen mounted on a suitable support shall be rigidly fixed on a suitable vibrating machine constructed to produce simple harmonic function (total amplitude of 1.5 mm) and shall be subjected to vibration through a frequency range of 10-55-10 Hz in a sweep period of 1 min with continuously varying frequencies. The vibration shall be applied for not less than 1 h in the directions of each of the 3 major axes of the light.</p> <p>Acceptance Criteria: During and after the test the device shall be required to meet the provisions of Functional Test Number 1 as listed in Table 6A.</p>

3	Ingress Protection (IP)	<p>The vehicle tracking devices must be able to work in dusty environment that are typically encountered by the public transport vehicles where these would be installed. IP rating (IS/IEC 60529 - 2001) is used for specifying the environmental protection characteristics of the tracking device. The device will be tested for dust and water ingress according to IP 65 rating.</p> <p>Acceptance Criteria: The device shall be required to meet the provisions of Functional Test Number 1 as listed in Table 6A.</p>
4	EMI/EMC	<p>The Electromagnetic Interference (EMI) and Electromagnetic Compatibility (EMC) tests are performed to assess whether the device performs its intended functions in the electromagnetic environment to which it would be exposed. Further, the device shall not generate electromagnetic disturbances that may influence other equipment in the vicinity.</p> <p>Acceptance Criteria: The device shall meet the EMI/EMC requirements as per AIS 004 (Part 3).</p>
5	Battery Backup Test	<p>Battery backup is the amount of time that the device battery can support sending the data without being connected to the power source. This test will be performed by disconnecting the input charging voltage to the device. On disconnecting the external supply, battery would use its charge capacity to send data through GPRS. Time duration between external power disconnect to the last data packet time denotes the battery backup time.</p> <p>Acceptance Criteria: Device shall be able to work in active mode for a period of 4 hours or more at the polling/ transmission rate of 60 sec</p>
6	Reverse Polarity Protection without Fuse	<p>The device to be tested shall be connected to a reversed voltage of 14 V for 12 V systems and 27 V for 24 V systems for 2 min after connecting the system to the suitable circuit.</p> <p>Acceptance Criteria: After test; the device shall be required to meet the provisions of Functional Test Number 1 as listed in Table 6A.</p>

7	Wiring Harness - Flammability Test	Flammability Test: The wiring harness used in the device shall be tested for flammability as per IS 2465.																				
8	Wiring Harness - Electrical Properties	As per AIS 028 or DIN72551 or ISO 6722																				
9	Free Fall	IS 9000 (Part VII/Sec 4) Free fall at 500 mm. Acceptance Criteria: After test the device shall be required to meet the provisions of Functional Test Number 1 as listed in Table A																				
10	Performance Parametric Test (Nine points, tri temperature/tri voltage)	<p>During testing, VLT with Emergency button shall be kept inside test chamber in power ON condition.</p> <p>(System shall be stabilized for minimum 5 min at each condition.</p> <p>At each test point the system will be powered on and shut down 5 times with a duration of 1 min ON and 1 min OFF time)</p> <p>Following are the various voltages & temperatures</p> <table border="1" data-bbox="815 1189 1310 1868"> <thead> <tr> <th>24V System</th> <th>12V System</th> </tr> </thead> <tbody> <tr> <td>18V, -25°C</td> <td>9V, -25°C</td> </tr> <tr> <td>18V, +80°C</td> <td>9V, +80°C</td> </tr> <tr> <td>18V, Room Temperature</td> <td>9V, Room Temperature</td> </tr> <tr> <td>27V, -25°C</td> <td>13.5V, -25°C</td> </tr> <tr> <td>27V, +80°C</td> <td>13.5V, +80°C</td> </tr> <tr> <td>27V, Room Temperature</td> <td>13.5 V, Room Temperature</td> </tr> <tr> <td>32V, -25°C</td> <td>16V, -25°C</td> </tr> <tr> <td>32V, +80°C</td> <td>16V, +80°C</td> </tr> <tr> <td>32V, Room Temperature</td> <td>16V, Room Temperature</td> </tr> </tbody> </table> <p>Acceptance Criteria: The device shall be required to meet the provisions of Functional Test Number 1 as listed in Table A for each value of the temperature and voltage.</p>	24V System	12V System	18V, -25°C	9V, -25°C	18V, +80°C	9V, +80°C	18V, Room Temperature	9V, Room Temperature	27V, -25°C	13.5V, -25°C	27V, +80°C	13.5V, +80°C	27V, Room Temperature	13.5 V, Room Temperature	32V, -25°C	16V, -25°C	32V, +80°C	16V, +80°C	32V, Room Temperature	16V, Room Temperature
24V System	12V System																					
18V, -25°C	9V, -25°C																					
18V, +80°C	9V, +80°C																					
18V, Room Temperature	9V, Room Temperature																					
27V, -25°C	13.5V, -25°C																					
27V, +80°C	13.5V, +80°C																					
27V, Room Temperature	13.5 V, Room Temperature																					
32V, -25°C	16V, -25°C																					
32V, +80°C	16V, +80°C																					
32V, Room Temperature	16V, Room Temperature																					

11	Insulation Resistance Test	<p>Test shall be conducted as per ISO 16750-2:2010 after damp heat test mentioned in point 3 of the Section 6.4. System/components shall remain 0.5 h at RT after the damp heat test.</p> <p>Test shall be conducted With a voltage of 500 V DC. Acceptance Criteria: Insulation Resistance shall be > 1 MΩ.</p> <p>No arcing or puncturing of insulation allowed shall be observed</p>
12	Load Dump Test Pulse 5a	<p>VLT shall be tested for this.</p> <p>For 12 V System: A Voltage spike of 65V, 4 Ohms 200ms pulse-5a as per standard ISO 7637-2: 2004</p> <p>For 24 V System: A Voltage spike of 123V, 8 Ohms 200ms pulse-5a as per standard ISO 7637-2: 2004.</p> <p>Acceptance Criteria: Device shall meet functional class A as per ISO 7637-2: 2004. After test, the device shall be required to meet the provisions of Functional Test Number 1 as listed in Table 6A.</p>

6.3.3 Device Level Environmental Tests

The environmental tests to be performed for device level approvals are as listed in Table 6C.

Following to be checked after testing:

- i) Tracking functionality shall be checked via Backend Control Centre for the VLT with Emergency Button.

Sl. No	Test	Test Procedure
1	Dry Heat / High Temperature Test	<p>The high temperature test is used to evaluate effects of high temperature conditions on safety, integrity, and performance of the device. The test shall be carried out in accordance with Indian Standard IS: 9000 (Part 3/Sec 5) the device shall be subjected to temperature of $70 \pm 2^{\circ}\text{C}$ for 16 h in high temperature. Test with device in working condition. The recovery period shall be 2 h.</p>

		<p>Acceptance Criteria: Device during and after the high temperature test the device shall be required to meet the provisions of Functional Test Number 1 as listed in Table 6A.</p>
2	Cold Test	<p>The test shall be carried out in accordance with IS 9000 (Part 2/Sec 4 - 1977). The device under test shall be subjected to temperature of $-10 \pm 2^{\circ}\text{C}$ for 2 h with device in working condition. The recovery period shall be 2 h.</p> <p>Acceptance Criteria: Device during and after the cold test, the device shall be required to meet the provisions of Functional Test Number 1 as listed in Table 6A.</p>
3	Damp Heat Test	<p>The device under test shall be tested according to IS 9000 (Part 5/Sec 2 - 1981). The test is carried out at $+25^{\circ}$ to $+55^{\circ}$ C, Humidity 95%. Six cycles (each test cycle of 24 h) shall be run with device in off condition. Functional test shall be carried out with power in 'On condition' at start of 2nd, 4th and 6th cycle.</p> <p>Acceptance Criteria: Device during and after the test the device shall be required to meet the provisions of Functional Test Number 1 as listed in Table 6A.</p>
4	Temperature Shock	<p>Temperature shock test is carried out to determine if the device can withstand sudden changes in the temperature of the surrounding atmosphere without experiencing physical damage or deterioration in performance. The device shall be tested as per IS 9000 (Part 14/Sec 2) – 1978. Exposure time would be 3 hours/cycle and number of cycles would be two.</p> <p>Acceptance Criteria: Device after the test the device shall be required to meet the provisions of Functional Test Number 1 as listed in Table 6A.</p>
5	High Temperature Test	<p>The high temperature test is used to evaluate effects of high temperature conditions on safety, integrity, and performance of the device. The test shall be carried out in accordance with Indian Standard IS: 9000 (Part 3/Sec 5) the device shall be subjected to temperature of $70 \pm 2^{\circ}\text{C}$ for 16 h in high temperature. Test with device in working condition. The recovery period shall be 2 h.</p> <p>Acceptance Criteria: Device during and after the high temperature test the device shall be required to meet the provisions of Functional Test Number 1 as listed in Table 6A.</p>

6	Salt Spray Test	<p>The salt spray test is conducted to check corrosion resistance of device. The device shall be tested according to Clause 4.8 of IS 10250 for 96 h.</p> <p>Acceptance Criteria: The device shall be required to meet the provisions of Functional Test Number 1 as listed in Table 6A.</p>
7	High Voltage Test	<p>The test is conducted to ensure service life requirements & functionality. The device under test shall be operated for 60 minutes at 18 V for 12 V systems & 36 V for 24 V systems. This test is as per ISO 16750-2:2010</p> <p>Acceptance Criteria: Device during and after the test the device shall be required to meet the provisions of Functional Test Number 1 as listed in Table 6A.</p>

6.3.4 Protocol Testing

This set of testing needs to be done for all cases namely vehicle level testing and component (Device) level testing.

Protocol is a set of rules to be followed by the device while sending data to the Backend Control Centre. The protocol comprises data update rate, number of fields, start character, end character, alert type etc. Protocol testing involves checking the compliance of data sets received by the Backend Control Centre against the protocol both with respect to the data fields as well the format. It is expected that the data coming to a central server shall be exactly as required under the protocol. Table below (Table 6D) mentions the validation process for the protocol communication.

Table 6D: Protocol Testing Parameters	
Field Description Validation Process	
Field	Description
Start Character	\$
Header	The header of the packet/ identifier
Vendor ID	Vendor identification header
Firmware Version	Version details of the Firmware used in EX.1.0.0
Packet Type	Specify the packet type – NR = Normal EA = Emergency Alert TA = Tamper Alert

	HP = Health Packet IN = Ignition On IF = Ignition Off BD = Vehicle Battery Disconnect BR = Vehicle Battery Reconnect BL = Internal Battery Low
Packet Status	L=Live or H= History
IMEI	Identified of the sending unit. 15 digit standard unique IMEI no.
Vehicle Reg. No	Mapped vehicle registration number
GPS Fix	1 = GPS fix OR 0 = GPS invalid
Date	Date value as per GPS date time (DDMMYYYY)
Time	Time value as per GPS date time in UTC format (hhmmss)
Latitude	Latitude value in decimal degrees (with minimum 6 decimal places)
Latitude Dir.	Latitude Direction. Example N=North, S= South
Longitude	Longitude value in decimal degrees (with minimum 6 decimal places)
Longitude Dir.	Longitude Direction. Example E=East, W= West
Speed	Speed of Vehicle as Calculated by GPS module in VLT.(in km/hr)
Heading	Course over ground in degrees
No. of Satellites	Number of satellites available for fix
Altitude	Altitude of the device in meters
PDOP	Positional dilution of precision
HDOP	Horizontal dilution of precision
Network Operator Name	Name of Network Operator.
Ignition	1= Ign On , 0 = Ign Off
Main Power Status	0 = Vehicle Battery Disconnected 1= Vehicle Battery Reconnected
Main Input Voltage	Indicator showing source voltage in Volts.
Internal Battery	Indicator for Level of battery charge remaining

Voltage	
Emergency Status	1= On , 0 = Off
Tamper Alert (Optional)	C = Cover Closed , O = Cover Open
GSM Signal Strength	Value Ranging from 0 – 31
MCC	Mobile Country Code
MNC	Mobile Network Code
LAC	Location Area Code
Cell ID	GSM Cell ID
NMR (neighbouring Cell ID)	Neighbouring 4 cell ID along with their LAC and signal strength
Digital Input Status	4 external digital input status (Status of Input 1 to Input 3 (0=Off; 1=On))
Digital Output Status	2 external digital output status (0=Off; 1=On)
Frame Number	Sequence Number of the messages (000001 to 999999)
Checksum	Insures No error in transmission (optional)
End Character	Indicated End of the frame
The following test would be performed along with the protocol testing of the device:	

a) Memory Storage

The device shall support 40000 or more positional logs/packets. This is a functional test and the device will be simulated to be in non – GPRS coverage area and the logs will be maintained. The capacity of logging will be checked by monitoring the logs on the device.

b) Messages & Alerts from Devices

Table below (Table 6E) contains the listing of alerts that need to come from the tracking devices. These alerts are applicable for both live packets as well as the history packets.

Alert ID	Message & Alerts	Remarks
1.	Location Update	Default message coming from each device
2.	Location Update (history)	Would be sent, if GPRS is not available at the time of sending the message
3.	Alert – Disconnect from main battery	If device is disconnected from vehicle battery and running on its internal battery

4.	Alert – Low battery	If device internal battery has fallen below a defined threshold
5.	Alert – Low battery removed	Indicates that device internal battery is charged again
6.	Alert – Connect back to main battery	Indicates that device is connected back to main battery
7.	Alert – Ignition ON	Indicates that Vehicle's Ignition is switched ON
8.	Alert – Ignition OFF	Indicates that Vehicle's Ignition is switched OFF
9.	Alert – GPS box opened (Optional)	Message would be generated indicating GPS box opened
10.	Alert – Emergency state ON*	When any of the emergency button is pressed
11.	Alert – emergency State OFF	Emergency state of switch will be cancelled by backend server, when emergency state of vehicle is removed
12.	Alert Over the air parameter change	When any parameter is changed over the air. Shall include the name of parameter changed and source of command
13.	Harsh Braking	Alert indicating for harsh braking.
14.	Harsh Acceleration	Alert indicating for harsh acceleration.
15.	Rash Turning	Alert indicating for Rash turning.

* In case of Emergency Alert ON system, the alert message should go in the below format as set out in Table 6F. This emergency alert message shall be sent to 2 different IPs; i.e. the device shall support minimum 2 IPs simultaneously.

**Table 6F:
Message Format**

Attribute	Value / Description	Size
Packet Header	EPB, The unique identifier for all messages from VLT	Character, 3 bytes
Message Type	Message Types supported. Emergency Message (EMR) or Stop Message (SEM)	Character, 2 bytes

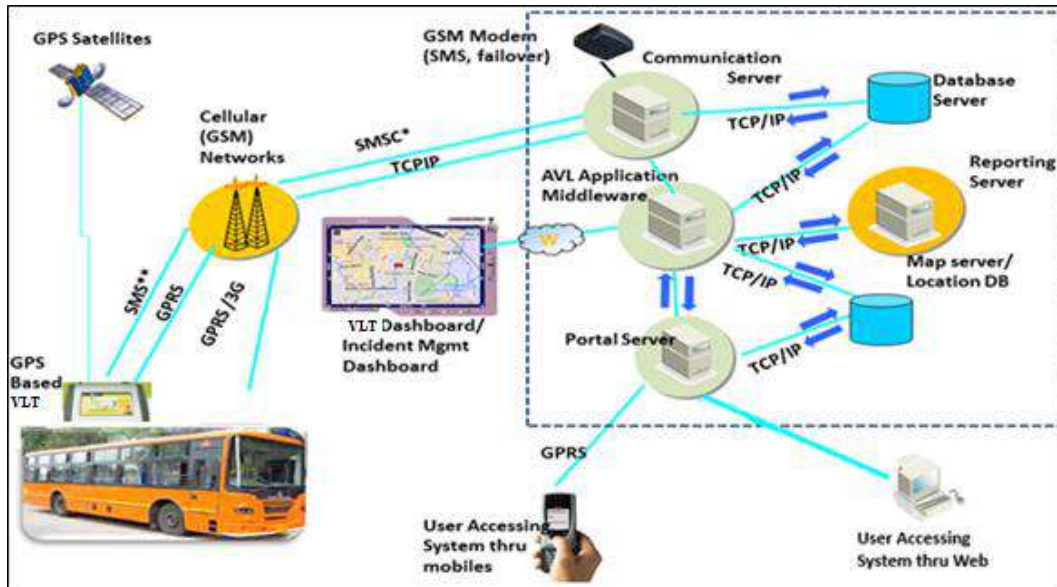
Device ID Vehicle ID	Unique ID of the Vehicle (IMEI Number)	Character, 15 bytes
Packet Type	NM – Normal Packet, SP – Stored Packet	Character, 2 bytes
Date	Date and time of the location obtained from the location data in DDMMYYYY hhmss format	Character, 14 bytes
GPS Validity	A – Valid, V – Invalid	Character, 1 byte
Latitude	Latitude in decimal degrees - dd.mmmmmm format	Double, 12 bytes
Latitude Direction	N – North, S – South	Character, 1 byte
Longitude	Longitude in decimal degrees - dd.mmmmmm format	Double, 12 bytes
Longitude Direction	E – East W – West	Character, 1 byte
Altitude	Altitude in meters (above sea level)	Double, 12 bytes
Speed	Speed of Vehicle as Calculated by GPS module in VLT. (in km/hrs.)	Float, 6 bytes
Distance	Distance calculated from previous GPS data	Float, 6 bytes
Provider	G - Fine GPS N – Coarse GPS or data from the network	Character, 1 byte
Vehicle RegnNo	Registration Number of the Vehicle	Character, 16 bytes
Reply Number	The mobile number to which Test response need to be sent. (Emergency Mobile No. as specified by MHA/MoRTH/States.)	0
CRC	The 32 bit checksum of all the characters from the header up to the CRC field	8 bytes

7.0

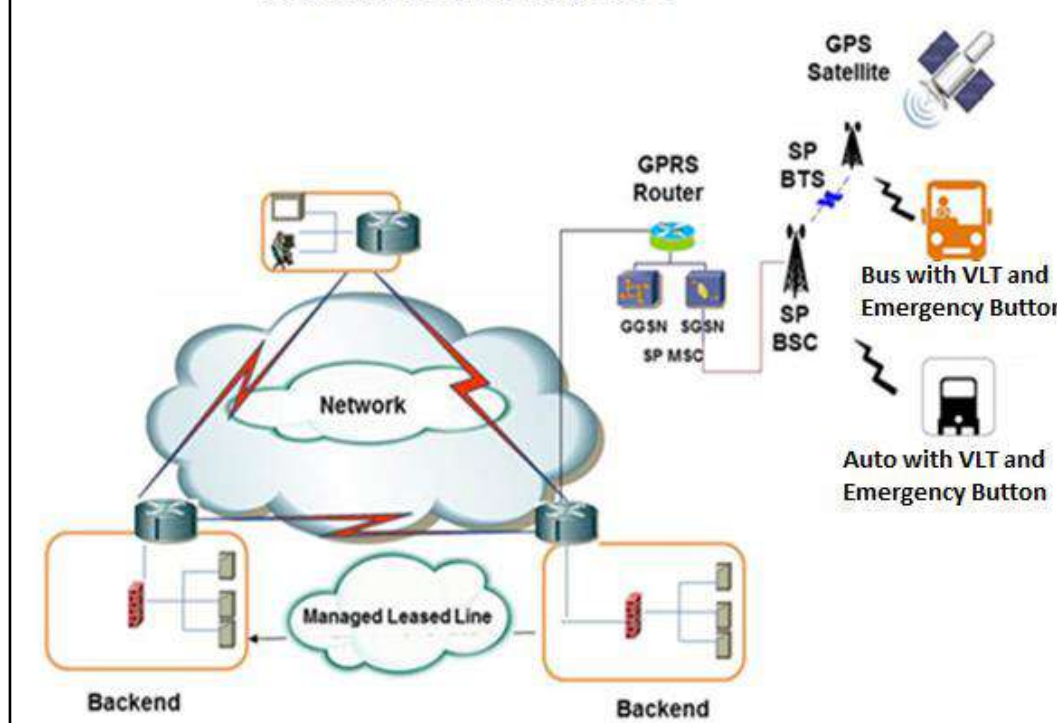
DEVICE TO BACKEND COMMUNICATION MECHANISM

The VLT device would transmit data to the Backend Control Centre using GPRS wireless connectivity (with SMS fall back) as per the protocol provided in respective sections (Sub-section 6.3.4). The data from the devices would travel over the wireless telecom service provider network and finally get delivered at the Backend Control Centre. Since the permit holders/Device suppliers would require to have

a valid communication plan on SIM cards on the devices and would avail services from multiple telecom service providers, the data would be transmitted to the Backend Control Centre using the networks of multiple telecom service providers.



Indicative Architecture



A suitable control mechanism would be established for the data transfer from VLT to Backend Control Centre, as only the authorized devices should be able to transfer data to the Backend Control Centre and a mechanism for authenticating the devices/SIMs shall also be put into place.

The following mandatory provisions will have to be made in the Backend Control Centre:

1. Registration and activation of the device(s) fitted on the vehicle, including the details of vehicle registration number, engine number, chassis number, vehicle make and model, device make and model, and telecom service provider's name.
2. Re-registration/re-activation of the device(s) fitted on the vehicle in case of any change in device or telecom service provider, etc.
3. Regular health check of the device(s) fitted on the vehicle, as per the parameters and frequency defined in Sub-section 3.1.4.
4. Administration/configuration of devices for any changes in the parameters as decided by the respective state from time to time.
5. Notification of alerts in case of press of an Alert Button fitted on the vehicle, in the protocol defined in Section 4.
6. Notification of alerts in case of defined deviations by vehicle such as over-speeding, deviation from defined route/geographic area, time of operation, etc.
7. Location tracking of the vehicle including real-time as well as history tracking for up to last 90 days.
8. Notification to the permit-holder through SMS in case any device(s) stops functioning/sending data to the Backend Control Centre.
9. Reports of the vehicles with devices not working/sending data beyond defined number of days (1 day, 3 days, 7 days and 30 days).
10. Ensure that the security and privacy of the data is maintained in accordance with applicable laws/guidelines of various government authorities.

In addition to the above mandatory provisions, the Backend Control Centre can provide any other optional features.

The mechanism to set up the Backend Control Centre shall be decided by the respective states. The states can chose any of the following options for setting up the Backend Control Centre:

1. States can set up their own dedicated Backend Control Centre, meeting the above listed mandatory provisions and any other optional features as they may decide.
2. States can allow telecom service providers to offer Backend Control Centre as a Value Added Service (VAS) to the permit holders, meeting the above listed mandatory provisions and any other optional features as they may decide. In this case, the telecom service providers shall provide access to the Backend Control Centre to government officials, as decided by the respective state.

**ANNEXURE A:
INFORMATION TO BE SUBMITTED FOR TYPE APPROVAL**

1.0 VLT SYSTEM DETAILS

- a. Make
- b. Type
- c. Model No.
- d. Part No.
- e. Installation layout: Attach drawing showing location in vehicle.

2.0 VEHICLE LOCATION TRACKING AND EMERGENCY BUTTONS

- a. Make
- b. Model No.
- c. Part No.
- d. Connector used
- e. Connector used for antennas
 - e.1. main GSM antenna
 - e.2. GPS antenna
 - e.3. WLAN antenna

3.0 SYSTEM SOFTWARE

- a. Make
- b. Version
- c. Operating System Details with Version

4.0 COMMUNICATION PROTOCOL USED

- a. Vehicle to Center
 - VLT to Control Center
 - Command Set for Configurations

5.0 DESCRIPTION OF DEVICE

6.0 DRAWINGS

6.1 Device/System Drawing.

6.2 Vehicle installation Drawing.

7.0 INSTRUCTIONS MANUAL

ANNEXURE B:**CRITERIA FOR EXTENSION OF TYPE APPROVAL**

B1.0 In case of following changes, Functional, Performance, Durability and Environmental Tests which are necessary for establishing compliance are listed below

	Changes in System	Tests to be conducted
B1.1	Change in Make, Model, Type, accompanied with or without a Part No of Vehicle Location Tracking (VLT) and Vehicle Health Monitoring.	Applicable tests as per Section 6 and Functional verification at system integration level or component level as applicable.
B1.2	Change in onboard layout of ITS component or complete system	Verification at system integration level along with target vehicle
B1.3	Change in software of ITS System	Functional verification at system integration level.
B1.4	Change in wiring harness and connectors	Connector requirements specified in this standard.

ANNEXURE C:

PHYSICAL INTERFACES (CONNECTORS) FOR POWER AND I/Os

The below section is for new vehicles and not for the retro-fitment of ITS systems on in-use vehicles.

Device/System side connector/s shall be as per the equipment manufacturer by in case of retro fitment in aftermarket.

Provisions for Power connectors and Power supply to be made by Manufacturers in case of OE fitment & Dealer / Permit holder in case of retro fitment of systems outside vehicle manufacturer facility.

These requirements do not apply to integrated systems with vehicle where integration is done by vehicle manufacturer and /or System Integrator.

1.0 Vehicle Side Connectors

The vehicles shall be equipped with connectors with appropriate fuse protection for interfacing systems implements the functions

Power for physical systems are supplied by vehicle battery which supplies power to all electrical system in the vehicle.

When the engine is running, the vehicle battery is in charge and the systems shall consume normal power needs. But when the engine is turned off, the power consumption by systems shall be limited by means of sleep modes or auto shut off.

Considering the power requirements for equipment packages, the systems are grouped as

ITS System Classification	Max Power	Typical Systems / Packages
Low Power Systems	Up to 120 W	VLT with Emergency Button

The power interface shall have

- One common GROUND linked to vehicle chassis - GND
- One permanent power line (12/24V) linked to the battery after Manual Switch – B+
- One non-permanent power line (12/24V) linked to the battery after Main Switch – SW+

1.1 Minimum Connector Requirements

The minimum connector requirements are formulated as following.

Sl. No.	Recommended Electrical Provisions	Max Power	Applicable ITS Systems	Minimum Requirement	Recommended Connector
1.	Low Power System 1 (Mandatory Provision)	Up to 120 W	Telematics Device/VLT System with Emergency Button	B+, SW+, GND	OEM to protect ISO 15170-B1-3.1-Sn/K1 Socket (Female) Connector

The OEM may provide optional auxiliary connectors of their choice for meeting other functional requirements.

1.2 Connector labeling in Wiring Harness:

Vehicle side wiring shall have the following labeling for the connectors

Recommended Electrical Provisions	Labeling Requirement
Low Power System 1 (Mandatory Provision)	ITS 120 W
Low Power System 2 (Mandatory Provision)	ITS 120 W
High Power System 1 (Mandatory Provision)	ITS 360 W
CAN Interface (OBDII CAN) (Mandatory Provision)	ITS CAN

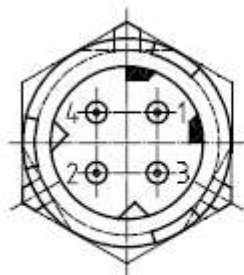
1.3 Connector Cavity/PIN Assignment

Power Connector: ISO 15170-B1-3.1-Sn/K1, ISO 15170-B2-3.1-Sn/K1

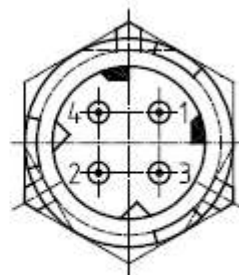
Pin 1	B+
Pin 2	SW+
Pin 3	GND

CAN Connector: ISO 15170-B1-4.1-Sn/K1

Pin 1	CAN High
Pin 2	CAN Low
Pin 3	Option CAN Ground
Pin 4	Not used



a) Code 1 — Colour: black (BK)



b) Code 2 — Colour: grey (GY)

2.0 Device/System connectors

Device/System side connector/s shall be pre-agreed with equipment manufacturer by

1. Vehicle OEM in the case of OE fitment of the systems
2. Permit holder or Dealer in case of retro fitment of systems outside vehicle manufacturer facility

ANNEXURE D:
(See Introduction)
COMPOSITION OF AISC PANEL *

Name	Organization
Convener	
Mr. Rakesh Jain	Delhi Integrated Multi-Modal Transit System Ltd. (DIMTS)
Members	Representing
Mr. Prashant Tiwari /Shri Alok Sethi	Delhi Integrated Multi-Modal Transit System Ltd. (DIMTS)
Mr. A. A. Deshpande/ Mr. M. M. Desai / Mr. K. B. Patil	The Automotive Research Association of India (ARAI)
Director / Mr. Samir Sattigeri /Shri M. M. Pathak	Central Institute of Road Transport (CIRT)
Mr. G. R. M. Rao	Vehicle Research & Dev. Estt. (VRDE)
Dr. Madhusudan Joshi	International Centre for Automotive Technology (ICAT)
Mr. K. K. Gandhi	SIAM
Mr. S. Ravishankar/ Mr. D. Balakrishnan/Ms. Suchismita Chatterjee	Ashok Leyland Technical Centre (SIAM)
Mr. Girish Kodolikar	Force Motors Ltd. (SIAM)
Mr. Sanjay Tank	Mahindra and Mahindra Ltd. (SIAM)
Mr. Shrikant V. Joshi / Mr. P S Gowrishankar, / Mr. Sharad S. Bhole	Tata Motors Ltd. (SIAM)
Mr. Suchindran M	Toyota Kirloskar Motor Pvt. Ltd. (SIAM)
Mr. Jitendra Malhotra/ Mr. Sumit Sharma/ Mr. Raj Kumar Diwedi	Maruti Suzuki India Ltd.(SIAM)
Mr. RajendraKhile/Mr Karuppasamy	Renault Nissan Technology and Business Centre (SIAM)
Mr. S Ramiah	TVS Motor Company Ltd. (SIAM)
Mr. Arun Sivasubrahmaniyan	Hero Motocorp Ltd. (SIAM)
Mr. R. Narasimhan	Bajaj Auto Ltd. (SIAM)
Mr. Uday Harite	ACMA
Mr. Raju Agarwal / Mr. Rahul Jain	Castmaster Mobitec India Pvt Ltd.
Mr. Vishwajit Joshi	KPIT Cummins Infosystems Ltd

* At the time of approval of this Automotive Industry Standard (AIS)

ANNEXURE E

(See Introduction)

COMMITTEE COMPOSITION *
Automotive Industry Standards Committee

Chairperson	
Mrs. Rashmi Urdhwareshe	Director The Automotive Research Association of India, Pune
Members	Representing
Shri Priyank Bharti	Ministry of Road Transport and Highways (Dept. of Road Transport and Highways), New Delhi
Representative from	Ministry of Heavy Industries and Public Enterprises (Department of Heavy Industry), New Delhi
Shri S. M. Ahuja	Office of the Development Commissioner, MSME, Ministry of Micro, Small and Medium Enterprises, New Delhi
Shri Shrikant R. Marathe	Former Chairman, AISC
Shri R.R. Singh	Bureau of Indian Standards, New Delhi
Director	Central Institute of Road Transport, Pune
Director	Indian Institute of Petroleum, Dehra Dun
Director	Vehicles Research and Development Establishment, Ahmednagar
Director	International Centre for Automotive Technology
Director	Global Automotive Research Centre
Director	Indian Rubber Manufacturers Research Association
Representatives from	Society of Indian Automobile Manufacturers
Shri T. R. Kesavan	Tractor Manufacturers Association, New Delhi
Shri Uday Harite	Automotive Components Manufacturers Association of India, New Delhi

Member Secretary

Shri Vikram Tandon

Dy. General Manager

The Automotive Research Association of India, Pune

* At the time of approval of this Automotive Industry Standard (AIS)

GOVERNMENT OF KERALA

Transport (B) Department

NOTIFICATION

GO(P)No. 27/2017/Trans. Dated, Thiruvananthapuram 15th November, 2017
30th Thulam, 1193

S.R.O. No...../2017.- WHEREAS, the draft rules further to amend the Kerala Motor Vehicles Rules, 1989 were issued as required by sub-section (1) of section 212 of the Motor Vehicle Act, 1988(Central Act 59 of 1988) as per notification No. B2/106/2017/Trans. dated 30th August, 2017 and published in the Kerala Gazette Extraordinary No.1989 dated 16th September, 2017, inviting objections and suggestions from all persons likely to be affected thereby ;

AND WHEREAS, no objections and suggestions has been received on the said draft rules ;

NOW, THEREFORE, in exercise of the powers conferred by clause (k) of sub-section (2) of section 65 of the Motor Vehicles Act, 1988, (Central Act 59 of 1988) , the Government of Kerala hereby make the following rules further to amend Kerala Motor Vehicles Rules, 1989, namely ;

RULES

1. *Short title and commencement.* - (1) These rules may be called the Kerala Motor Vehicles (Third Amendment) Rules, 2017.

(2) (a) Sub-rule (a) of rule 2 shall come into force on the 1st day of April, 2018

(b) Sub-rule (b) of rule (2) shall come into force at once.

2. *Amendment of the Rules.* - In the Kerala Motor Vehicles Rules, 1989,-

(a) after rule 151, the following rule shall be inserted, namely :-

" 151 A. *Provision of Vehicle Location Tracking Device.* - (1). All public service vehicles, as defined under clause (35) of section 2 of the Act, shall be equipped with or fitted with vehicle location tracking device and one or more emergency buttons and all goods carriage vehicles shall be provided with location tracking device:

Provided that this rule shall not apply to the following category of vehicles, namely:-

- (i) two wheeler;
- (ii) E-rickshaw;
- (iii) three wheelers ; and
- (iv) any transport vehicle for which no permit is required under the Act.

(2). The specifications, testing and certification of vehicle location tracking device referred in sub-rule (1) shall be in accordance with AIS-140:2016, as amended from time to time, till such time the corresponding BIS specifications are notified under the Bureau of Indian Standards Act, 1986 (63 of 1986).

(3). The vehicle location tracking device referred to in sub-rule (1) shall be fitted by the manufacturer or their dealer or the respective operator, as the case may be, in accordance with AIS-140:2016, as amended from time to time, till such time the corresponding BIS specifications are notified under the Bureau of Indian Standards Act, 1986 (63 of 1986).”;

(b) in rule 153, after sub-rule (4), the following sub-rule shall be inserted, namely:-

“(5) shall display the name, age , address and contact numbers of the driver in white colour along with his photograph inside the vehicle at a prominent place”

By order of the Governor,
K R JYOTHILAL
Secretary to Government.

Explanatory Note

(This does not form part of the notification, but is intended to indicate its general purport.)

As per G.S.R.1095(E) dated 28th November, 2016, a provision namely rule 125H, has been inserted in the Central Motor Vehicles Rules, 1989 for providing vehicle location tracking device or one or more emergency buttons in all public service vehicles as defined under clause (35) of section 2 of the Motor Vehicles Act, 1988 (Central Act 59 of 1988) except two wheelers, E-rickshaw, three wheelers and any transport vehicle for which no permit is required under the said Act.

In the report submitted by justice (Rtd) J.S.Varma Committee to improve safety of women, the Committee has made certain recommendations including fitment of tamper proof GPS Tracking System in Stage Carriages. The committee has also recommended to display the name, age and address and contact number of the drivers along with their photograph inside the vehicle at a prominent place.

Government have decided to amend the Kerala Motor Vehicles Rules, 1989 to incorporate the above provisions in the said Rules and accordingly issued preliminary notification as per B2/106/2017/Trans. dated 30th August, 2017 and published in the Kerala Gazette Extraordinary No.1989 dated 16th September, 2017, inviting objections or suggestions on the same. As no objection or suggestion has been received, Government have decided to issue final notification in this regard.

As the Central Motor Vehicles (Twentieth Amendment) Rules, 2016 issued as per G.S.R.1095(E) dated 28th November, 2016, shall come into force on the 1st day of April, 2018, sub-rule(a) of rule 2 of the Kerala Motor Vehicles (Third Amendment) Rules, 2017 shall also come into force on the 1st day of April, 2018 and sub-rule (b) shall come into force at once.

The notification is intended to achieve the above objects.

MIT5/4/2020-TC	MOTOR VEHICLES DEPARTMENT GOVERNMENT OF KERALA	30-11-2024
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EXPRESSION OF INTEREST (EOI) FOR THIRD-PARTY AUDIT TO ASSESS THE IMPLEMENTATION AND OPERATIONAL EFFECTIVENESS OF THE CENTRAL GOVERNMENT SCHEME ‘VEHICLE LOCATION TRACKING PLATFORM IN PUBLIC PASSENGER VEHICLES TO ENHANCE SAFETY.

1.	INVITATION
1.1	The Motor Vehicles Department (MVD), Government of Kerala, invites Expression of Interest (EOI) from reputed and experienced agencies to conduct a Third-Party Audit of the Vehicle Location Tracking Platform (VLTP) Scheme implemented under the Nirbhaya Framework. This initiative aims to evaluate the performance, compliance, and impact of the scheme in enhancing safety and security, particularly for women, in public passenger vehicles, as per the Ministry of Road Transport & Highways (MORTH), Government of India scheme ‘Development, Customization, Deployment and Management of State-wise vehicle tracking platform for Safety & Enforcement as per AIS: 140 specifications’.
1.2	MORTH as per the directives of the Empowered Committee of Ministry of Women and Child Development (Nirbhaya cell), Government of India have directed all the States/UTs to conduct a third-party audit to assess the outcome of the scheme and to submit a report on the findings.

2.	EXECUTIVE SUMMARY OF THE PROJECT IN KERALA
2.1	<p>Phase I</p> <p>The Motor Vehicles Department, Kerala was the first state in India to initiate the steps for monitoring and tracking of public transport vehicles. The project was started in the year 2014-15 based on the prevailing guidelines and rules of MORTH. The technology used was GPS based and the project was implemented through C-DAC, Kerala as a Consultant cum Service Provider. As part of this, application software for Vehicle Tracking and Management System (VTMS) – Suraksha-Mitr was developed and deployed. Also, for tracking and monitoring purpose, a Master Control Room was set up at the Head Office and 17 Mini Control Rooms was set up at 17 Regional Transport Offices in Kerala.</p>
2.2	<p>Phase II</p> <p>In the year 2016, MORTH amended the Central Motor Vehicles Rules (CMVR) by adding Rule 125H which insists that w.e.f 01.04.2018, all public service vehicles (except two-wheelers, E-rickshaws, three-wheelers, and any transport vehicles not requiring permit) should be fitted with Vehicle Location Tracking (VLT) devices and one or more emergency (panic) buttons. MORTH also formulated a standard - AIS 140 specifying the</p>

	<p>minimum features required for VLT devices and back end system. The existing platform of VTMS was made compatible as per AIS 140 and the project was declared Go-live in the year 2018. Government of Kerala had amended the Kerala Motor Vehicles Rules (KMVR) by including Rule 151-A making it mandatory to fit VLT devices and emergency buttons in all public service vehicles and goods carriages (except two-wheelers, E-rickshaws, three-wheelers, and any transport vehicles not requiring permit).</p>
2.3	<p>Phase III</p> <p>MORTH in the year 2020, envisaged a scheme for implementation of ‘Development, Customization, Deployment and Management of State-wise vehicle tracking platform for Safety & Enforcement as per AIS 140 Specifications’ in States/UTs under Nirbhaya framework. The scheme is to support the States/UTs in setting up Monitoring and Control Centre by providing funds under the Nirbhaya framework. As per the scheme, the total project cost estimated for Kerala is Rs 20.35 crores which will be funded in the ratio 60(Central share): 40 (state share) i.e, Rs 12.21 crores and Rs 8.14 crores. Out of the central share, Rs 4.97 crores is retained by MORTH towards cloud charges and PMU (Project Management Unit) charges and central fund for Kerala is Rs 7.24 crores. MORTH has released an advance amount of Rs 5.79 crores to MVD and department has tied up with C-DAC to implement the guidelines framed in the scheme and is in progress. The fund expended by the State for project implementation and standardization has been adjusted to the State share.</p>

3. STATISTICS				
3.1	Number of Public Service Vehicle (PSVs) on- boarded on Tracking System (AIS-140 compiled VLTD & Panic button installed)	Public Service Vehicle	Total number of vehicle registered	Total number of vehicle on-boarded
		Buses	75,963	55,978
		Motorcab/ Maxi	1,17,950	95,797
		Education Institution Buses (EIB)	36,345	32,023
		Total	2,30,258	1,83,798
3.2	Number of National Permit/ Other vehicles on-boarded on Tracking System (AIS-140 compiled VLTD & Panic button installed)	Type of Vehicles	Total number of vehicle registered	Total number of vehicle on-boarded
		National Permit Vehicles/ Hazardous goods vehicle/Goods permit	1,91,296	1,87,222
		Ambulance	6,861	6,775
		Oxygen Tankers	NA	NA

	Other	29,375	18,108
	Total	2,27,532	2,12,105
<i>Statistics as on 11.09.2024</i>			

4.	OBJECTIVE OF THE AUDIT
	<ol style="list-style-type: none"> 1. Evaluate the implementation, performance, and impact of the VLTP scheme. 2. Evaluate the scheme's impact on passenger safety, with a focus on women and vulnerable groups. 3. Review compliance with regulatory requirements and identify any gaps or areas for improvement. 4. Provide actionable recommendations to improve implementation, compliance, and sustainability.

5.	SCOPE OF WORK
	<p>The scope of work shall be purely based on the scheme guidelines issued by MORTH. Major scopes are given below:-</p> <ol style="list-style-type: none"> 1. Evaluate the installation, operational status, and functionality of Vehicle Location Tracking (VLT) devices and panic buttons in public passenger vehicles. 2. Functionality of panic buttons and their integration with emergency response systems. 3. Assess the operational effectiveness of State Monitoring Centers in monitoring vehicles and responding to emergencies. 4. Adherence to data-sharing protocols with central/state repositories. 5. Analyze compliance with MORTH guidelines and standards, agreement terms and conditions with C-DAC. 6. Study the impact of the scheme in terms of passenger safety outcomes, including crime reduction. 7. Identify gaps and challenges in implementation and propose recommendations for improvement.

6.	KEY EVALUATION CRITERIA TO BE COVERED	
	The key evaluation criteria to be covered as part of the scope of work are detailed below:-	
	Area	Criteria
6.1	Implementation	<ol style="list-style-type: none"> i. Number and percentage of vehicles equipped with VLT devices and panic buttons. ii. Compliance with installation and operational timelines set by MORTH. iii. Adequacy of training provided to transport operators and

		authorities.
6.2	Performance	<ul style="list-style-type: none"> i . Accuracy and reliability of vehicle tracking. ii . Responsiveness of emergency services to distress signals triggered by panic buttons. iii . Frequency and resolution time of reported incidents.
6.3	Impact	<ul style="list-style-type: none"> i . Reduction in crime rates and incidents involving public transport, especially against women. ii . Improvement in passenger perception of safety.
6.4	Efficiency	<ul style="list-style-type: none"> i . Functionality and uptime of command and control centers. ii . Resource utilization under the Nirbhaya Fund.
6.5	Compliance	<ul style="list-style-type: none"> i . Conformity to guidelines issued by MORTH for VLT devices and panic buttons. ii . Data privacy and security measures for tracking and emergency data.

7.	DELIVERABLES OF THE AUDIT
	<p>A detailed audit report on: -</p> <ul style="list-style-type: none"> i . Summary of findings (qualitative and quantitative analysis) ii . Evaluation of the scheme's effectiveness and alignment with objectives. iii . Case studies highlighting strengths and weaknesses. iv . Recommendations for Improving implementation and compliance, Enhancing the technology and emergency response mechanisms, Addressing gaps in infrastructure, training, and stakeholder awareness. v . Cost-benefit analysis of the scheme.

8.	ELIGIBILITY CRITERIA
	<p>The agencies/firms should meet the below requirements:-</p> <ul style="list-style-type: none"> i . Should be an agency listed by MORTH as per Letter No. RT-16031/1/2020-T dated 17.09.2024 or a Government of India/State Government authorized audit firms. ii . Should have adequate experience and technical expertise in the field. iii . Should have adequate qualified personnel to complete the audit in the stipulated time frame. iv . Should be a registered legal entity with a valid PAN/TAN and GST number.

9.	SUBMISSION PROCEDURE
	<p>Interested agencies shall submit the following documents as part of EOI proposal:-</p> <ul style="list-style-type: none"> i . Cover Letter in official letter head - Brief introduction and interest in the project,

	<p>Name & Designation of authorized contact person.</p> <p>i i . Organizational Profile - Details of the organization, key personnel, and relevant expertise.</p> <p>i i i . Technical Proposal - Approach and methodology for conducting the audit, Proposed timeline and milestones.</p> <p>i v . Project Experience - Summary of similar projects conducted, including client references.</p> <p>v . Supporting Documents - Copies of registration certificates, PAN, TAN, GST, and any certifications.</p> <p>v i . Undertakings – Firm is not blacklisted nor has any conflict of interest in the project.</p> <p>v i i . Financial Proposal - Indicative cost for conducting the audit, including a breakdown of expenses.</p> <p>EOIs shall be submitted by post or e-mail to:-</p> <p>The O/o the Transport Commissioner, Motor Vehicles Department, Trans Towers, Vazhuthacaud, Thycaud P.O., Thiruvananthapuram – 695014. Ph: 0471-2333317</p> <p>E-mail: tcoffice.mvd@kerala.gov.in</p>
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10.	EVALUATION PROCEDURE
	EOIs will be evaluated based on the technical competence, which considers the approach, methodology, and the team's experience; past experience, focusing on the relevance and scale of previous projects; and financial proposal, assessing cost-effectiveness and alignment with the project scope. During the evaluation process, agencies will be required to make a presentation on their proposals.

11.	TIMELINE
	Issue of EOI: - 01.12.2024. Last date for submission: - 15.12.2024. The date for presentation by the agencies/firms will be intimated by e-mail.

Copy of documents enclosed for reference and information:-

1. MORTH scheme for Nirbhaya framework
2. AIS 140 requirements for VLT devices
3. Central Motor Vehicle Rule 125 H
4. Kerala Motor Vehicle Rule 151 A

NAGARAJU CHAKILAM IPS
TRANSPORT COMMISSIONER

Signed by

Chakilam Nagaraju

Date: 30-11-2024 16:31:04



भारत का राजपत्र The Gazette of India

असाधारण

EXTRAORDINARY

भाग II—खण्ड 3—उप-खण्ड (i)

PART II—Section 3—Sub-section (i)

प्राधिकार से प्रकाशित

PUBLISHED BY AUTHORITY

सं. 633]

नई दिल्ली, बृहस्पतिवार, अक्टूबर 24, 2019/कार्तिक 2, 1941

No. 633]

NEW DELHI, THURSDAY, OCTOBER 24, 2019/KARTIKA 2, 1941

सड़क परिवहन और राजमार्ग मंत्रालय

अधिसूचना

नई दिल्ली, 23 अक्टूबर, 2019

सा.का.नि. 808(अ).—केंद्रीय मोटर यान अधिनियम, 1988 (1988 का 59) की धारा 212 की उपधारा (1) के अधीन यथा अपेक्षित केंद्रीय मोटर यान नियम, 1989 का और संशोधन करने के लिए कतिपय नियमों का प्ररूप भारत सरकार के सड़क परिवहन और राजमार्ग मंत्रालय की अधिसूचना संख्यांक सा.का.नि. 439(अ), तारीख 21 जून, 2019 द्वारा भारत के राजपत्र, असाधारण, भाग II, खंड 3 उप-खंड (i) में प्रकाशित किए गए थे, उन सभी व्यक्तियों से जो इससे प्रभावित हैं, उस तारीख से जिसको उक्त अधिसूचना को अंतर्विष्ट करने वाले राजपत्र की प्रतियां जनता को उपलब्ध करा दी गई थीं, तीस दिन की अवधि की समाप्ति के पूर्व आक्षेप और सुझाव आमंत्रित किए गए थे;

और उक्त राजपत्र अधिसूचना की प्रतियां 21 जून, 2019 को जनता को उपलब्ध करा दी गई थीं;

और उक्त प्ररूप नियमों के संबंध में जनता से कोई आक्षेप और सुझाव प्राप्त नहीं हुए हैं;

अतः अब केंद्रीय सरकार, मोटर यान अधिनियम, 1988 (1988 का 59) की धारा 110 की उपधारा (1) के खंड (ट) द्वारा प्रदत्त शक्तियों का प्रयोग करते हुए, केंद्रीय मोटर यान नियम, 1989 का और संशोधन करने के लिए निम्नलिखित नियम बनाती है, अर्थात्:-

- संक्षिप्त नाम और प्रारंभ.**—(1) इन नियमों का संक्षिप्त नाम केंद्रीय मोटर यान (दसवां संशोधन) नियम, 2019 है।
(2) ये राजपत्र में उनके प्रकाशन की तारीख को प्रवृत्त होंगे।
- केंद्रीय मोटर यान नियम, 1989 के नियम 125(ज) के उप-नियम (1) के परंतुक में, खंड (ii), खंड (iii) और खंड (iv) के स्थान पर निम्नलिखित खंड रखे जाएंगे, अर्थात्:-

“(ii) ई-रिक्शा; और

(iii) तिपहिया।”

[फा. सं. आरटी-11028/12/2015-एमवीएल]

प्रियांक भारती, संयुक्त सचिव

टिप्पण : मूल नियम भारत के राजपत्र, असाधारण, भाग II, खंड 3 उप-खंड (i) में अधिसूचना सं. सा.का.नि. 590(अ), तारीख 2 जून, 1989 द्वारा प्रकाशित किए गए थे और अधिसूचना सं. सा.का.नि. 681(अ) तारीख 23.09.2019. द्वारा अंतिम बार संशोधित किया गया था।

MINISTRY OF ROAD TRANSPORT AND HIGHWAYS

NOTIFICATION

New Delhi, the 23rd October, 2019

G.S.R. 808(E).—Whereas the draft of certain rules further to amend the Central Motor Vehicles Rules, 1989, were published, as required under sub-section (1) of section 212 of the Motor Vehicles Act, 1988 (59 of 1988), *vide* notification of the Government of India in the Ministry of Road Transport and Highways number G.S.R. 439(E), dated the 21st June, 2019 in the Gazette of India, Extraordinary, Part II, Section 3, Sub-section (i), inviting objections and suggestions from affected persons before the expiry of the period of thirty days from the date on which copies of the Gazette containing the said notification were made available to the public;

And whereas, copies of the said Gazette notification were made available to the public on the 21st June, 2019;

And whereas, no objections and suggestions received from the public in respect of the said draft rules;

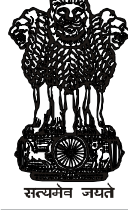
Now, therefore, in exercise of the powers conferred by clause (k) of sub-section (1) of section 110 of the Motor Vehicles Act, 1988 (59 of 1988), the Central Government hereby makes the following rules further to amend the Central Motor Vehicles Rules, 1989, namely: —

1. **Short title and commencement.**—(1) These rules may be called the Central Motor Vehicles (Tenth Amendment) Rules, 2019.
(2) They shall come into force on the date of their publication in the Official Gazette.
2. In the Central Motor Vehicles Rules, 1989, in rule 125H, in sub-rule (1), in the proviso, for clauses (ii), (iii), and (iv), the following clauses shall be substituted, namely: -
“(ii) E-rickshaw; and
(iii) three wheelers.”.

[F. No. RT-11028/12/2015-MVL]

PRIYANK BHARTI, Jt. Secy.

Note : The principal rules were published in the Gazette of India, Extraordinary, Part-II, Section 3, Sub-section (i), *vide* notification number G.S.R. 590(E), dated the 2nd June, 1989 and lastly amended *vide* notification number G.S.R. 681(E), dated 23.09.2019.



भारत का राजपत्र The Gazette of India

असाधारण

EXTRAORDINARY

भाग II—खण्ड 3—उप-खण्ड (i)

PART II—Section 3—Sub-section (i)

प्राधिकार से प्रकाशित

PUBLISHED BY AUTHORITY

सं. 817]

नई दिल्ली, सोमवार, नवम्बर 28, 2016/अग्रहायण 7, 1938

No. 817]

NEW DELHI, MONDAY, NOVEMBER 28, 2016/AGRAHAYANA 7, 1938

सड़क परिवहन और राजमार्ग मंत्रालय

अधिसूचना

नई दिल्ली, 28 नवंबर, 2016

सा.का.नि. 1095(अ).—केंद्रीय मोटरयान अधिनियम, 1988 (1988 का 59) धारा 212 की उपधारा (1) द्वारा यथा अपेक्षित केन्द्रीय मोटर यान नियम, 1989 का और संशोधन करने के लिए प्रारूप नियम भारत सरकार में सड़क परिवहन और राजमार्ग मंत्रालय की अधिसूचना सं. सा.का.नि. 478 (अ), तारीख 2 मई, 2016 द्वारा भारत के राजपत्र, असाधारण, भाग II, खंड 3, उपखंड (i) में उनसे द्वारा संभाव्य प्रभावित सभी व्यक्तियों द्वारा उस तारीख से जब प्रारूप नियमों से अंतर्विष्ट उक्त अधिसूचना की प्रतियां जनसाधारण को उपलब्ध करवाई गई थीं, से तीस दिन की अवधि की समाप्ति से पूर्व आक्षेप और सुझाव आमंत्रित करने के लिए प्रकाशित किए गए थे ;

उक्त राजपत्र अधिसूचना की प्रतियां जनसाधारण को 2 मई, 2016 को उपलब्ध करवाई गई थीं ;

उक्त प्रारूप नियमों के संबंध में जनसाधारण से प्राप्त आक्षेपों और सुझावों पर केंद्रीय सरकार द्वारा विचार किया गया है ;

अतः, केन्द्रीय सरकार मोटर यान अधिनियम, 1988 (1988 का 59) की धारा 110 की उपधारा (1) के खंड (ट) द्वारा प्रदत्त शक्तियों का प्रयोग करते हुए केन्द्रीय मोटर यान नियम, 1989 का और संशोधन करने के लिए निम्नलिखित नियम बनाती है, अर्थात्:-

1. (1) इन नियमों का संक्षिप्त नाम केंद्रीय मोटर यान (200क संशोधन) नियम, 2016 है ।
(2) ये 1 अप्रैल, 2018 को प्रवृत्त होंगे ।
2. केंद्रीय मोटर यान नियम, 1989 में, नियम 125 छ के पश्चात्, निम्नलिखित नियम अंतःस्थापित किया जाएगा, अर्थात् :-

“125-ज. यान की अवस्थिति का पता लगाने वाली युक्ति और आपात बटन -

(1) मोटर यान अधिनियम, 1988 की धारा 2 के खंड (35) के अधीन यथापरिभाषित सभी लोक सेवा यानों को यान की अवस्थिति का पता लगाने वाली युक्ति और एक या अधिक आपात बटनों से सज्जित किया जाएगा और फिट किए जाएंगे :

परंतु यह नियम यानों के निम्नलिखित वर्ग को लागू नहीं होगा, अर्थात् :-

(i) दुपहिया;

(ii) ई-रिक्शा;

(iii) तिपहिया; और

(iv) कोई परिवहन यान जिसके लिए मोटरयान अधिनियम, 1988 (1988 का 59) के अधीन अनुज्ञा-पत्र (परमिट) अपेक्षित नहीं होता है:

(2) उपनियम (1) में निर्दिष्ट यान की अवस्थिति का पता लगाने वाली युक्ति और आपात बटन के विनिर्देश, परीक्षण और प्रमाणन तब तक समय-समय पर यथासंशोधित एआईएस-140:2016 के अनुसार होंगे, जब तक तत्स्थानी बीआईएस विनिर्देश भारतीय मानक ब्यूरो अधिनियम, 1986 (1986 का 63) के अधीन अधिसूचित नहीं किए जाते हैं।

(3) उपनियम (1) में निर्दिष्ट यान की अवस्थिति का पता लगाने वाली युक्ति और आपात बटन, यथास्थिति, विनिर्माता या उनके ब्यौहारी या अपने-अपने ऑपरेटर द्वारा यथासंशोधित एआईएस-140:2016 के अनुसार तब तक फिट किए जाएंगे जब तक तत्स्थानी बीआईएस विनिर्देश भारतीय मानक ब्यूरो अधिनियम, 1986 (1986 का 63) के अधीन अधिसूचित नहीं किए जाते हैं”।

[सं. आरटी- 11028/12/2015-एमवीएल]

अभय दामले, संयुक्त सचिव

टिप्पणः— मूल नियम, भारत के राजपत्र, असाधारण, भाग II, खंड 3, उपखंड (i) में अधिसूचना सं. सा.का.नि. 590 (अ), तारीख 2 जून, 1989 को प्रकाशित किए गए थे और अंतिम बार अधिसूचना सं. 1034 (अ), तारीख 02.11.2016 को संशोधित किए गए।

MINISTRY OF ROAD TRANSPORT AND HIGHWAYS

NOTIFICATION

New Delhi, the 28th November, 2016

G.S.R. 1095(E).—Whereas the draft rules further to amend the Central Motor Vehicles Rules, 1989, were published, as required under sub-section (1) of section 212 of the Motor Vehicles Act, 1988 (59 of 1988), vide notification of the Government of India in the Ministry of Road Transport and Highways number G.S.R. 478 (E), dated the 2nd May, 2016 in the Gazette of India, Extraordinary, Part II, section 3, sub-section (i), inviting objections and suggestions from affected persons before the expiry of the period of thirty days from the date on which copies of the Gazette containing the said notification were made available to public;

And whereas, copies of the said Gazette notification were made available to the public on the 2nd May, 2016;

And whereas, the objections and suggestions received from the public in respect of the said draft rules have been considered by the Central Government.

Now, therefore, in exercise of the powers conferred by clause (k) of sub-section (1) of section 110 of the Motor Vehicles Act, (59 of 1988), the Central Government hereby makes the following rules further to amend the Central Motor Vehicles Rules, 1989, namely: —

1. (1) These rules may be called the Central Motor Vehicles (Twentieth Amendment) Rules, 2016.
- (2) They shall come into force on the 1st day of April, 2018.

2. In the Central Motor Vehicles Rules, 1989, after rule 125 G, the following rule shall be inserted, namely.-

“125 H. Provision of vehicle location tracking device and emergency button.-

(1) All public service vehicles, as defined under clause (35) of section 2 of the Act, shall be equipped with or fitted with vehicle location tracking device and one or more emergency buttons:

Provided that this rule shall not apply to the following category of vehicles, namely:-

- (i) two wheelers;
- (ii) E-rickshaw;
- (iii) three wheelers; and
- (iv) any transport vehicle for which no permit is required under the Act.

(2) The specifications, testing and certification of the vehicle location tracking device and emergency button referred to in sub-rule (1) shall be in accordance with AIS-140: 2016, as amended from time to time, till such time the corresponding BIS specifications are notified under the Bureau of Indian Standards Act, 1986 (63 of 1986).

(3) The vehicle location tracking device and emergency button referred to in sub-rule (1) shall be fitted by the manufacturer or their dealer or the respective operator, as the case may be, in accordance with AIS-140: 2016, as amended from time to time, till such time the corresponding BIS specifications are notified under the Bureau of Indian Standards Act, 1986.”.

[No.RT-11028/12/2015-MVL]

ABHAY DAMLE, Jt. Secy.

Note:- The principal rules were published in the Gazette of India, Extraordinary, Part-II, section 3, sub-section (i) vide notification number G.S.R.590(E), dated the 2nd June, 1989 and last amended vide notification number G.S.R.1034(E) dated the 2nd November, 2016

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9/18/10/2020

Speed Post/E-mail

No. RT-16011/1/2018-T

Government of India

Ministry of Road Transport & Highways

Transport Section

Transport Bhawan, 1, Parliament Street, New Delhi-110001

12th January, 2020

To,

- 1) The Principal Secretary(Transport) / Secretary (Transport) and Transport Commissioners of all States/UTs.

Subject: Scheme for Implementation of "Development, Customization, Deployment and Management of State-wise vehicle tracking platform for Safety & Enforcement as per AIS 140 Specifications", in States / UTs under Nirbhaya Framework

Sir/Madam,

1. A copy of the scheme finalised by this Ministry for implementation of the State-wise vehicle tracking platform for Safety & Enforcement as per AIS 140 Specifications", in States / UTs under Nirbhaya Framework is attached for your further necessary action.
2. In this connection it is brought out that Ministry of Road Transport & Highways, earlier issued a notification dated 28th November 2016 wherein Vehicle Location Tracking (VLT) Device and Emergency Buttons were mandated to be fitted in all public service vehicles (all four wheeled or higher, passenger carrying vehicles) w.e.f. 01st April, 2018. This was re-examined by the Ministry, and it was decided to give exemption to all public service vehicles which were registered up to 31st December 2018 (old vehicles) from the fitment of Vehicle Location Tracking Device and Emergency Buttons till the time as notified by State/UT Governments in their respective States/UTs. All public service vehicles registered on or after 01st January 2019 must be fitted with Vehicle Location Tracking Device and Emergency Buttons.
3. Since very little progress could be achieved on setting up the Monitoring Centers, it was felt necessary to support the States under Nirbhaya Framework to set up Monitoring Centers at the earliest so as to effectively implement the vehicle tracking system and ensure safe commute to the women and children in public passenger transport vehicles.
4. The 37 States / UTs have been categorized into four categories, based on the number of vehicles and the geographical area for determination of maximum Project cost. The State wise maximum Project cost and funding structure is mentioned in scheme and will be financed as per the Nirbhaya Fund Framework, in the following ratio
 - (i) 60% (Centre) :40% (State) for all States (other than States with difficult terrain)
 - (ii) 90% (Centre):10% (States) for States with difficult terrains
 - (iii) 100% financed by Centre for UTs

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5. MoRTH will set up a Project Management Unit (PMU) through DIMTS, to scrutinize State/UT applications seeking funds under the Scheme, to coordinate between the stakeholders, provide technical support in respect of technical specifications, monitor implementation of the Scheme and to review implementation/operation reports submitted by the States/UTs. A Dashboard will be set up at MoRTH for the monitoring of Scheme. The State Governments/ UTs shall apply in a Performa to seek assistance attached as per **Annexure A** with the scheme by **15th February 2020** and will also appoint a single point Nodal Officer and a PIU for the project smooth implementation of the project.
6. The States/UTs shall ensure that all the minimum features as well as the guidelines listed in the scheme under **Annexure B & C** shall be followed and implemented so as to ensure the harmonization of implementation as well as the seamless tracking of the vehicle all across the country.
7. A copy of the draft MoU is also attached with scheme which shall be signed between the State/UT and MoRTH. Out of total Centre's share, 80% of the Central Government's share (after deducting pro-rata costs of national PMU, Dashboard to be set up in MoRTH and the cloud to be provided by NIC) will be released to States/UTs on signing of MoU. Each State/UT will select its own Implementation Agency for setting up of Monitoring Centers. The backend system of the Monitoring Centre will be hosted on NIC cloud. Balance 20% of the Centre's share will be released after three months of successful operation of Monitoring Centre post commissioning by the States/UTs and submitting the utilization certificate for the earlier received share.

Encl:-

- (i) Detailed Guidelines for Scheme.
- (ii) MoU between MoRTH and State/UT Government.

Yours faithfully,



(Sudip Dutta)

Under Secretary to the Government of India
Tele: 011-23357125

Copy to:

- The Under Secretary, Nirbhaya cell, Ministry of Women and Child Devevelopment, 3rd Floor, Jeevan Vihar Building, Sansad Marg, New Delhi.

No. RT-16011/1/2018-T
Government of India
Ministry of Road Transport and Highways
(Transport Division)
Transport Bhavan, 1, Sansad Marg, New Delhi - 110001

Dated, the 15th January, 2020

Subject: Scheme for Implementation of "Development, Customization, Deployment and Management of State-wise vehicle tracking platform for Safety & Enforcement as per AIS 140 Specifications", in States / UTs under Nirbhaya Framework.

1. Introduction
 - 1.1. Ministry of Road Transport & Highways, Government of India had issued a notification on 28th November 2016 wherein Vehicle Location Tracking (VLT) Device and Emergency Buttons were mandated to be fitted in all public service vehicles (all four wheeled or higher, passenger carrying vehicles) w.e.f. 1st April, 2018.
 - 1.2. In order to standardize the specification of VLT and Emergency button across the country, AIS 140 standards were released by ARAI for Ministry of Road Transport & Highway (MoRTH). The standard mainly includes the specifications for Vehicle Location Tracking device (VLTD) and vehicle tracking Backend system. The vehicle location tracking device and the emergency button must be fitted by the manufacturers or their respective dealers or operators as the case may be in accordance with the AIS 140, as amended from time to time, till corresponding BIS Standards are notified under the Bureau of Indian Standards Act, 1986.
 - 1.3. The States were required to set up Command and Control Centre's (Monitoring Centers) as per MoRTH notification and AIS-140 to provide interface to various stakeholders etc. as per code of practice of AIS 140.
 - 1.4. Since the States could not set up the Monitoring Centers, the effective implementation of the vehicle tracking system could not be done. Though a few states for implementation of VLT Devices and Emergency Buttons are using BSNL AIS 140 Compliant Common Layer backend. It was therefore felt necessary to support the States under Nirbhaya Framework to set up Monitoring Centers at the earliest so as to effectively implement the vehicle tracking system and ensure safe commute to the women and children in public passenger transport vehicles.
 - 1.5. The Monitoring Centers in the States shall be used to provide interface to various stakeholders such as State emergency response center, the transport department or Regional Transport Offices, MoRTH and its designated agency, law enforcement agency, VLT device manufacturers and their franchisees, etc. The Monitoring Centres shall receive data from the VLT devices in the vehicles and process the same. The Monitoring Centre shall also process the alerts specified in AIS 140 specification.
 - 1.6. The Ministry therefore has decided to support the States/UTs to implement the project by providing funds under the Nirbhaya Framework and would like to take onboard all the States/UTs to implement the same effectively.

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Ministry of Road Transport and Highways
(Transport Division)
Transport Bhavan, 1, Sansad Marg, New Delhi - 110001

2. Objectives

- 2.1. Safety of women and girl children is a prime concern during their travel in public passenger transport vehicles like cabs, taxis, public buses etc. The proposed system envisages to enhance the safety of the women and the girl children by equipping all the *public passenger transport vehicles with location tracking device and emergency buttons for raising an alert in case of emergency.
- 2.2. Monitoring Centre shall be setup in each State / UT for monitoring the alerts and coordinating with State ERSS for responding to distress calls.

3. System Overview

- 3.1. The proposed Vehicle Tracking System consists of a Vehicle Location Tracking (VLT) device, with Emergency buttons, meeting the specifications of AIS-140, mounted in the vehicle, which will send the vehicle location, health status, alerts and other data to the Monitoring center at a specified periodicity. A Standard Operating procedure (SoP) shall be defined by State/UT for handling emergency alerts at the Monitoring Centre. The Transport Department officials will be able to access the system and monitor the alerts at the Monitoring Centre. The actionable alerts will be filtered and handled as per the Standard Operating Procedure (SoP) formulated by State/UT.
- 3.2. The system will be a web-based system so that the officials concerned will be able to use the system on their desktop computers. For states equipped with fully functional ERSS, the VLT device shall be configured to send data to Monitoring Centre and to the ERSS of the State. However, for states equipped with only partially functional ERSS, the VLT device will be configured to send emergency button press alert and related data to Monitoring Centre. The alert will be handled by the monitoring official and forwarded to the concerned aid agency or police manually.

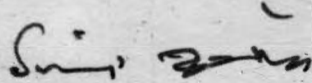
4. Implementation Mechanism

- 4.1. The implementation of CMVR 125H is the responsibility of the State Government. However, being a matter of safety of women and children, Ministry of Road Transport and Highways, Govt. of India has decided to support the state government for the implementation of CMVR 125H by providing financial support under Nirbhaya fund managed by Ministry of Women & Child Development (MWCD). The funding pattern of this project shall be as per the Nirbhaya funding guidelines. The contribution of MoRTH would remain in the specified proportion as per Nirbhaya Framework and in no case exceed the amounts spelt out in the para 6.5 of this Scheme.
- 4.2. The State have to setup Monitoring Centre (Command and Control Centre or backend system) in compliance to AIS-140. The states may appoint an

Sanjay Singh

No. RT-16011/1/2018-T
Government of India
Ministry of Road Transport and Highways
(Transport Division)
Transport Bhavan, 1, Sansad Marg, New Delhi - 110001

- Implementation Agency to design, develop and deploy a Monitoring Centre in compliance to AIS-140.
- 4.3. The Centre has decided to support State/UTs in setting up the Monitoring Centre through Nirbhaya framework by providing financial assistance as per the Scheme.
- 4.4. Deliverables, responsibilities, milestones and state contributions are provided in subsequent paragraphs.
- 4.5. NIC cloud shall be used for hosting the backend system of Monitoring Centre. The minimum configuration for the Monitoring Centre will be as listed in Annexure B. Over and above the minimum configuration, the States/UTs can opt for additional features.
- 4.6. Based on the number of vehicles covered by the notification and the geographical area, the 37 States/UTs have been categorized into 4-categories. (Refer section 6.5 of this document).
- 4.7. Till the time the states set up the Monitoring Centres under this Scheme, they shall ensure the compliance of CMVR 125H for vehicles registered after 1st Jan 2019 through VAHAN/ respective state vehicle registration system using any backend system as per MoRTH SO No. 5453 date 25 October 2018..
- 4.8. The states shall notify the timelines for implementation of VLT device installation with respect to the vehicles registered prior to 1st Jan 2019. The passenger transport vehicle owners shall have the responsibility to purchase the vehicle tracking device and emergency button(s) and get them installed from any of the type approved VLT device vendors.
- 4.9. The State/UT will enforce fitment/functional status of device at the time of registration/ permit issuance/ renewal / fitness check of the vehicle in VAHAN or the respective state vehicle registration/ permit system
- 4.10. For ensuring proper fitment of VLTD in vehicles, the VLT manufacturer shall enter the Unique Identification number in VAHAN database for the purposes of linking the VLT device to the specific public service vehicle, in case of retro-fitment in old vehicles. In case of new vehicles where the VLT device is installed by the vehicle manufacturer, then the above process shall be undertaken by the vehicle manufacturer/ or their authorized agency.
- 4.11. The Monitoring Centre set up by States/UTs shall provide access to various stakeholders/systems such as their transport department/RTO officials, device suppliers, testing agencies, permit holders, VAHAN & MoRTH. The States/UTs will ensure that the Monitoring Centre are mandatorily linked to States/UTs' ERSS/other emergency response systems.



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- 4.12. The Monitoring Centres will need to meet the minimum features listed in Annexure B. The responsibility matrix of the MoRTH/State/NIC (VAHAN) are also detailed in Annexure B.
- 4.13. A Dashboard will be set up at MoRTH for the monitoring of Scheme. The State/UT's Monitoring Centres will share data with MORTH Dashboard as defined in AIS 140 or specified by MoRTH from time to time, for the purpose of monitoring of the Scheme.
- 4.14. MoRTH will set up a National Project Management Unit (PMU) to scrutinize State/UT applications seeking funds under the Scheme, to coordinate between the stakeholders, monitor implementation of the Scheme and to review implementation/operation reports submitted by the States/UTs.
5. Sources of finance for the Scheme and Total Cost of the Project
- 5.1. The Government of India has set up Nirbhaya Fund which is being administered by Department of Economic Affairs, Ministry of Finance. The fund is mandated to be utilized for projects related to women safety and security. The instant project shall be financed from Nirbhaya Fund
- 5.2. Total cost shall be shared between Centre Government and States/UTs in the ratio as mentioned in Nirbhaya framework guidelines.
- 5.3. The Project cost to be funded by MoRTH under this Scheme will include costs towards the backend Software, Monitoring Centre equipment, space for setting up the Monitoring Centre, training, and helpdesk support for vendors and department officials, cloud service, map services, State/UT's own manpower to be engaged for Monitoring Centre, state-level project management, and national PMU set up by MoRTH. Operations & Maintenance (O&M) charges for two years following the commissioning of the system (refer section 8) will also be part of the funding Scheme.
- 5.4. State specific requirements in addition to the AIS-140 standards can be taken up as part of the project cost as per the requirement of the States/UTs.
- 5.5. The 37 States / UTs have been categorized into four categories, based on the number of vehicles and the geographical area for determination of estimated Project cost. The State wise estimated Project cost and funding structure is mentioned in the table below:

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Ministry of Road Transport and Highways
(Transport Division)
Transport Bhavan, 1, Sansad Marg, New Delhi - 110001

Table 1: Cost structure and Centre and States / UTs share

Name of State / UT	State / UT	Sharing Formula (Centre : State)	Category	Estimated Project Cost (INR Crores)	Centre's Share (Maximum) (INR Crores)	Amount to be retained from Centre's Share (INR Crores)	State's Share (INR Crores)
1	2	3	4	5	6	7	8
Maharashtra	S	60:40	A	20.35	12.21	4.97	8.14
Tamil Nadu	S	60:40	A	20.35	12.21	4.97	8.14
Gujarat	S	60:40	A	20.35	12.21	4.97	8.14
Kerala	S	60:40	A	20.35	12.21	4.97	8.14
Karnataka	S	60:40	A	20.35	12.21	4.97	8.14
Andhra Pradesh	S	60:40	A	20.35	12.21	4.97	8.14
West Bengal	S	60:40	B	15.40	9.24	4.00	6.16
Haryana	S	60:40	B	15.40	9.24	4.00	6.16
Telangana	S	60:40	B	15.40	9.24	4.00	6.16
Rajasthan	S	60:40	B	15.40	9.24	4.00	6.16
Madhya Pradesh	S	60:40	B	15.40	9.24	4.00	6.16
Odisha	S	60:40	B	15.40	9.24	4.00	6.16
Bihar	S	60:40	B	15.40	9.24	4.00	6.16
Assam	S	90:10	B	15.40	13.86	4.00	1.54
Punjab	S	60:40	B	15.40	9.24	4.00	6.16
Uttar Pradesh	S	60:40	B	15.40	9.24	4.00	6.16
Jharkhand	S	60:40	B	15.40	9.24	4.00	6.16
Chhattisgarh	S	60:40	B	15.40	9.24	4.00	6.16
Delhi	U	100:00	C	10.40	10.40	2.49	0.00
Jammu & Kashmir	U	100:00	C	10.40	10.40	2.49	0.00
Himachal Pradesh	S	90:10	C	10.40	9.36	2.49	1.04
Nagaland	S	90:10	C	10.40	9.36	2.49	1.04
Meghalaya	S	90:10	C	10.40	9.36	2.49	1.04
Tripura	S	90:10	C	10.40	9.36	2.49	1.04
Manipur	S	90:10	C	10.40	9.36	2.49	1.04
Mizoram	S	90:10	C	10.40	9.36	2.49	1.04
Sikkim	S	90:10	C	10.40	9.36	2.49	1.04
Arunachal Pradesh	S	90:10	C	10.40	9.36	2.49	1.04
Uttarakhand	S	60:40	C	10.40	9.36	2.49	1.04
Goa	S	60:40	C	10.40	6.24	2.49	4.16
Puducherry	U	100:00	D	4.60	4.60	1.35	0.00

Sumit

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Ministry of Road Transport and Highways
(Transport Division)
Transport Bhavan, 1, Sansad Marg, New Delhi - 110001

Name of State / UT	State / UT	Sharing Formula (Centre : State)	Cate-gory	Estimated Project Cost (INR Crores)	Centre's Share (Maximum) (INR Crores)	Amount to be retained from Centre's Share (INR Crores)	State's Share (INR Crores)
1	2	3	4	5	6	7	8
Chandigarh	U	100:00	D	4.60	4.60	1.35	0.00
Padra & Nagar Haveli	U	100:00	D	4.60	4.60	1.35	0.00
Andaman & Nicobar Islands	U	100:00	D	4.60	4.60	1.35	0.00
Daman & Diu	U	100:00	D	4.60	4.60	1.35	0.00
Lakshadweep	U	100:00	D	4.60	4.60	1.35	0.00
Ladakh	U	100:00	D	4.60	4.60	1.35	0.00
TOTAL (Scheme Value)				463.90	332.24	117.15	131.66

- 5.6. The Central Government shall pay the percentage of the actual project cost as indicated in column 3 in the above table subject to maximum centre's share as indicated in column 6 above.
- 5.7. A Dashboard will be set up by DIMTS Ltd. at MoRTH for the scheme at the cost of Rs. 1.3 crores plus GST which will be integrated with data from State/UT's Monitoring Centres. This amount will be withheld by MORTH along with the National PMU cost and cost of NIC Cloud services. The NIC Cloud charges to be withheld by MoRTH for different categories of States/UTs will be as under:

Category of State/UT	Charges towards NIC Cloud (INR Crores)
A	3.75
B	3.04
C	1.87
D	1.04

- 5.8. Total amount to be retained by MoRTH towards NIC Cloud, National PMU and Dashboard shall be as mentioned in column 7 above. The funds to the State/UT will be released after deducting these amounts proportionately from State/UT payments.

6. Procedure for seeking support for implementation of the Scheme

- 6.1. The State Governments/ UTs shall apply in a Proforma as prescribed by the Central Government to seek assistance (Annexure A) along with a Project Note. The detailed information with respect to concerned State/UT will have to be provided as per the relevant columns of the proforma attached with the Scheme as per Annexure A. The Project Note shall include the following:

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- Approach for setting up the monitoring centre
- Mechanism adopted currently for compliance of CMVR 125 H
- Plans for enforcing CMVR 125 H for vehicles registered prior to 01st Jan. 2019
- Estimated project cost and implementation timeline

For seeking funds under the Scheme, the State Governments/ UTs shall apply by 15th February 2020.

- 6.2. The State/UTs government will appoint a single point Nodal Officer and a PIU for the project implementation. The State/UT may also appoint a PMC to assist it in implementation of the project. The States/ UTs can appoint their own PMC or can use the National PMU agency for providing State level PMC services however the cost of the PMC at the State/UT level shall be borne by the State/UT
- 6.3. The State/UT will also provide an undertaking for the availability of required size furnished space for Monitoring Centre as well as the electricity and air conditioning.
- 6.4. The applications received from the States/UTs will be scrutinized by MoRTH through its PMU. Once, the application of the State/UT is approved by MoRTH, the State/UT shall sign an MoU with MoRTH.

7. Payment / Implementation Milestones

The payment by MoRTH of its share of project cost after retaining amount as specified in column 7 of Table 1 and implementation milestones for the implementation of the project will be as follows:

Sl. No.	Deliverables	Payment (%)	Timeline
1	Signing of MoU (MoRTH & State/UT)	80%	T +15 days
2.	Commissioning of the Monitoring Centre by the State/UT	--	T+ 180 days (Latest by 31 December 2020)
3	Three months of successful operation of Monitoring Centre post commissioning	20%	3 months after commissioning of Monitoring Centre

Note: T will be date of Sanction letter issued by MoRTH for funding under the Scheme.

8. Setting up of a PMU

- 8.1. MoRTH will set up a National Project Management Unit (PMU) through DIMTS Ltd. to scrutinize State/UT applications seeking funds under the Scheme, to coordinate between the stakeholders, monitor implementation of the project and to verify implementation/operation reports submitted by the State/UT.

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- 8.2. The PMU will be set up immediately and will be for a period of three years. The tenure of the PMU can be further increased, if required.
- 8.3. DIMTS Ltd. as the National PMU for the Scheme will undertake the following activities:
- Scrutinize applications by States/UTs for funding under the Scheme
 - Monitor the implementation of the Scheme
 - Coordinate among various stakeholders including States/UTs, monitoring centre, NIC, etc.
 - Check/verify various implementation/operation reports submitted by States/UTs.
 - Reconcile payments made by MoRTH to States/UTs against utilization certificates submitted by States/UTs.
 - Assist MoRTH in resolving queries/issues of States/UTs regarding compliance to AIS-140/ notifications issued by MoRTH/ other issues related to implementation
 - Undertake periodic (quarterly) review of implementation of the Scheme across various States/UTs and give suggestions for improvement in the Scheme/its implementation
 - Undertake periodic visits to States/UTs (once per milestone) implementing the project under the Scheme to assess the progress at the ground level.
- 8.4. The PMU will comprise 3 full-time resources (one senior resource with 7 years plus experience and two resources with 3 year plus experience) deployed by DIMTS at MoRTH. In addition to the full-time resources, PMU will also be supported by other subject matter experts provided by DIMTS for PMU.
- 8.5. The fees of PMU will be 2% of the Scheme value plus GST, and would be part of the Scheme. The fee will be payable to PMU as under:
- 1% of the total Scheme value payable on half yearly basis in advance in equal installment over a period of 36 months from the date of deployment of PMU; and
 - Balance 1% of the project value payable along with release of milestone linked fee to the states concerned for the respective projects, to be paid quarterly.
9. **Capacity Building and Hand holding support**
- 9.1. Key stakeholders like Transport department and vendors would require extensive training for getting accustomed to the system. Depending on the roles assigned to the users of the system, the training requirements may vary. The States/UTs will conduct Workshops and Training sessions to department officials. The training will be provided at Transport Department Headquarters or at the venue arranged by the States / UTs.

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9.2. The States for effective project management can appoint a State level PMC to guide them through the process and project period. The states/ UTs can appoint their own PMC or can use the National PMU agency for providing State level PMC services at Manpower cost as per NICSI rates.

10. Milestones & Payment Terms

- The payments from MoRTH shall be released to States/UTs after verification of milestones/deliverables by the PMU set up by the MoRTH.
- The initial payment shall be released by MoRTH as advance. Subsequent payment shall be released against the achieved milestone after review by MoRTH PMU.
- States shall submit implementation / operation report to MoRTH on achieving a milestone. MoRTH shall release its share of payment after receipt of the requisite implementation / operation report from the concerned State/UT.
- The implementation/operation reports from States/UTs shall be checked and reviewed by MoRTH PMU before release of payments.
- The State/UT shall ensure the commissioning of the Monitoring Centre by 31st December 2020.
- The payments released shall be reconciled against the Utilization Certificate (UC).
- Second payment shall be released after three months of successful operation of the Monitoring Centre post its commissioning.
- The National PMU Costs and cost of Dashboard at MORTH will be retained by MORTH and the funds to States/UTs will be released after adjusting the proportionate amounts.

11. Recurring cost after the project period

The States/UTs shall budget for entire O&M costs of the project after initial two years. This cost shall be borne by the State/UT for maintaining the system, including the following activities:

- Cloud services
- Connectivity & Maintenance charges for Monitoring Centre
- Charges for operations and maintaining the help desk facility
- Annual Maintenance charges for the application software and hardware
- Annual charges for Map services/ Data.

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Annexure A

Proforma for seeking assistance from Ministry of Road Transport & Highways (MoRTH) under the Scheme "Development, customization, deployment and management of State-wise vehicle tracking platform for Safety & Enforcement with AIS 140 Specifications" through IA under Nirbhaya framework

1.	Name of the State/UT															
2.	Number of Districts															
3.	Number of RTO & SRT0															
4.	Number of Motor Vehicles Dept. officials (JTC, RTO, MVI, AMVI)															
5.	Vehicle Statistics (This Scheme covers public transport vehicles only)	<table border="1"> <tr> <td>Total No. of Vehicles falling under the purview of CMVR 125H</td> <td></td> </tr> <tr> <td>Vehicle Type</td> <td>Approximate Number</td> </tr> <tr> <td>Buses</td> <td></td> </tr> <tr> <td>Taxis</td> <td></td> </tr> <tr> <td>Education Institution Buses (EIB)</td> <td></td> </tr> <tr> <td>Others (Please specify)</td> <td></td> </tr> <tr> <td>Total</td> <td></td> </tr> </table>	Total No. of Vehicles falling under the purview of CMVR 125H		Vehicle Type	Approximate Number	Buses		Taxis		Education Institution Buses (EIB)		Others (Please specify)		Total	
Total No. of Vehicles falling under the purview of CMVR 125H																
Vehicle Type	Approximate Number															
Buses																
Taxis																
Education Institution Buses (EIB)																
Others (Please specify)																
Total																
6.	Monitoring Centre, Helpdesk Details															
	Address of Location, Identified															
	Area (approx. 800 Sq.ft.)															
	Facilities Available (Furnished/ Unfurnished), Air-conditioned															
	Electric Power Availability (Yes/No)															
7.	Vehicle Registration & Permit Details															
	Existing Application (VAHAN / Others)															
	<ul style="list-style-type: none"> • If others Specify Details such as if the Application is Web based • Whether application hosted at State Data Centre • Name of Product vendor • Contact person (Vendor) 															

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	<ul style="list-style-type: none"> Contact No (Vendor) 	
	Migration Plan to VAHAN (Not planned / Ongoing / Completed)	
8.	Emergency Response Support System Details (ERSS)	
	<ul style="list-style-type: none"> Status of ERSS (Functional / Planned) 	
	<ul style="list-style-type: none"> ERSS System Details 	
	<ul style="list-style-type: none"> If others specify details Name of Product vendor Contact person (Vendor) Contact No (Vendor) 	
	<ul style="list-style-type: none"> ERSS URL/IP 	
9.	State Nodal Officer Details	
	Name	
	Designation	
	Official Address	
	Contact Number	
	Email Id	
10.	Project Note	
	<ul style="list-style-type: none"> Approach for setting up the Monitoring Centre Mechanism adopted currently and interim for compliance of CMVR 125 H Plans for enforcing CMVR 125 H for vehicles registered prior to 01st Jan. 2019 Estimated project cost and implementation timeline 	
	<u>Undertaking</u>	
	<p>The State/UT of _____ wishes to be a part of this national Scheme and agrees to fully comply with the guidelines mentioned in this document.</p> <p>_____ State/UT also undertakes that the state contribution shall be made as per the milestones specified in the Scheme and support mentioned under the roles & responsibilities covered in the Scheme shall be extended to all stakeholders for the successful implementation of this project.</p> <p>Name & Designation of Designated Officer</p> <p>Sign</p> <p>Date</p>	

.....

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Annexure B

1. Minimum Features of Monitoring Centres

The States/UTs will set up monitoring centres which will be compliant to AIS-140 standard and MoRTH guideline issued in this regards. The monitoring centres will have following features at the minimum:

- Vehicle Tracking and monitoring Software as per AIS-140
- Hosting of application on NIC Cloud
- Map service/ Data as per AIS-140.
- Protocol integration of all type approved VLT Manufactures for the State/UTs
- m2m/ telecom service provider integration for SIM activation/validity support for the period as per MoRTH guidelines
- Mobile application
- Online storage for complete data for three months, online storage of alerts data for two years and archive storage of all data for minimum two years.
- SMS gateway / packages
- Connectivity to Monitoring Centre
- Helpdesk supporting telephone call, e-mails and web complaint for VLT manufacturer/Transport Department/Permit Holders, etc.
- Minimum Equipment in Monitoring Centre
 - Video wall (one set of 55 inches LED, 2x2 matrix)
 - Desktop computers with operating system, Office suite
 - Multi-functional printer
 - UPS
 - Switch
 - Connectivity
- Manpower resources for Monitoring Centre Operations & Help desk support
- Testing and certification as per AIS-140
- SSL & Security (CERT-IN) Certificates
- Data Sharing API with MoRTH

2. Features of the System

The Monitoring Centre will meet all the requirements as set out in AIS-140 / equivalent BIS standard and as per MoRTH notification issued from time to time. The monitoring centre will have the following minimum features.

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2.1. Real-time Tracking

The real-time tracking will enable users to track location of vehicles on the map, get status information about vehicle, and for a play back option on the map to view the path travelled by a vehicle earlier as per the requirements listed in AIS-140.

2.2. Secure Communication and Device Management

The monitoring centre will be integrated with all VLT device vendors' protocols as approved for AIS-140 by test agencies to enabling secure, authenticated connection between VLT device and backend including m2m/ telecom service provider integration etc. The monitoring centre shall enable device communication for commands, alerts as set-out in AIS-140 for the State/UT.

2.3. Installation, Registration, Activation and Service Process for VLT Device

The monitoring centre shall create the software will all facilities as mentioned in MoRTH guidelines/ AIS140 and enable all requirements mentioned like SIM validity, Activation SMS, Health check, VAHAN integration for activation status update required for registration, installation, activation and health check of VLT devices. Providing m2m/ telecom service provider integration for SIM activation/validity/ KYC support for the period as per MoRTH guidelines.

2.4. Web Interface to VLT vendors for tagging

Tagging is the process of installing the VLT device in a vehicle and associating it with the software system. The monitoring centre shall follow the whole process as set-out in the MoRTH guidelines and AIS140. The initial tagging of the vehicle will be done by the Vehicle manufacturer or dealer or VLT manufacturer or their registered agencies on VAHAN. The software will provide necessary interface to the above users for this operation in integration with VAHAN / State vehicle registration system. The VLT device after tagging will be activated as per process set out in AIS-140 and as per MoRTH guidelines issued from time to time, on the backend system as part of Monitoring Centre. The tagged vehicle will be verified and approved by the concerned RTO at the time of fitness check or as decided by the department in VAHAN/state vehicles registration platform.

2.5. Monitoring Centre

The Monitoring Centre will enable real-time monitoring, quick response to alerts and enforcement assistance.

2.6. Map Services

The real-time location of the vehicles will be depicted on the GIS map of the State/UT. The monitoring centre will be responsible for providing the map platform as well as the required map data for the requirement of the State/UT. The map platform should be in compliance to Survey of India guidelines for Maps.

The various functionalities of the map platform will be:



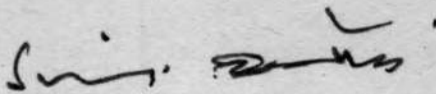
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- **Real-time Plotting:** The real-time location of a single/multiple vehicle(s) shall be plotted and updated on the map. Clustered view of vehicles shall be provided to view large number of vehicles.
- **Map Data / Points of Interest (POI):** The map data/service shall provide detailed point of interest for city/ roads, including schools, hospital, police station, Bank, ATM etc. at a scale better than 1:25000 or as required by State/UT. User (admin level) will be given options to add/edit/delete points of interest. POI will be shown to users in the map view.
- **Geo-fencing:** Geo-fence is a predefined set of boundaries marked on a map layer to mark specific zones such as school zone, hospital zone etc. User (admin level) will be given options to add/edit/delete geo-fence.
- **Map Based Tools:** Different map-based tools like Zoom and Pan will be integrated in the Monitoring Centre screens.
- **Track & Trip View:** The tracking screen provides users with options to track online the location of vehicles on the map, display status view information about vehicle, and display Trip View information on the route travelled by a Vehicle earlier on the map. The online option displays the current location of the Vehicle and Trip View displays the route taken by the Vehicle earlier. Both Online and Trip View can be viewed as Map View.
- **Multi filter options:** User will be given options to track vehicles by their category, speed, location, Vehicle number, etc.

2.7. Alerts & Messages

The system shall generate various alerts like over-speeding, restricted-area violation, route violation (if route details are available) etc. as per the AIS-140 standard. Based on these alerts, Transport Department can respond quickly and take necessary actions. The various alerts to be generated are:

- **Emergency Alerts:** This alert is raised when a passenger or crew in a vehicle presses the emergency button in need of immediate aid or assistance. This alert will be routed to the emergency response system directly as well to the Monitoring Centre. Alerts will be highlighted in the Monitoring Centre. This is the highest priority alert.
- **Speed violation alerts:** Identifies the vehicle moving at a speed greater than the allowed speed limit and to passes the vehicle information to the nearest enforcement unit.
- **Geo-fence alerts:** The application provides facility to geo-fence an area on the map. Geo-fence can be either done based on an area or based on a specific Point of Interest. The route travelled by the vehicle can also be geo-fenced to receive alerts on any route violations from the actual route.
 - Geo-fence Pol (Point)



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- Geo-fence Place (Area)
- Geo-fence Route
- Geo-fence Alerts can be configured to track vehicles entering the geo-fence area, going out of the geo-fence area or for both the instances.
- **VLT device tampering alerts:** VLT device will send information to the server if its power cable gets disconnected or if it gets tampered. Application will record an alert after verifying the information.

2.8. Reports

The system shall provide the Transport Department with options for generating various reports like device installation report, device uptime report, number and type of alerts, route report, distance report, speed violation report, fleet summary report and alert reports.

2.9. Integration with VAHAN, ERSS and Legacy Systems

VAHAN software of Motor Vehicles Department is used for management of the services provided by Transport Department to the public. The system is integrated with VAHAN and can be integrated with other legacy systems running in the state for getting vehicle registration details. The States/UTs will ensure that the Monitoring Centre are mandatorily linked to States/UTs' ERSS/other emergency response systems.

2.10. Data Archival

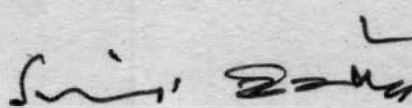
The monitoring centre shall provision online storage for complete data for three months, online storage of alerts data for two years and archive storage of all data for a minimum period of two years. The emergency tagged data, which might be required for evidence purposes, shall not be deleted from the system. The data identified as old based on an archival policy can be moved to and stored in a separate storage device for long-term retention as per State/ UT policy. The monitoring centre should provision the storage for the State/UT at the Monitoring Centre or any other place identified by State/UT for retention by the State.

2.11. Access to Stakeholder of the System

The monitoring centre shall provide access to all the stakeholders as per AIS-140 and MoRTH Guidelines or as decided by the State/UT through a role-based access mechanism.

2.12. Health Monitoring of VLT device and Emergency buttons

To ensure that the VLT device and Panic buttons serve in need and are in proper working condition, the health monitoring of both VLT device and Emergency buttons are performed periodically. The system shall be so designed that the Emergency button cannot be tampered with in any way, as any attempt to do so will alert the Monitoring Centre regarding the activity.



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2.13. Web Interface to Vehicle Owners

Interface shall be provided to the vehicle owners, using which they can track their vehicles.

2.14. Data Exchange/Sharing with External System

The monitoring centre will need to share/exchange data in real time with external system such as interstate message exchange platform etc. The monitoring centre will provide APIs for sharing/exchange of data with external systems as defined in AIS-140 or prescribed by MoRTH from time to time.

2.15. Data Sharing with MoRTH

APIs will be provided for sharing of data with MoRTH as defined in AIS-140 or notified by MoRTH from time to time, for the purpose of monitoring of compliance of implementation of VLTD.

3. Responsibility Matrix

S/N	Major Activities	MoRTH	States / UTs	NIC/ VAHAN
1.	Finalization of Scheme for setting up of Monitoring Centre	✓		
2.	Setting up of National PMU	✓		
3.	Signing of MoU for setting up of Monitoring Centre	✓	✓	
4.	Selection of Implementation agency for setting up of Monitoring Centre		✓	
5.	Release funds to States/UTs	✓	✓	
6.	Support the project with the State's contribution as specified under the MoRTH guidelines		✓	
7.	Implementation of Monitoring Centre for the State/UT			
8.	Integration with VAHAN Application	✓		✓
9.	Data sharing by Monitoring Centre with MoRTH.	✓	✓	
10.	Constitute a State level Project Management Unit, with a nodal officer for monitoring and supporting the project implementation		✓	
11.	Operation & Maintenance of Monitoring Centre		✓	


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Annexure – C

General Guidelines for Implementation of State-wise Monitoring Centre for VLT devices as per AIS-140

1. The specified public service vehicle owners have to ensure that the VLT devices installed in their vehicles, are in working condition and regularly send required data to the corresponding Monitoring Centre through cellular connectivity.
2. The specified new public service vehicles shall not be registered in the State/UT if the vehicles are not equipped with or fitted with vehicle location tracking device and one or more emergency buttons, in compliance with the CMVR.
3. The Unique Identification number and others details of each VLT device shall be uploaded on the VAHAN database by the Vehicle manufacturer or its authorized agency, in case of New Vehicles using their secured authenticated access. The Unique Identification number of VLTD shall be tagged to vehicles details (Engine no./Chassis Number) in VAHAN for the purpose of linking the VLT device to the specific public service vehicle. For the registration of new PSV in VAHAN, the VLTD shall be activated and functional and the Unique ID of VLTD shall be tagged to the vehicles in VAHAN.
4. In case of retro-fitment in vehicles, the VLT device manufacturers or their authorized dealers shall install the VLT devices in public service vehicles and register the devices along with Unique Identification number and other details on VAHAN and the corresponding Monitoring Centre systems in real-time.
5. The State/UT shall enforce fitment/functional status of device at the time of registration/ permit issuance/ renewal / fitness check of the vehicle in VAHAN or the respective state vehicle registration/ permit system and the State/UT Monitoring System.
6. The VLT device shall be activated on the Monitoring Centre as per the process set-out in AIS 140 and the functional status shall be updated in VAHAN/ State registration software by the Monitoring Centre of the State.
7. VLT device manufacturers or their authorised dealers shall provide comprehensive warranty/maintenance support for the VLT device and facilitate cellular connectivity for a minimum period of two years for new public service vehicles and one year for other vehicles.
8. The State/UTs shall ensure compliance to rule 125 H of Central Motor Vehicles Rules, 1989 and check fitment and functional status of the VLT device in the public service vehicles at the time of checking of the vehicles for fitness certification in VAHAN and State/UT Monitoring Centre.



MEMORANDUM OF UNDERSTANDING (MoU)

BETWEEN

Ministry of Road Transport & Highways, Government of India

AND

Transport Department, Government of {State/UT name}

For Implementation of "Monitoring Centre for Tracking and Monitoring of Public Service Vehicles as per AIS-140 standard under Nirbhaya Framework"

This MoU is made on the {date} at {place}

BY AND BETWEEN

Ministry of Road Transport & Highways, Government of India, {designation of the signing representative} (hereinafter referred to as the "MoRTH" or "Ministry" which expression shall unless excluded by or repugnant to the context be deemed to mean and include its successors in office or assignees) of the FIRST part

AND

The {State/UT} Government represented by {designation of the signing representative}, Transport Department, (hereinafter referred to as the "{State/UT}") which expression shall unless excluded by or repugnant to the context be deemed to mean and include its successors in office or assignees) of the SECOND part.

WHEREAS, MoRTH had issued a notification on 28th November 2016 wherein Vehicle Location Tracking Device (VLT or VLTD) and Emergency Buttons were mandated to be fitted in all public service vehicles (four wheeled or higher, passenger carrying vehicles) w.e.f. 1st April, 2018. In order to standardize the specifications of VLTD and Emergency Buttons across the country, AIS 140 standard was released. Subsequently, Ministry exempted all public service vehicles from the purview of provisions of rule 125H of the Central Motor Vehicle Rules 1989 up to 1st April 2019 vide notification dated 18th April, 2018 as it had come to the notice of this Ministry that difficulties were being faced in implementing Vehicle Location Tracking Device and Emergency Buttons due to lack of Monitoring Centres to monitor and track the vehicles. The matter was re-examined in the Ministry, and it was decided to give exemption to all public service vehicles which were registered up to 31st December 2018 (old vehicles) from the fitment of VLTD and Emergency Buttons till the time as notified by State/UT Governments in their respective States/UTs. All public service vehicles registered on or after 1st January 2019 must be fitted with VLTD and Emergency Buttons.

AND WHEREAS, MoRTH, in order to support the States/UTs to set up Monitoring Centers, brought a scheme under Nirbhaya Framework (Scheme). The Scheme Guidelines are provided at Annexure A.

AND WHEREAS, the funding pattern under the Scheme shall be as per the Nirbhaya Framework guidelines as per which, for UTs 100% funds will be provided, for States with difficult terrains 90% and for the remaining States 60% funds will be provided under the Scheme. The balance funds shall be provided by the respective States.

AND WHEREAS, MoRTH has agreed to fund the {State/UT Name} to implement the project (Project) for setting up of the Monitoring Centre at a total estimated cost of Rs. {INR in figures and words} comprising MoRTH contribution not exceeding Rs. {INR in figures and words} subject to conditions specified in this MoU and Scheme issued by MoRTH vide No. RT-16011/1/2018-T {dated}.

NOW IT IS HEREBY AGREED BY AND BETWEEN THE PARTIES HERETO AS FOLLOWS:-**1. Effective Date**

This Memorandum of Understanding comes into effect from the date of signing of this MoU by and between the parties.

2. Objective and Overview of the Project

The objective of the project is to improve safety of women and children in public service vehicles through the implementation of CMVR 125H.

Accordingly, all the specified public service vehicles shall be equipped with vehicle location tracking (VLT) device with multiple emergency buttons for requesting emergency response.

The {State/UT} shall set up a Monitoring Centre for monitoring the alerts and health status of VLTD and emergency buttons fitted in the vehicles.

The Monitoring Centre will include a backend system for handling and processing the data and alerts (except Emergency button press alert) sent from the VLT devices fitted in vehicles.

The Monitoring Centre shall be integrated with ERSS through a backend system, for handling the alerts generated by a passenger in distress, by pressing the emergency button fitted in the vehicles.

3. Scope of the project

The scope of the project shall be as below:

- Setting up the Monitoring Centre
 - Space for setting up of Monitoring Centre
 - Development / Customisation of backend software
 - Cloud Hosting & Deployment of backend software and map platform on NIC Cloud
 - Map data and services and along with its Integration
 - Equipment at Monitoring Centre
 - Connectivity to Monitoring Centre
 - Helpdesk support
- State level project management for Monitoring Centre. The {State/UT} may appoint a project management consultant (PMC) for project management.
- Manpower for operations of Monitoring Centre
- Training and capacity building
- Operations and maintenance (O&M) of Monitoring Centre for two years after its commissioning

The costs towards the above scope shall only be considered as project cost for the purpose of funding under the Scheme, as per the terms of this MoU.

4. Roles & Responsibilities of MoRTH

The roles and responsibilities of MoRTH shall be as below:

- Supporting the {State/UT} by providing standard guidelines and instructions for setting up of Monitoring Centre
- Providing funding support for setting up of Monitoring Centre in the {State/UT} as per Nirbhaya Framework
- Set up a National PMU in MoRTH through DIMTS Ltd. to coordinate between the stakeholders, monitor implementation of the project, review deliverables and implementation/operation reports, recommend release of payments and reconcile payments against the utilization certificates.
- Providing support for the integration with VAHAN
- Coordination with MHA and other departments as per the requirements

5. Roles & Responsibilities of {State/UT}

The roles and responsibilities of {State/UT} shall be as below:

- Setting up of the Monitoring Centre, as per the Scheme Guidelines.
- Appointment of Implementation Agency for setting up Monitoring Centre.
- Support the project by ensuring timely payment of its contribution.
- Appoint a Nodal Officer and a PIU for the project implementation. The {State/UT} may also appoint a PMC to assist it in implementation of the project. The nodal officer shall be the single point of contact for all correspondences and coordination in connection with the project implementation.
- Ensure that the Monitoring Centre is linked with State ERSS/other emergency response system.
- Ensure that the Monitoring Centre is mandatorily compliant to the minimum features specified by MoRTH in the Scheme Guidelines.
- Undertake various activities as required for ensuring compliance to CMVR and MoRTH notifications/guidelines such as issuing necessary orders/directions to permit holders/ VLT manufacturers/ RTO officials etc.
- Ensure that the registration/fitness of specified public service vehicles are done at the RTO level only after checking the fitment and functional status of the VLT device in VAHAN/any other vehicle registration system being used by the {State/UT}.
- Integrate the Monitoring Centre with Vahan/any other vehicle registration system in use.

- Ensure necessary infrastructure, like desktops and Internet connectivity at Regional Transport Offices, for using the proposed system.
- O&M of the Monitoring Centre
- Till the time the State set up the Monitoring Centre under this Scheme, it shall ensure the compliance of CMVR 125H for vehicles registered after 1st Jan 2019 through VAHAN/ state vehicle registration system using any backend system as per MoRTH guidelines.

6. Project Cost and Payment Terms

MoRTH shall pay the {percentage as per the Scheme} of the actual project cost, subject to a maximum of Rs. {amount as per the Scheme}, after deduction of Rs. {amount as per the Scheme} towards the NIC Cloud, National PMU and MoRTH Dashboard on a proportionate basis.

The payment of MoRTH share after deduction as above, will be as per the milestones below:

Sl. No.	Milestone	Payment (%)	Timeline
1	Signing of MoU	80%	T +15 days
2	Commissioning of the Monitoring Centre by the State/UT	--	T + 180 days (Latest by 31 December 2020)
3	Three months of successful operation of Monitoring Centre post commissioning	20%	3 months after commissioning of Monitoring Centre

Note: T will be date of Sanction letter issued by MoRTH for funding under the Scheme.

- The initial payment shall be released by MoRTH as advance. Subsequent payments shall be released against the achieved milestones after checking by MoRTH PMU.
- {State/UT} shall submit implementation / operation report to MoRTH on achieving a milestone. MoRTH shall release its share of payment after receipt of the requisite implementation / operation report from the {State/UT}.
- The State/UT shall ensure the commissioning of the Monitoring Centre by 31st December 2020.
- The implementation/operation reports from {State/UT} shall be checked and reviewed by MoRTH PMU before release of second payment, which shall be released after three months of successful operation of the Monitoring Centre post its commissioning.
- The cost of NIC Cloud, National PMU and Dashboard at MoRTH will be retained by MoRTH and the funds to {State/UT} will be released after adjusting the proportionate amounts.

- The {State/UT} shall submit Utilization Certificate (UC) for each instalment of payment released by MoRTH upon utilization of money for the specified purpose.

7. Activities after Commissioning

The {State/UT} shall budget for entire O&M costs of the project after initial two years. This cost shall be borne by the {State/UT} for maintaining the system, including the following activities:

- Cloud services
- Connectivity & Maintenance charges for Monitoring Centre
- Charges for operations and maintaining the help desk facility
- Annual Maintenance charges for the application software and hardware
- Annual charges for Map services/ Data.

8. Validity

This MoU shall be valid for 36 months from the Effective Date. The MoU may be extended on mutual consent.

9. Amendment

This MoU shall be the sole repository of the terms agreed to between the parties and no amendment thereof shall take effect and be binding unless such amendment is recorded in writing and signed by the representatives of the parties.

10. Severability

If any part of this MoU is found by a court of competent jurisdiction or other competent authority to be invalid, unlawful or unenforceable, then such part will be severed from the remainder of this MoU which will continue to be valid and enforceable to the fullest extent permitted by law.

11. Disputes/Arbitration

Any or all disputes between the parties will be settled amicably between the parties through mutual discussions by the signatories or their designated nominees. Failing amicable settlement, both the parties agree to refer the dispute to the Secretary (Transport), MoRTH whose decision shall be final.

12. Jurisdiction

The validity and interpretation of this MoU shall be governed by the laws of India and Courts in Delhi alone shall have jurisdiction to lay any matter relating to this MoU.

13. Communication

The following contact persons are identified for each party, assigning them the responsibility during the project.

MoRTH

{State/UT}

Any notice, request, demand, approval, consent, or other communications provided or permitted hereunder shall be in English language and in writing and sent by registered post or by e-mail addressed to the Representative Authority.

Each party acknowledges that it has read this MoU, understands it, and agrees to be bound by its terms and further agrees that it is the complete and exclusive statement of the MoU between the parties for this project.

IN WITNESS WHEREOF, THE PARTIES SIGNED THIS MOU AT THE PLACE AND ON THE DAY WRITTEN ABOVE.

For and on behalf of

MoRTH

Signature :

Name :

Designation :

Contact No. and email :

Place and Date :

Seal :

{State/UT} Transport Department

Signature :

Name :

Designation :

Contact No. and email :

Place and Date :

Seal

Annexure A
Scheme Guidelines