Protocol

Srno	Name	Description
1	*IND	Header indicate the start of string of new packet
	Packet Type	NR → Normal Packet
3	IMEI No	The IMEI (International Mobile Equipment Identity) number is 15 digits unique no.
4	GPS Validity	'A' → GPS is valid 'V' → GPS not Valid
5	GPS Date	Ddmmyy
6	GPS Time	UTC time
7	GPS Satellites	Value indicates the number of satellites acquire by device
8	Latitude	In GPS data, latitude is represented as a signed float value, which indicates the position of a point on the Earth's surface relative to the Equator. **Latitude Representation** 1. **Signed Float Value**: Latitude is typically expressed as a floating-point number where: o Positive values (e.g., +37.7749) indicate positions in the Northern Hemisphere. o Negative values (e.g., -37.7749) indicate positions in the Southern Hemisphere. **Explanation of the Significance** • **Positive Latitude (North)**: o A latitude value of `+37.7749` means the location is 37.7749 degrees north of the Equator, placing it in the Northern Hemisphere. • **Negative Latitude (South)**: o A latitude value of `-37.7749` means the location is 37.7749 degrees south of the Equator, placing it in the Southern Hemisphere.

9	Longitude	Longitude is also represented as a signed float value in GPS data, indicating the position of a point on the Earth's surface relative to the Prime Meridian.
		
		Longitude Representation
		
		1. **Signed Float Value**: Longitude is expressed as a floating-point number where:
		  ○ Positive values (e.g., +122.4194) indicate positions in the Eastern Hemisphere.
		  ○ Negative values (e.g., -122.4194) indicate positions in the Western Hemisphere.
		
		Explanation of the Significance
		
		• **Positive Longitude (East)**:
		  ○ A longitude value of `+122.4194` means the location is 122.4194 degrees east of the Prime Meridian.
		• **Negative Longitude (West)**:
		  ○ A longitude value of `-122.4194` means the location is 122.4194 degrees west of the Prime Meridian.

10	Speed	**Speed Measurement**:
		
		This field displays the current speed of the vehicle, typically measured in kilometers per hour (km/h).
		
		Ignition Status:
		
		1. **Ignition Off**:
		  ○ When the vehicle's ignition is off, the speed will be recorded as **zero**. This indicates that the vehicle is not in operation.
		2. **Ignition On**:
		  ○ If the ignition is on but the vehicle's speed is less than 5 km/h the speed will also be recorded as **zero**. This is typically used to filter out very low speeds that might occur during idling or very slow maneuvers.

11	Altitude	Not Applicable

12	COG	The direction of a device in a Vehicle Tracking System (VTS) is crucial for understanding its movement and route. This direction is often represented as a heading or bearing, typically measured in degrees from true north (0°) to 360°. If the difference in the Course Over Ground (COG) angle between two consecutive packets exceeds 10 degrees, the device will mark the packet with an 'L' indication and store it for later transmission. This means that rather than sending the data immediately, the device recognizes that the vehicle has made a significant directional change and decides to wait before transmitting this information. This approach helps in optimizing data usage and ensuring that only relevant changes are communicated to the server at the right time.
13	MCC	N.A
14	MNC	N.A
15	LACID	N.A
16	CELLID	N.A
17	GSM Signal Strength	This field indicates the GSM signal strength for the device, which is crucial for maintaining effective communication between the device and the cellular network. GSM signal strength measures the quality of the mobile network connection that the device is using. It is typically expressed in decibels (dBm) or as a value on a scale from 0 to 31.
18	Internal Battery Voltage	The battery voltage field indicates the voltage level of the battery used to power the device, which is essential for ensuring reliable operation and performance. The battery serves as a backup power source for the device when the vehicle in situations where the main power supply is interrupted. Maintaining an adequate battery voltage ensures that the device operates correctly. Low voltage levels can lead to device malfunctions or complete shutdown.
19	External Battery Voltage	External battery voltage monitoring involves measuring the voltage of an external battery connected to the VTS device. If the external battery voltage drops below a certain threshold, alerts can be generated to notify users
20	External Battery Disconnection Byte	0 → Battery is connected to device. 1 → Battery is disconnected to device.

21	Live and History packet indication	'L' → Packet received by server is current or live packet. 'H' → Packet received by the server is History packet.
22	Total Available value in packet (AVL values)	That field shows the number of available value in this particular packet.
23	AVL value 02	The AVL value specifically represents whether the vehicle's Ignition is ON or OFF. This is crucial for tracking and trip generation The AVL value can take on two states: • **02:0**: Indicates that the vehicle's **Ignition is OFF.** • **02:1**: Indicates that the vehicle's is **Ignition is ON.**
24	AVL value 04	The AVL value specifically represents whether the vehicle is immobilized or mobilized. This is crucial for security, allowing operators to control vehicle movement remotely. The AVL value can take on two states: • **04:0**: Indicates that the vehicle is **mobilized** (i.e., it can be driven). • **04:1**: Indicates that the vehicle is **immobilized** (i.e., it cannot be driven).
25	AVL value 05	The AVL value related to the SOS button indicates whether the emergency button has been activated. This button is typically installed in vehicles to provide a quick way to signal for help in emergency situations. The AVL value can take on two states: • **05:0**: Indicates that the **SOS** button is not pressed. • **05:1**: Indicates that the **SOS** button is pressed.

26	AVL value 06	The AVL value related to reading the ADC (Analog-to-Digital Converter) value indicates the voltage level measured from various sensors connected to the Vehicle Tracking System (VTS). This measurement can range from 0 to 30 volts DC and is useful for applications such as temperature monitoring and fuel monitoring. The AVL value will be float: • **06:11.16**: Indicates that the **sensor is giving 11.16 volts**.
27	AVL value 09	The AVL value related to door status indicates whether a vehicle's door is currently open or closed. This is crucial for monitoring the security and safety of the vehicle. If the vehicle is parked and a door is opened, the system can send immediate notifications, allowing for timely intervention if unauthorized access occurs. The AVL value can take on two states: • **09:0**: Indicates that the **DOOR of vehicle is close**. • **09:1**: Indicates that the **DOOR of vehicle is Open**.
28	AVL value 10	The AVL value related to the air conditioning (AC) status indicates whether a vehicle's AC system is currently turned ON or OFF. This feature is important in Vehicle Tracking Systems (VTS) for misuse prevention of AC. Monitoring the AC status helps prevent misuse, particularly during idle periods. If the vehicle is parked or not in use and the AC is still running, it can lead to unnecessary fuel consumption and increased wear on the vehicle's systems. The AVL value can take on two states: • **10:0**: Indicates that the **AC of vehicle is OFF**. • **10:1**: Indicates that the **AC of vehicle is ON**.
29	AVL value 15	The AVL value for firmware version represents the specific version of the software that is embedded in the tracking device. Firmware is the low-level software that controls the hardware components of the device and dictates how it operates. This value allows users, technicians, and system administrators to identify which version of firmware the device is currently running. It plays a crucial role in maintaining the device's functionality and ensuring compatibility with the VTS. **example: 15:V2.3**

30	END Byte	The '$' character serves as a termination marker for data packets. It indicates that the packet has been fully transmitted and no additional data will follow.

Example:

*IND,NR,869630057878146,A,281024,000001,11,12.891507,77.606552,0.00,0,87.11,0,0,0,0,8,4.27,49.02,0,L,5,02:0,04:1,05:0,06:00.0,09:0,10:0,15:V2.5,$

Login Packet

The login packet in VTS is a crucial component of establishing a connection between the tracking device and the server.

1. **Purpose**:
   - The login packet is used to authenticate the device with the server. It is the first step in establishing a stable communication link after the device powers on or reconnects.
2. **Initial Transmission**:
   - Once the device is powered on and establishes a stable connection to the network, it generates and sends a login packet to the server. This packet contains essential information such as device ID, IMEI number, GPS status, Longitude and latitude etc.

The login packets may be sent at regular intervals until a successful acknowledgment is received from the server. This approach enhances the chances of successful connection in unstable network environments.

Srno	Name	Description
1	Header	*IND
2	Packet Type	LP
3	IMEI	The IMEI (International Mobile Equipment Identity) number is 15 digits unique no.
4	GPS Date	ddmmyy
5	GPS Time	UTC time
6	GPS Validity	'A' → GPS is valid 'V' → GPS not Valid
7	END Byte	$

Example:

*IND,LP,869630057878146,281024,000001,A,$

BMS PACKET

Srno	Name	Description
1	Header	*IND
2	Packet Type	BMS
3	BMS ID	1
3	IMEI	The IMEI (International Mobile Equipment Identity) number is 15 digits unique no.
4	GPS Validity	'A' → GPS is valid 'V' → GPS not Valid
4	GPS Date	‘000000
	GPS Time	‘000000
5	Battery Voltage	BMS Battery Voltage in float
6	Battery Current	Charge Current if Value id =Ve else Discharging current
7	SOC	State of charge in percentage
	Max cell voltage	Voltage of cell with max value
	Max cell voltage no	Cell no with max voltage.
	Min cell voltage	Voltage of cell with min value
	Min cell voltage no	Cell no with min voltage.
	Max Temperature	Maximum temperature value
	Min Temperature	Minimum temperature value
	Charge/Discharge Status	1 : Discharging
	Charger Status	0
	Load State	0

	BMS Cycle	No of BMS cycle
	Remaining Capacity	Remaining Capacity value in integer
	No of cells	Total No of cells in Battery
	Cells Voltages in MV	
	No of Temperature Sensor	
	Temperatures	
	Charging Energy KWH	
	Discharging Energy KWH	
	Alarm 1	NA
	Alarm2	NA
	Alarm3	NA
	END Byte	