



French C-ITS Deployment Coordination committee

Common technical specifications for use cases

Stationary law enforcement vehicle (V_{LEV2V})

2.4.1.1_H_L2

Activity 2: Studies

Sub Activity 2.4 > Specifications

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Information on the document

Document: Common technical specifications for use cases – Stationary law enforcement vehicle (V2V)

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Publishing history

Date	Version	Author(s)	Updates & changes	Diffusion
07/04/20	0.01	OCSTI	First draft	
12/04/20	0.02	OCSTI A. AUDIGÉ	Second draft	
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Black highlighted text are problem with standards.

The following legend is used on the document tables :

Standard / Field: if status is mandatory in standard: **bold**, If optional: *italic*.

Profile / Status:

- If mandatory: **v**
- If optional in standard:
 - Used (**U**) when always used.
 - Not used (**N**) when never used.
 - Sometimes (**S**) when it depends.

Profile / Content: important settings or information are in ***bold italic pink underline***.

Quality rules

Reference to the version administration

Version number to be composed of 3 digits > vR.XY

- **R** corresponds to the release number: it is upgraded each time SC Studies validates the diffusion of a new release,
- **X** is the major version number: it is upgraded each time SC Studies validates the deliverable,
- **Y** is the minor version number: it is upgraded each time a contributor changes anything.

Once the deliverable is approved, its version number is upgraded from vR.XY to vR.(X+1)0

Once the deliverable is release, its version number is upgraded from vR.XY to v(R+1).00

As illustration:

- 0.03 > Work in progress version
- 0.10 > Del. Approved by SC Studies but not released
- 2.00 > Del. approved & released (in release 2)
- 2.05 > Del. Updated - in progress version

Requirements identification & traceability

In this document, the following verbal forms are used to indicate requirements: **Shall / Shall not**

Recommendations shall be indicated by the verbal forms: **Should / Should not**

Permissions shall be indicated by the verbal forms: **May / May not**

Possibility and capability shall be indicated by the verbal forms: **Can / Cannot**

Inevitability used to describe behaviour of systems beyond of the scope of this del. shall be indicated by: **Will / Will not**

Facts shall be indicated by the verbal forms: **Is / Is not**

In the table here below:

2.4.X.XX > is the number given to the deliverable (e.g. 2.4.4.8)

YYYY > for digit are given to identifying which component/entity the requirement is addressing (e.g. LTCA for long term certificate authority)

ZZZ > is the numeration of the requirement

ID	2.4.X.XX-YYYY-ZZZ
Component(s)	(e.g) ITSS-VU, ITSS-VRO, ITSS-R, PKI
Requirement	(e.g) An ITS station SHALL be able to request and get a Long term Certificate (LTC) from the SCOOP Public Key Infrastructure (PKI).
Acceptance	(e.g) CA1 : ITSS-VU sends a LTC request to the LTCA CA2 : ITSS-R relays the LTC request CA3 : The LTCA verifies the request and sends a response CA4 : The ITSS-R relays the response CA5 : The response is received by the ITSS-VU and is valid
Additional information	

Acronyms & abbreviations

C-ITS	Cooperative Intelligent Transport Systems
DENM	Decentralized Environmental Notification Message
HLN	Harzadous Location Notification
ITS	Intelligent Transport Systems
Nfr-ITS-S	French National ITS Station
N-ITS-S	National ITS Station
PF	Platform
R-ITS-S	Roadside ITS Station
RW	Road Works
TCC	Traffic Control Center
TMS	Traffic Management System
UC	Use Case
V-ITS-S	Vehicular ITS Station
V_{LEV}-ITS-S	Law enforcement vehicle ITS Station
SLEV	Stationary Law Enforcement Vehicle

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1. Figure

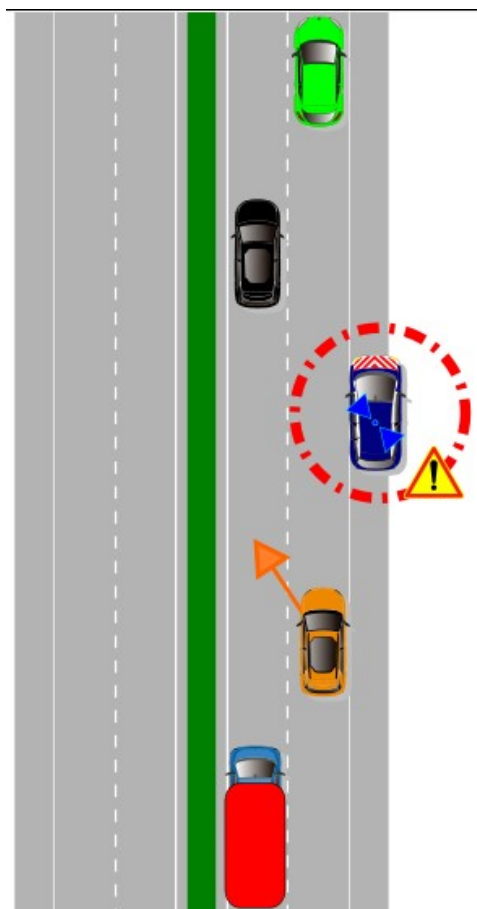
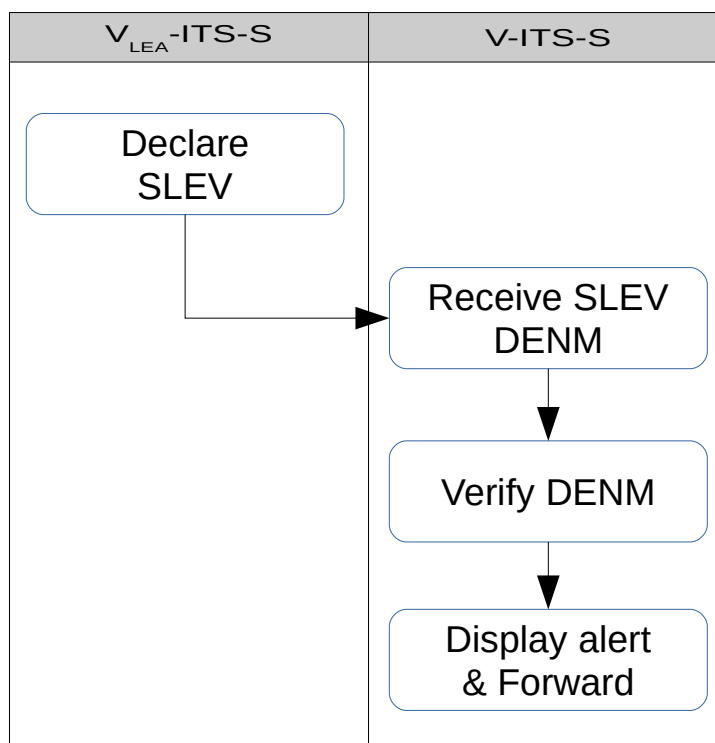


Figure : caution, a law enforcement vehicle is stopped

A law enforcement vehicle stops in an intervention zone located on or near a roadway.

2. Step by step Diagram



Declare SLEV :

The activation of the service is possible as following :

ID	2.4.1.1_M_L2-LawEnforcementVehicle-Activation1
Component(s)	V _{LEV} -ITS-S
Requirement	<p>If the vehicle stops with "Law enforcement vehicle approaching" service active (D12 UC), or if the vehicle stops with warning lights activated by an officer on board, or if the vehicle stops and then the warning lights are activated, the system SHALL propose to the on-board officers the activation of the "Stationary law enforcement vehicle (L2)" service. If the service is neither validated nor refused after X seconds, the "Stationary law enforcement vehicle" service SHALL be automatically activated. The activation of the "Stationary law enforcement vehicle" service automatically SHALL deactivates the "Law enforcement vehicle approaching" service.</p> <p>X is an editable parameter of the on-board system.</p>
Acceptance	<p>CA1 : proposition of activation of the service L2 SHALL be proposed after Y seconds of stationary position in D12.</p> <p>CA2 : proposition of activation of the service L2 SHALL be proposed if the vehicle stops with warning lights or stops and then warning lights are activated.</p> <p>CA3 : after X seconds, if the operator does not choose to activate L2, it SHALL be automatically activated.</p> <p>CA4 : whenever L2 is activated, if D12 was active, the latter is deactivated.</p>
Additional information	<p>Editable, X COULD be of 30 seconds and Y COULD be of 120 seconds (to consider stationary positions at a traffic light intersection or if the LEV is stuck in a traffic jam)</p>

ID	2.4.1.1_M_L2-LawEnforcementVehicle-Activation2
Component(s)	V _{LEV} -ITS-S
Requirement	The on-board system SHALL propose the manual activation of L2, except if the service is already active.
Acceptance	
Additional information	

ID	2.4.1.1_M_L2-LawEnforcementVehicle-InMotion
Component(s)	V _{LEV} -ITS-S
Requirement	If the vehicle is in motion, the "Stationary law enforcement vehicle" service is inactive or stopped.
Acceptance	
Additional information	

When the service is triggered, the DENM message defined in the following chapter (profile table) is emitted.

Receive SLEV DENM : through architecture. Architecture options are not treated in this document (see 2.4.1_M). Anyway, whatever route the information has followed, **DENM of an event SHALL have the same actionID and the same detectionTime (as presented below in profile)**. So that vehicle **CAN** treat one message or the other, but not both of them.

In G5, the vehicles in the vicinity of the V_{LEV} receive directly the message broadcast by the V_{LEV}.

In cellular, the message SHOULD be brought through the following route : V_{LEV}->Nfr->V (receiver)

Verify DENM and display alert: an alert is given to warn the driver he **MAY** encounter a SLEV soon. The process of vehicle-receiver **CAN** be as followed:

1. The vehicle checks actionID and detectionTime to verify if event is already known, if it is a new event or if it is an update.
2. The vehicle checks validityDuration to know if event is still active.
3. The vehicle checks eventPosition to determine how far from its position the event is and calculate its time-to-event.
4. The vehicle checks causeCode/subCauseCode and relevanceTrafficDirection: It's a 15/1 (SLEV) and allTrafficDirections.
5. The vehicle-receiver checks if it approaches the eventPosition, if yes it is concerned by the event.
6. If relevant, the vehicle displays the event before eventPosition to alert the driver (proper moment is car manufacturer domain).

Deactivation of the service :

Two cases are possible:

- If the law enforcement vehicle moves more than X metres, the "Stationary law enforcement vehicle" service is automatically deactivated.
- The service is manually deactivated by an onboard officer.

Related case of information to the road operator:

A stationary LEV is a valuable information for road operator. It can be imagined that the presence of a SLEV on a road triggers an alert of the concerned road operator automatically (use-case type "A" family).

3. Information profile – Message description (in details)

ID	2.4.1.1_M_L2-LawEnforcementVehicle-DENMProfile
Component(s)	V _{LEV} -ITS-S (for emission), V-ITS-S (for reception)
Requirement	The DENM transmitted by the V _{LEV} SHALL respect what's expected in the following table (DENM profile for L2).
Acceptance	Referring to the "Status for the UC" column in the table : CA1 : All mandatory ✓ DE and used ✓ DE shall be present in the message emitted, with the defined values. CA2 : All optional S DE can be present in the message emitted. See expected values in the table when defined. CA3 : All not used ✗ DE shall be absent in the message emitted,
Additional information	At reception, V-ITS-S receiving a message with not used ✗ DE shall not discard the message.

DENM profile for L2 :

DENM Master I2V status		Profile SLEV		
Field	Status (Master)	Status For the UC	Comments	Value set
Header				
protocolVersion	✓	✓	See Master_V2X document / DENM	
messageID	✓	✓	See Master_V2X document / DENM	(is 1)
stationID	✓	✓	See Master_V2X document / DENM	
Management container				
actionID	✓	✓	See Master_V2X document / DENM	
detectionTime	✓	✓	See Master_V2X document / DENM	
referenceTime	✓	✓	See Master_V2X document / DENM	
termination	S	S	See Master_V2X document / DENM Deactivation of the service. Two cases are possible: <ul style="list-style-type: none"> If the law enforcement vehicle moves more than X metres, the "Stationary law enforcement vehicle" service is automatically deactivated. (parameter : first value could be of 20 meters) The service is manually deactivated by an onboard officer. Note that in case of deactivation, the termination SHALL be emitted during a sufficient duration (remaining time of validityDuration at the instant of deactivation)	
eventPosition >	✓	✓	See 4 next lines and See Master_V2X document / DENM	
>latitude	✓	✓	See Master_V2X document / DENM	
>longitude	✓	✓	See Master_V2X document / DENM	
>confidencePositionElipse	✓	✓	See Master_V2X document / DENM	
>altitude	✓	✓	See Master_V2X document / DENM	
relevanceDistance	✗			
relevanceTrafficDirection	✓	✓	allTrafficDirections. It involves that the message CAN be displayed to opposite traffic of a road with separation. However, it is justified by the fact that emergency vehicles (and especially law enforcement vehicles) CAN be stationary in case of event in the vicinity of the separation or even on the opposite lanes of a road.	0
validityDuration	✓	✓	With a default value of 3600s (1 hour) for this UC.	
transmissionInterval	✗			
stationType	✓	✓	See Master_V2X document / DENM	(is 10)
Situation container				
informationQuality	✓	✓		6

DENM Master_I2V status		Profile SLEV		
Field	Status (Master)	Status For the UC	Comments	Value set
eventType	V	V	The causeCode is set to 15 (Rescue and recovery work in progress). The subCauseCode is set to 1 (emergencyVehicles)	is 15/1
linkedCause	X			
eventHistory	U	X	Not used (the V _{LEV} , the event is punctual and static)	
Location container				
eventSpeed	S	S	SpeedValue CAN be given as Standstill(0) SpeedConfidence CAN be given as equalOrWithinOneCentimeterPerSec(1)	0/1
eventPositionHeading	S	S	CAN be filled in thanks to the path history.	By V _{LEV} -ITS-S
traces	V	V	CAN be filled in thanks to the path history.	
roadType	S	S	See Master_V2X document / DENM	
À la carte container				
lanePosition	S	S	Not provided, except if the V _{LEV} can do so.	
impact Reduction (DF)	S	X	Not applicable to this UC	
external Temperature	S	S	Provided if the vehicle can do so, but not useful for the UC	
roadWorks (DF)	S	X	Not applicable to this UC	
positioning Solution	S	S	Provided if the vehicle can provide this information	
stationary Vehicle (DF)	S	S	Not used on initial implementation, but can be modified during experiments.	