

# SEA V2X Day One Application - Test Catalogue -

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## Table of Contents

|              |   |
|--------------|---|
| 1 ETSI ..... | 4 |
| 2 SAE .....  | 5 |
| 3 CSAE.....  | 6 |

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✔ implemented

✘ implementation limited: Message type not supported or no sufficient description in standards

⚠ In progress

# 1 ETSI

Use Cases mainly event-based (receive DENM or transmit DENM):

- Rx: Receive DENM from surrounding vehicle or RSU and inform driver
- Tx: environment fulfils triggering conditions (vehicle status on CAN or received messages) and DuT should transmit a DENM

| Use Case  |                                    | Test Direction     | Status | message types | missing?   |
|-----------|------------------------------------|--------------------|--------|---------------|--|
| EEBL      | Emergency Electronic Brake Light   | V2V:<br>Rx, Tx     | ✓      | DENM          | -  |
| SVW       | Stationary Vehicle Warning         | V2V:<br>Rx, Tx     | ✓      | DENM          | -  |
| RWW       | Road Works Warning                 | V2I:<br>Rx         | ✓      | DENM          | -  |
| AWC       | Adverse Weather Condition          | V2V/V2I:<br>Rx, Tx | ✓      | DENM          | -  |
| TJA       | Traffic Jam Ahead                  | V2V:<br>Rx, Tx     | ✓      | DENM,<br>CAM  | -  |
| GLOS<br>A | Green Light Optimal Speed Advisory | V2I:<br>Rx         | ✗      | MAP,<br>SPAT  | <ul style="list-style-type: none"> <li>• scenario with suitable MAP/ SPAT,</li> <li>• reaction of DuT not specified</li> </ul>                           |
| EVA       | Emergency Vehicle Alert            | V2V:<br>Rx         | ✓      | DENM          |  |
| SVW       | Slow Vehicle Warning               | V2V:<br>Rx, Tx     | ⚠      | DENM          | <ul style="list-style-type: none"> <li>• implementation in CarMaker test series</li> <li>• no description of Triggering Conditions from C2CCC</li> </ul> |
| IVS       | In- Vehicle Signage                | V2I:<br>Rx         | ✗      | IVIM          | IVIM message   |

## 2 SAE

All Applications, that are listed in SAE J2945 document.

Test Directions:

- Tx: DuT analyzes situation (vehicle status, i.e. via CAN data and/or received V2X messages) and is expected to transmit a BSM with activated event flag for that special event.
- Rx: DuT receives a special message and analyzes situation (vehicle status, i.e. via CAN data and/or received V2X messages) and is expected to show warning/information to driver.
- App: DuT analyzes situation (vehicle status, i.e. via CAN data and/or received V2X messages) and is expected to show warning/information to driver.

| Use Case     |   | Test Direction | Status | message types | missing?   |
|--------------|---|----------------|--------|---------------|--|
| EEBL         | Emergency Electronic Brake Light            | V2V:<br>Rx, Tx | ✓      | BSM           | -  |
| FCW          | Forward Crash Warning                       | V2V:<br>App    | ✓      | BSM           | -  |
| BSW /<br>LCW | Blind Spot Warning /<br>Lane Change Warning | V2V:<br>App    | ✓      | BSM           | -  |
| IMA          | Intersection<br>Movement Assist             | V2V:<br>App    | ✓      | BSM           | -  |
| LTA          | Left Turn Assist                            | V2V:<br>App    | ✓      | BSM           | -  |
| CLW          | Control Loss Warning                        | V2V:<br>Rx, Tx | ✓      | BSM           |  |
| GLOSA        | Green Light Optimal<br>Speed Advisory       | V2I:<br>Rx     | ✗      | MAP,<br>SPAT  | <ul style="list-style-type: none"> <li>• scenario with suitable MAP/ SPAT,</li> <li>• reaction of DuT not specified</li> </ul> |

### 3 CSAE

Based on [T/CSAE 53-2017](#) (Cooperative intelligent transportation system; vehicular communication; application layer specification and data exchange standard).

- 5 message types defined in standard
- Most applications evaluate received BSMs from surrounding participants and show warning/information to driver via HMI.
- We are not aware about applications that use received RSM (Roadside Security Messages) containing status data of nearby vehicles (kind of compilation of BSM data).

Test directions:

- Rx: receive V2X messages and application should inform driver
- Tx: DuT should send BSM with active event flag
- App:: DuT analyzes situation (vehicle status, i.e. via CAN data and/or received V2X messages) and is expected to inform driver.

| Use Case |   |   |           | message types | Status | missing? |
|----------|---|---|-----------|---------------|--------|----------|
| FCW      | 1 | Forward Collision Warning               | V2V       | BSM           | ✓      |          |
| ICW      | 2 | Intersection Collision Warning          | V2V/V2I   | BSM           | ✓      |          |
| LTA      | 3 | Left Turn Assist                        | V2V/V2I   | BSM           | ✓      |          |
| BSW/ LCW | 4 | Blind Spot Warning /Lane Change Warning | V2V       | BSM           | ✓      |          |
| DNPW     | 5 | Do Not Pass Warning                     | V2V       | BSM           | ✓      |          |
| EBW      | 6 | Emergency Brake Warning                 | V2V-Event | BSM           | ✓      |          |
| AVW      | 7 | Abnormal Vehicle Warning                | V2V-Event | BSM           | ✓      |          |
| CLW      | 8 | Control Loss Warning                    | V2V-Event | BSM           | ✓      |          |
| HLW      | 9 | Hazardous Location Warning              | V2I       | RSI           | ✓      |          |

| Use Case |    |  |         | message types   | Status | missing?   |
|----------|----|--|---------|-----------------|--------|--|
| SLW      | 10 | Speed Limit Warning                    | V2I     | RSI, MAP<br>?   | ✓ ⚠    | <ul style="list-style-type: none"> <li>no known possibility to communicate a speed limit from RSU:</li> <li>official version of RSI can only inform about alert (unreleased version of RSI as stated in word document does contain parameter speedLimit).</li> <li>CMAQ may contain information about speed limit</li> </ul> |
| RLWW     | 11 | Red Light Violation Warning            | V2I     | MAP, SPAT       | ✗      |  |
| VRUCW    | 12 | Vulnerable Road User Collision Warning | V2P/V2I | BSM ?           | ✓      |  |
| GLOSA    | 13 | Green Light Optimal Speed Advisory     | V2I     | MAP, SPAT       | ✗      | <ul style="list-style-type: none"> <li>scenario with adequate MAP/ SPAT, design by hand?</li> <li>CMAQ</li> </ul>  |
| IVS      | 14 | In-Vehicle Signage                     | V2I     | RSI, MAP<br>?   | ✓ ⚠    |  |
| TJW      | 15 | Traffic Jam Warning                    | V2I     | RSI ?,<br>RSM ? | ✓ ⚠    |  |
| EVW      | 16 | Emergency Vehicle Warning              | V2V     | BSM             | ✓      |  |
| VNFP     | 17 | Vehicle Near-Field Payment             | V2I     | ?               | ✗      | <ul style="list-style-type: none"> <li>which messages are necessary</li> </ul>   |