

# SPaT/MAP Message Capture Tool Alternatives for Validation Sites

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# 1 Introduction

As the USDOT/ ITE CI Implementation Guide Project’s validation efforts have advanced, it has become clear that several options exist for sites to use to collect data. These options are described in Section 4, SPaT/MAP Message Capture Tool Availability for Validation Sites. Sections 1-3 offer background information related to the data capture tool.

The purpose of the this Connected Intersection Field Verification is to ensure over-the-air (OTA) broadcast of SPaT and MAP messages from connected signalized intersections (USDOT/ITE CI Project) for Red Light Violation Warning (RLVW) application is consistent with the Connected Intersections Implementation Guide.

The focus of verification procedure for field evaluation is only SPaT/MAP messages at this time, and is illustrated in Figure 1.

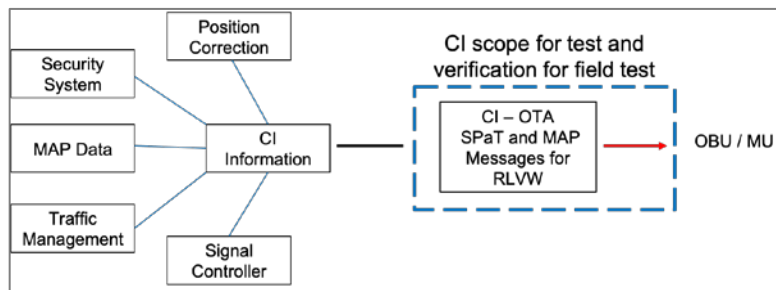


Figure 1: Focus of CI Implementation Field Test

The concept of the field test is shown in Figure 2. The test process does not:

1. verify actual signal indication with the broadcast signal phase information in the SPaT message and
2. verify proper conversion of SPaT data from the signal controller to the SPaT message from RSU.

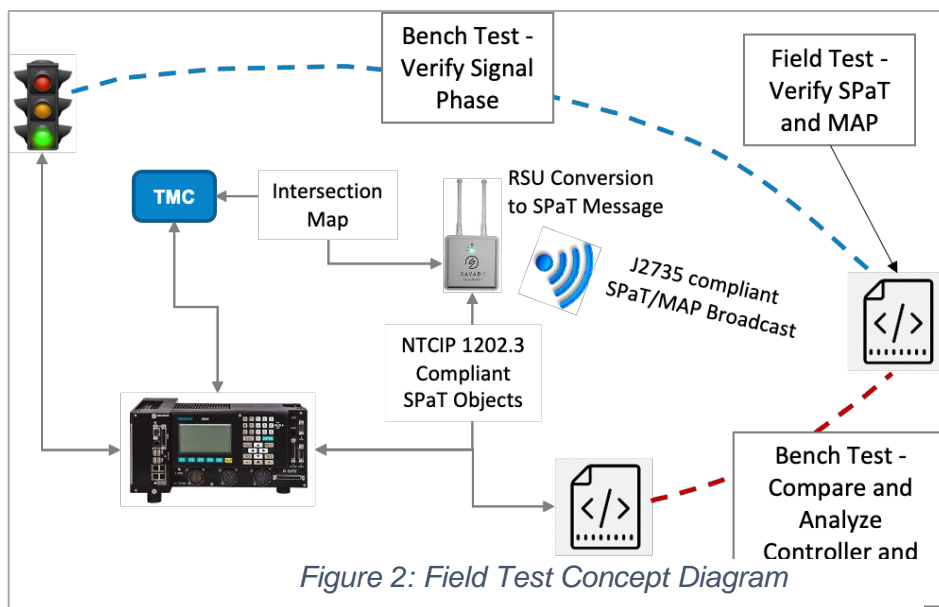


Figure 2: Field Test Concept Diagram

The field verification will verify that:

- The SPaT and MAP messages conform to the SAE J2735 standards specification,
- all data elements required in the USDOT/ ITE CI Implementation Guide Project appear, as shown in Table 1 below for SPaT and Table 2 for MAP message, and
- all data elements in the messages are within the proper limits as specified in SAE J2735.

## 2 Mandatory SPaT Message Data for CI Implementation

Data requirements from the System Design Detail (SDD) document for the CI Implementation Guide are described in detail in the [Connected Intersection Implementation Evaluation for Verification](#) document, posted on the MS Teams Site for Validation Committee members to reference.

Ideally, the data will be captured using a Kapsch data logging tool that is configured for this project and produces a JSON file output that can be easily entered into the analysis software. This process is shown in the image below.

### SPaT / MAP Message Capture Using Kapsch Tool, Analysis and Visualization

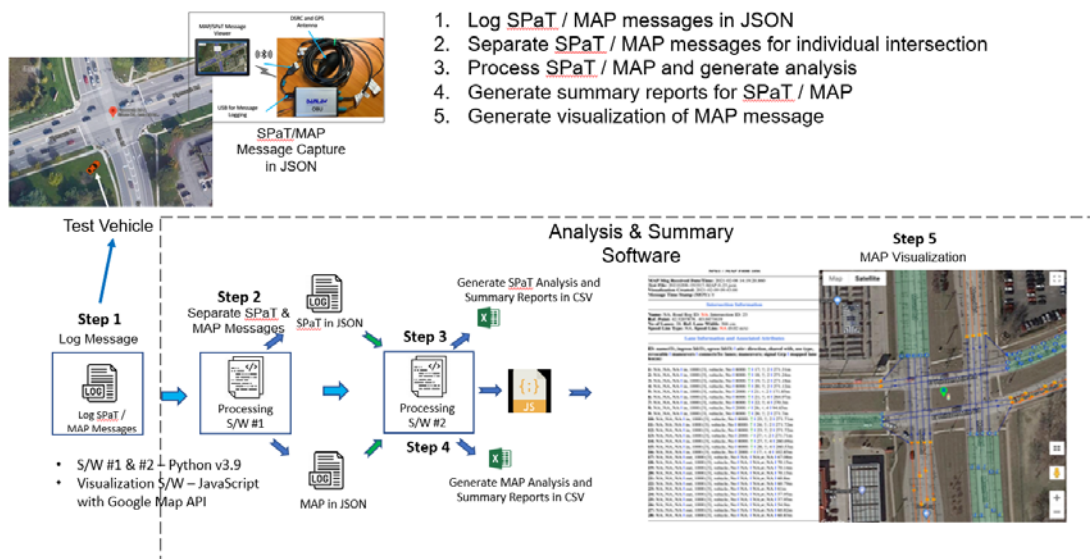


Figure 3: Kapsch Data Logger Tool Process Diagram

The data may also be captured in PCAP logs which can be translated to the desired JSON file output that can be easily entered into the analysis software. This process is shown in the image below.

## SPaT / MAP Message Capture in PCAP, Analysis and Visualization

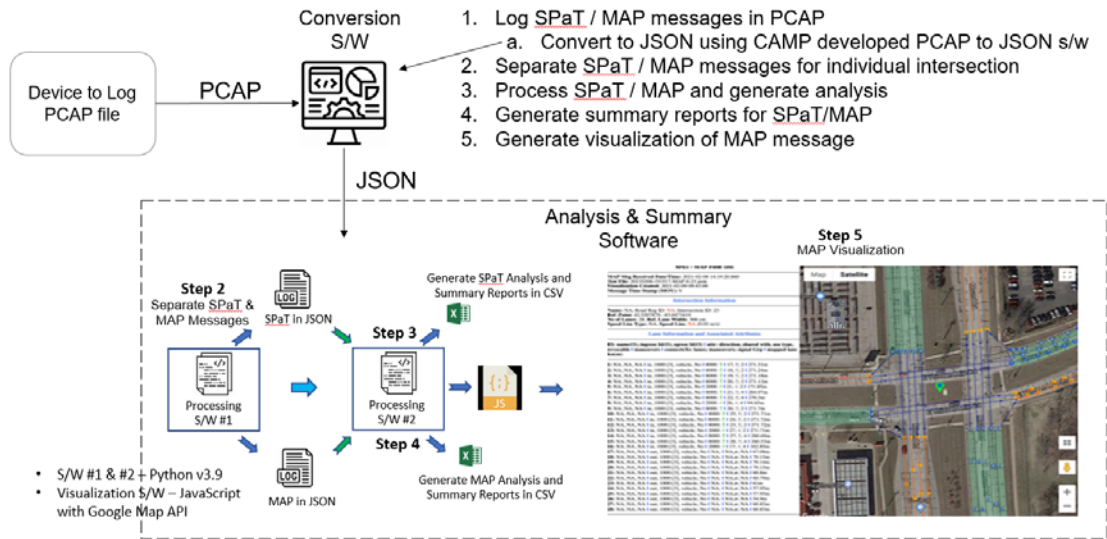


Figure 4: PCAP Logger Process Diagram

### 3 SPaT/MAP Message Capture Tool Availability for Validation Sites

#### 3.1 Agency Owned / Purchased Kapsch Data Logger Tool

The first option is for a site to use or purchase their own Kapsch Data Logger Tool. The tool must be configured to meet the requirements of the projects. The project team will provide instructions and/or a configuration file to assist with this.

- Request / Support Contacts: [Steve Sprouffske](#) (Kapsch) / [Tom Timcho](#) (WSP)

#### 3.2 CAMP: TOSCo Project Loaner Data Logger Tool

Another option would be to request use of a CAMP tool. There are a limited number of these devices available, first come first served. The tool will be pre-configured for this data collection effort. The tool collects data in PCAP and then translates to JSON required for analysis.

The [TOSCo Pod User Manual](#) is available for reference on the Validation Committee MS Teams Site for more information on this tool.

- Request / Support Contacts: [Jay Parikh](#) / [Roy Goudy](#) (CAMP)

#### 3.3 USDOT Saxton Lab Loan Kapsch Data Logger Tool

Equipment is also available to borrow from the USDOT Saxton Lab. There are a limited number of these devices available, first come first served. Configuration and testing may be required to verify the device is configured to meet the requirements of the projects.

An [information sheet](#) has been prepared by USDOT Saxton Labs to describe the equipment available for temporary use, as well as instructions, and contact information.

- Request / Support Contact: [Marisa Adams](#) (USDOT Saxton Lab)

#### 3.4 Wireshark or Similar PCAP Logging Tool

Wireshark or similar PCAP logging tools may also be used to support the validation efforts if the other alternatives are not possible. In this case the site would collect data in PCAP and then share the data with the project team, who would be responsible for translating it from PCAP to JSON required for analysis.

- Request / Support Contacts: [Jay Parikh](#) / [Roy Goudy](#) (CAMP)