

MICHIGAN
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR

5.9 GIGAHERTZ DEDICATED SHORT RANGE COMMUNICATION ROADSIDE UNIT

ITS:CLC

1 of 3

APPR:MDW:JVG:01-17-18

a. Description. This work consists of furnishing installing, testing, and warranting a Roadside Unit (RSU). This work must be completed in accordance with the standard specifications, except as modified herein.

1. General.

A. Furnish, install, test, and provide manufacturer warranty for all equipment and components necessary to provide complete functionality without additional expense to the Department.

B. Use identical and completely interchangeable units at each field location.

C. Ensure final equipment selection, procurement, and installation is approved and coordinated with the Engineer.

b. Materials.

1. RSU must be in compliance with the FHWA Dedicated Short-Range Communications Roadside Unit Specification 4.1.

2. Functional and Performance Requirements.

A. RSU must minimally support SAE J2735 compliant message sets, including: Basic Safety Message (BSM), Signal Phase and Timing (SPaT), Map or Geometric Intersection Description (GID) and Traveler Information Message (TIM).

B. RSU must support the full range of Provider Service Identifiers (PSIDs) as specified in IEEE 1609.12.

3. Electrical Requirements.

A. Ensure RSU is capable of being powered by IEEE 802.3at power over Ethernet (PoE).

B. Provide PoE injector that interfaces with 120 volts alternating current (V AC), 60 hertz single-phase power. If the device requires operating voltages of less than 120 V AC, the appropriate voltage converter will be supplied at no additional cost.

C. Ensure RSU design protects personnel from exposure to high voltage during installation and maintenance.

4. Ensure RSU can withstand exposure to direct solar heating.
5. RSU must support use of global navigation satellite systems (GNSS) to an accuracy of less than 1 meter. External antennas, if necessary, are to be provided at no additional cost.
6. Minimum of two external antennae mounting ports for DSRC broadcast. External antennas, if necessary, are to be provided at no additional cost

c. Construction. All elements included in this special provision, including power and communications, must comply with all standard specifications, and any applicable state and local regulations.

1. Furnish all available software/firmware upgrades through final acceptance at no additional cost to the Department.

2. Installation.

- A. Ensure all installation is done in a neat and professional manner. Ensure installed RSU can withstand a three second gust wind speed of 120 miles per hour (mph) from any direction as required by *ASCE 7*.

- B. Ensure installation of RSU is in conformance with the manufacturer's specifications.

- C. Ensure all cabling from RSU to switch is labeled on both ends, bundled, and stressed.

- D. Ensure the installation meets local and state electrical requirements, including grounding. Grounding will be paid for under 12SP-826B - Grounding, Bonding, Lightning Protection and Surge Protection for ITS Equipment.

- E. Do not damage any part or equipment during installation. Ensure damaged parts or equipment are replaced at no additional cost to the project or the Department. Repair is not an acceptable means of replacement. Ensure all equipment is replaced with new parts.

- F. Ensure the appropriate surge protector protects the power and components of the RSU. Surge protection is to be paid for under the 12SP-826B - Grounding, Bonding, Lightning Protection and Surge Protection for ITS Equipment.

- G. Mount the RSU as shown on the plans. The RSU must be mounted at a height recommended by the Manufacturer and in compliance with the Federal Communications Commission regulations.

3. Manufacturer Warranty. Ensure any defect in design, materials, or workmanship which may occur during proper and normal use through final system acceptance is corrected by and/or replacement by the Contractor without cost to the Department.

All RSUs and associated PoE injector devices must carry a standard manufacturer's warranty (equipment and parts) of 2 years from the date of shipment with at least 1 year remaining at the start of burn-in. Furnish warranty and other applicable documents from the manufacturer,

and a copy of the invoice showing the date of shipment, to the Engineer prior to final written acceptance. Ensure all warranties are transferred to MDOT upon written final acceptance.

4. Intersection Installation. If Intersection type installation is specified in the contract the following procedures apply after installation:

- A. Verify physical connections are performed as specified in contract.
- B. Verify the RSU is operational and settings for Internet Protocol address, subnet mask, and default gateway, unless otherwise directed by the MDOT Engineer.

5. Non-intersection Installation. If Non-Intersection type installation is specified in the contract the following procedures apply:

- A. Verify the device is securely mounted on the structure.
- B. Verify physical connections are performed as specified in the contract.
- C. Verify cable, connections, and antenna properly installed.
- D. Verify successful ping test of Road Side Unit at default settings.
- E. Verify local access to device settings.
- F. Power down device.

d. Measurement and Payment. The completed work, as described, will be measured and paid for at the contract unit price using the following pay item.

| Pay Item | Pay Unit |
|-----------------------------|-----------------|
| Roadside Unit, (type) | Each |

Roadside Unit, Intersection includes the processing unit, antennas, power over Ethernet injector, surge protection, cabling, mounting accessories, and power and communication connections for a fully functional unit at an Intersection installation

Roadside Unit, Non-intersection includes the processing unit, antennas, power over Ethernet injector, surge protection, cabling, mounting accessories, power and communication connections, and local device testing for a fully functional unit at a non-intersection installation.