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Standard for Connected Vehicle Infrastructure—Roadside Equipment

National Electrical Manufacturers Association

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Connected Vehicle Infrastructure—Roadside Equipment

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FOREWORD

This NEMA Standards publication TS 10-2020 *Connected Vehicle Infrastructure—Roadside Equipment* was developed to procure the equipment for secure communications among vehicles, infrastructure, and personal devices with traveler safety as the highest priority.

In the preparation of NEMA TS 10-2020, the input of users and other interested parties has been sought and evaluated. Inquiries, comments, and proposed or recommended revisions should be submitted to the concerned NEMA product subdivision by contacting the:

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The NEMA 3TS Connected Vehicle Infrastructure Technical Committee developed NEMA TS 10 under the auspices of the NEMA Transportation Management Systems and Associated Control Devices Section (3TS), of which it is a part. The following individuals were Members of the Technical Committee

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At the time this draft was completed, the Transportation Management Systems and Associated Control Devices Section was composed of the following Members:

360 Network Solutions, LLC	Panasonic Corporation of North America
Applied Information, Inc.	Parsons Corporation
Daktronics, Inc.	Qualcomm
Eberle Design, Inc.	Siemens Industry, Inc.
Horizon Signal Technologies	Skyline Products, Inc.
Intelight, a Q-Free Company	Sunrise SESA Technologies, Inc.
John Thomas, Inc.	Temple, Inc.
McCain Inc.	Ver-Mac Inc.

NEMA recognizes that this Standard, NEMA TS 10, has been developed at a time when there is much uncertainty over the continued dedicated use of the 5.9GHz waveband for transportation safety applications. This is due to the outcome of the Federal Communication Commission's Notice of Proposed Rule Making (NPRM) on the 5.9GHz band being currently awaited. Potential impacts could be in the types of communications technologies permitted in the band, allocation of channels, and the very range of frequencies made available to transportation under licensed use.

While consideration was given to delaying the release of NEMA TS 10, NEMA's Technical Committee, which prepared the Standard, strongly believes the Standard contains elements that justify its timely release for use by road infrastructure owners and operators (IOOs) for infrastructure equipment

procurement. This is because NEMA TS 10 contains key elements that enable IOOs to procure equipment safely in the knowledge that it will not be made obsolete by the possible changes in regulations contained in the NPRM. Such elements include the use of multiple modes (radios) in one roadside unit, dual-mode/dual active operation of such equipment, and over-the-air update capability for this equipment.

NEMA does expect that an update to the version of NEMA TS 10 will be needed due to the resultant rule making. However, it is felt that the visibility into the changes provided by comparing the current and updated versions of NEMA TS 10 will help IOOs that have already deployed roadside and on-board units better understand the impacts on their installations.

CAUTION: It is the responsibility of the Agency deploying radio equipment procured against this standard to ensure that the equuipment is operating legally under the necessary licenses and/or authorizations required by the Federal Communications Commission (FCC).

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Section 1
General [Informative]

1.1 Scope

NEMA TS 10-2020 (TS 10) is a Standard for the equipment deployed at roadside to support standardized over-the-air wireless messages, applications, and cybersecurity measures of communications with Connected Vehicles. This Standard describes physical and performance interfaces as well as functionality requirements as defined in Section 2.2.

1.1.1 Purposes for Implementing the System

This TS 10 Standard is designed for Agencies and other transportation infrastructure owner/operators to procure and deploy Connected Vehicle (CV) Roadside Units (RSU) in order to:

a. Reduce crashes and roadway fatalities as the highest priority
b. Reduce traffic congestion, fuel consumption, and emissions
c. Provide automated vehicles with situational awareness to supplement onboard sensors

1.1.2 Goals and Objectives

1.1.2.1 Support Present and Future Mobility

TS 10 is a Standard for the equipment deployed at the roadside to support standardized over-the-air wireless messages, applications, and cybersecurity measures throughout North America communicating to:

a. Other OEM private vehicles for sale throughout North America
b. Public agency vehicles such as emergency and transit
c. Fleet vehicles, such as freight, delivery, taxis, ride share, waste collection, recycling, and Mobility on Demand (MoD)
d. Aftermarket vehicle onboard devices for retrofit into existing public and private vehicles
e. Central management systems, such as traffic, transit, emergency, freeway, freight, and others
f. Personal Information Devices (PID), such as smartphones
g. Micromobility, such as motorized scooters, pedelec, and mobility aids
h. Infrastructure Sensors (IS) detecting unequipped vehicles and Vulnerable Road Users (VRU)
i. Rail grade crossings
j. Public works personnel such as construction workers, tow operators, waste collectors, and recyclers

1.1.2.2 Support Infrastructure Owner/Operator Procurements

TS 10 Standard enables user agencies to have confidence in procuring infrastructure equipment that remains interoperable and effective as technology advances. The RSU device proposed here is designed for future wireless technology and application through firmware or software within hardware constraints. This Standard also recognizes that there could be multiple configurations of the RSU device depending on a user agency's procurement needs.

1.1.2.3 Reduce Long-Term Total Cost of Ownership

The functional and performance requirements of the RSU devices proposed are designed for the practical implementation of multiple transportation applications at a less long-term total cost of ownership. For example, the cost of RSUs may be shared among agencies such as traffic, transit, and emergency districts to replace multiple special-purpose roadside devices serving dedicated functions, such as signal control, transit priority, and emergency preemption that become RSU software applications.