

NEMA TS 10-2020

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# Standard for Connected Vehicle Infrastructure Roadside Equipment



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**NEMA Standards Publication TS 10-2020**

*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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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 equipment is operating legally under the necessary licenses and/or authorizations required by the Federal Communications Commission (FCC).

## CONTENTS

Section 1		
General [Informative]	.....	<b>1</b>
1.1	Scope .....	1
1.1.1	Purpose for Implementing the System .....	1
1.1.2	Goals and Objectives .....	1
1.1.2.1	Support Present and Future Mobility .....	1
1.1.2.2	Support Infrastructure Owner/Operator Procurements .....	1
1.1.2.3	Reduce Long-Term Total Cost of Ownership .....	1
1.1.2.4	Support Interchangeability .....	2
1.1.3	Constraints .....	2
1.2	Background .....	2
1.2.1	Connected Vehicle Basics .....	2
1.3	References .....	3
1.3.1	Reference Documents (RD) Cited in NEMA TS-2020 .....	3
1.3.2	Contact Information—National Electrical Manufacturers Association (NEMA) .....	3
1.4	Terms .....	3
1.5	Standards Development Process .....	5
Section 2		
Concept Of Operations [Normative]	.....	<b>6</b>
2.1	Concept of Operations Overview .....	6
2.2	Scope .....	6
2.2.1	Power .....	6
2.2.2	Environmental .....	6
2.2.3	Physical .....	6
2.2.4	Functional .....	6
2.2.5	Behavioral .....	7
2.2.6	Performance .....	7
2.2.7	Interfaces .....	7
2.2.8	Applications Capabilities .....	7
2.3	Intended End User of the Standard .....	8
2.4	Tutorial [Informative] .....	8
2.4.1	Operational Boundaries .....	9
2.4.2	Desired Situation .....	11
2.4.3	Problems: Gaps Between Current and Desired Situation Addressed by TS 10 .....	11
2.5	Reference Physical Architecture [Informative] .....	12
2.5.1	Intelligent Transportation System .....	12
2.5.2	Subsystem Control .....	12
2.5.3	Interfaces .....	12
2.6	User Needs .....	13
2.6.1	Security Needs .....	16
2.6.2	Performance Needs .....	16
2.6.3	Physical/Environmental Needs .....	17
2.6.4	Related System Needs (Interfaces) .....	17
2.6.5	Radio Related Needs .....	17
Section 3		
Functional Requirements [Normative]	.....	<b>18</b>
Section 4		
Testing/Conformance Evaluation	.....	<b>39</b>
4.1	Conformance Traceability .....	39
4.2	Test Cases .....	39
4.2.1	Test Case Channel Allocation and Channel Usage .....	40

4.2.2	IEEE 802.11p Physical Layer and MAC Test Cases .....	40
4.2.3	IEEE 1609.2 Security and Certificates Test Cases .....	41
4.2.4	IEEE 1609.3 Network Services Test Cases.....	42
4.2.5	IEEE 1609.4 Multi-Channel Operations Test Cases.....	43
4.2.6	RSU Requirements Specification v4.1a Test Cases .....	44
4.2.7	Environmental Test Cases .....	45
4.2.8	Interface Triples Test Cases .....	45

Section 5

Design Elements .....	<b>45</b>
5.1 Software Application Layer .....	45
5.2 Software Stack Layer .....	45
5.2.1 Common Design Elements .....	45
5.2.2 Software Stack Design Elements for DSRC Radio Subsystem.....	50
5.2.3 Software Stack Design Elements for C-V2X Radio Subsystem .....	52
5.3 Software Operating System Layer .....	52
5.4 Hardware Physical Layer .....	53
5.5 Interfaces .....	53
5.5.1 Flow 1 Content: Traffic Signal Controller Broadcast Message .....	53
5.5.2 Flow 2 Content: SAE J2735 MAP Message .....	54
5.5.3 Flow 3 Content: SAE J2735 SPaT Message .....	55
5.5.4 Flow 4 Content: SAE J2735 Traveler Information Message.....	56
5.5.5 Flow 5 Content: SAE J2535 Personal Safety Message.....	56
5.5.6 Flow 6 Content: SAE J2735 Basic Safety Message .....	57
5.5.7 Flow 7 Content: SAE J2735 Signal Request Message.....	57
5.5.8 Flow 8 Content: NTCIP 1211 Priority Request .....	58
5.5.9 Flow 9 Content: SAE J2735 Signal Status Message.....	58
5.5.10 Flow 10 Content: NTCIP 1211 Priority Status .....	59
5.5.11 Flow 11 Content: NTCIP 1218v1 Deliver Data to RSU.....	59
5.5.12 Flow 12 Content: NTCIP 1218v1 Retrieve Data from RSU .....	59

Appendix A

CV2X Experimental Licensing User Guide .....	<b>60</b>
A1 Purpose .....	60
A2 Prerequisites for a C-V2X Experimental Filing .....	60
A2.1 License Types .....	60
A2.2 Experiment Description .....	60
A2.4 Experimental License Filing Prerequisites .....	61
A2.4 Determination of License Owners/Users in Region .....	61
A2.5 Application Information required for Experimental License Application or STA .....	63
A3 Application Filing Procedure Summary.....	63
A4 Post Grant Operations .....	64
A4.1 Experimental License Renewals and STA Modifications.....	64
A4.2 Experimental License Modifications.....	64

Appendix B

<b>ATIS Standards that Apply to V2X [Informative].....</b>	<b>65</b>
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Appendix C

<b>SAE J2735 Traveler Information Message (TIM) Representation [Informative].....</b>	<b>67</b>
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Appendix D

<b>Flow 7: SAE J2735 Signal Request Message Additional Information [Informative].....</b>	<b>70</b>
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**FIGURES**

	<b>Page</b>
Figure 2-1: Conceptual Connected Vehicle Diagram .....	9
Figure 2-2: Connected Vehicle Operational Boundaries .....	10
Figure 2-3: ITS System Architecture (US DoT).....	45
Figure 4-1: Channel Allocation [D] .....	49
Figure A2-1: Advance License Search Website .....	62

**TABLES**

	<b>Page</b>
Table 1-1: References.....	3
Table 1-2: Terms .....	3
Table 1-3: Standards Development Process .....	5
Table 2-1: Message Frequency and Latency Related to Operational Boundary Delivery Modes.....	10
Table 2-2: Interface Triples .....	13
Table 2-3: User Needs Template .....	13
Table 2-4: Security Needs.....	16
Table 2-5: Performance Needs.....	16
Table 2-6: Environmental and Physical Needs.....	17
Table 2-7 Related System Needs (Interfaces).....	17
Table 2-8: Radio Related Needs.....	17
Table 3-1: User Needs to Requirements Traceability Matrix .....	18
Table 3-2: Security Needs to Requirements Traceability Matrix.....	34
Table 3-3: Performance Needs to Requirements Traceability Matrix.....	35
Table 3-4: Physical and Environmental Needs to Requirements Traceability Matrix.....	36
Table 3-5: Related System and Interfaces Needs to Requirements Traceability Matrix .....	36
Table 3-6: Radio Related Needs to Requirements Traceability Matrix.....	37
Table 4-1: Requirements to Verification Traceability .....	39
Table 4-2: Channel Usage .....	40
Table 4-3: IEEE 802.11P Physical and MAC Test Cases .....	40
Table 4-4: IEEE 1609.2 Security and Certificates Test Cases .....	41
Table 4-5: IEEE 1609.3 Network Services Test Cases .....	41
Table 4-6: IEEE 1609.4 Multi-Channel Operations Test Cases .....	42
Table 4-7: RSU Requirements Specification 4.10 Test Cases .....	42
Table 4-8: Environmental Test Cases.....	43
Table 4-9 Interface Triples Test Cases.....	44
Table 5-1: Software Application Design Elements.....	45
Table 5-2: Software Stack Design Elements Addressed by NTCIP 1218 .....	45
Table 5-3: Common Software Stack Design Elements.....	45
Table 5-4: Software Stack Design Elements for DSRC Radio .....	50
Table 5-5: Software Stack Design Elements for CV2X Radio .....	51
Table 5-6: Software Operating System Design Elements .....	52
Table 5-7: Hardware Physical Layer Design Elements .....	52
Table 5-8: Traffic Signal Controller Broadcast Message .....	53
Table 5-9: TS 10 MAP Message Content .....	54
Table 5-10: TS 10 SPaT Message Content.....	55
Table 5-11: TS 10 PSM Message Content .....	56
Table 5-12: TS 10 BSM Message Content .....	57
Table 5-13: TS 10 SRM Message Content .....	57
Table 5-14: TS 10 Signal Request Content .....	58
Table 5-15: TS 10 SSM Message Content .....	58
Table A1-1: Definition of Terms .....	61
Table A2-1: General Experimental License Application Requirements.....	63
Table B1-1: ATIS Standards that Apply to V2X .....	65

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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, e-bike, and mobility aids
- h. Infrastructure Sensors (IS) detecting non-equipped 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.