



CONNECTED VEHICLE CERTIFICATION FOR AFTERMARKET CONNECTED VEHICLE WORLD

Nov 1, 2016

GOALS / SCOPE

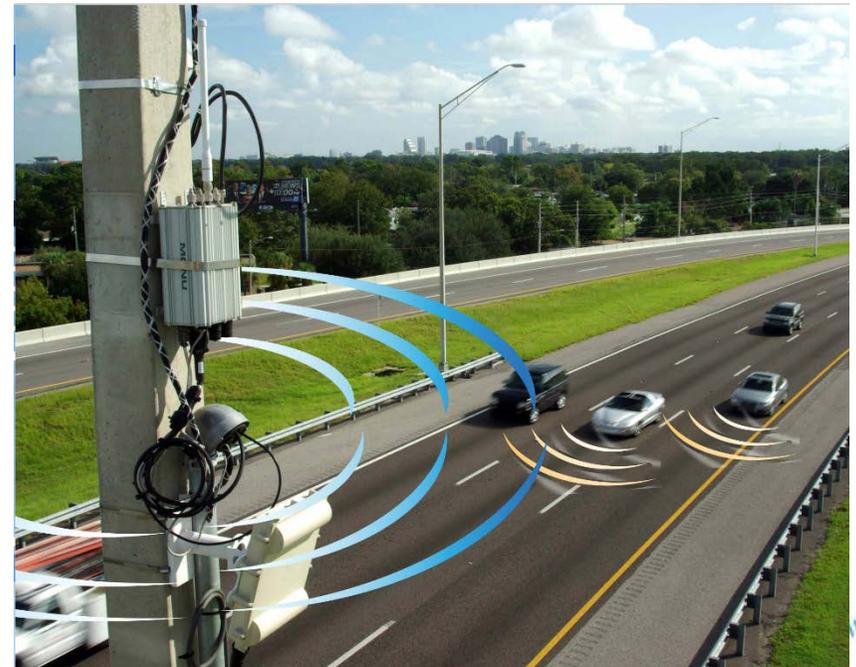
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Vehicle-to-vehicle communication allows cars to make decisions based on their surroundings and context, including distance, speed, and directional movement of other vehicles, underpinning self-driving and safety applications but also traffic management and driving efficiency use cases. Source: <https://www.cbinsights.com/blog/auto-tech-startups/>

- Customer satisfaction depends on
 - Interoperability
 - Performance
 - Installation
 - Service



RIPE FOR AFTERMARKET

- 
- 200,000,000 passenger vehicles in US
 - Some years before OEM installed equipment gets to the market
 - Over 100 Connected Vehicle applications for safety and mobility
 - 360,000 roadside infrastructure points

USDOT CERTIFICATION PROGRAM

- The USDOT competitively selected three certification service providers (7Layers, Danlaw, and Southwest Research Institute (OmniAir))
- All three work together through the Certification Operating Council (COC) to support certification testing for CV Pilots
- Vision is to help the industry to organize and run a self-sustaining certification program supporting deployment of DSRC-based services.



Danlaw provides connected vehicle telematics solutions and embedded electronics to OEMs and their Tier-1 supply chain.



OmniAir Certification Services (OCS) is a non-profit organization founded by OmniAir to execute independent certification for the intelligent transportation industry.



7Layers is an international group of engineering & test centers having a core competence in wireless technologies.

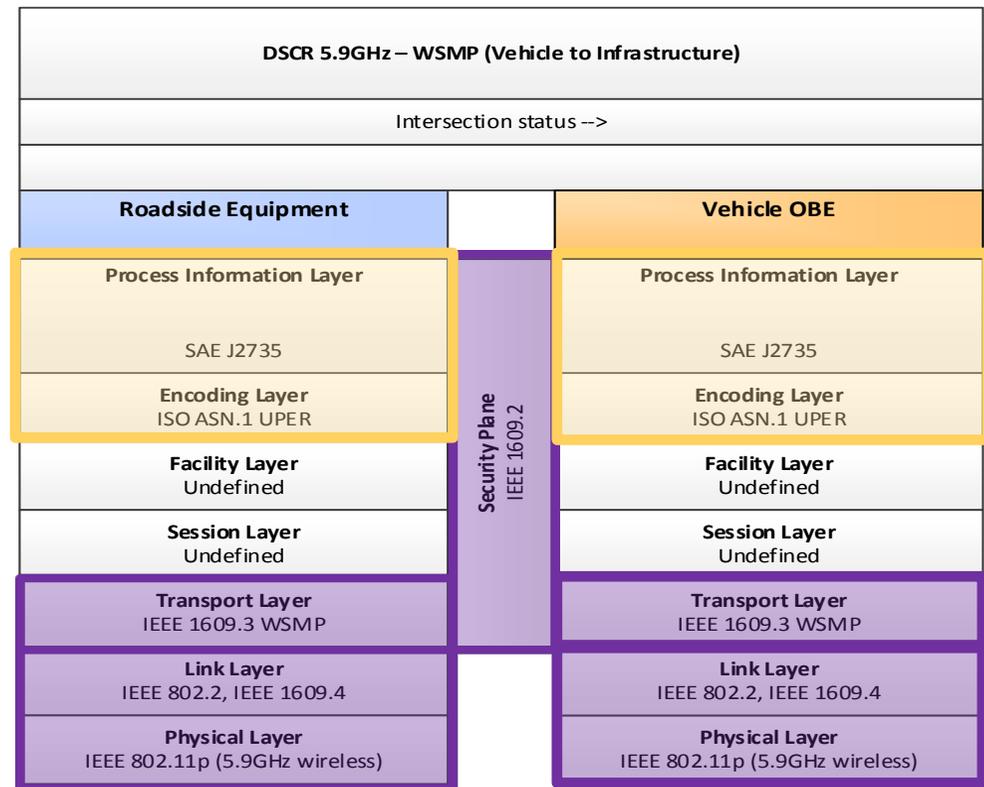
Dedicated Short Range Communication is a wireless communication technology similar to WiFi optimized for vehicle-to-vehicle/infrastructure (V2X) communications

Data Messages

- SAE J2945/1 Requirements for BSM
- Encoding (ISO ASN.1 UPER)
- Process Information (SAEJ2735)

Data Transmission

- Transport (IEEE1609.3 WSMP, IPv6)
- Security (IEEE 1609.2)
- Link (IEEE 1609.4)
- Physical (IEEE 802.11)



SECURITY / CONFIDENTIALITY BY DESIGN

Security certificates (based on IEEE 1609.2 Standard) allow

- Exchange digitally signed unencrypted messages
- Protect message receiver from spoofing
- Hide persistent identity
- Encrypt communications to the back office
- With minimum impact on latency and smallest packet overhead

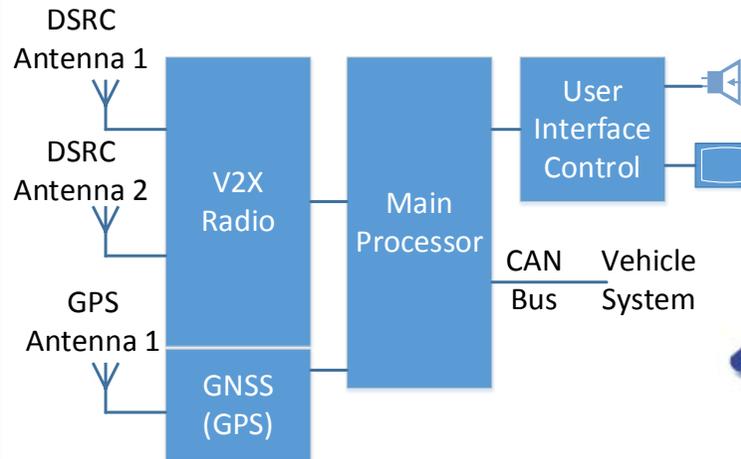


5.9GHZ DSRC TECHNOLOGY READY FOR PRIME TIME

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In-vehicle equipment



2017MY Cadillac CTS – 1st DSRC enabled vehicle



Roadside equipment



CERTIFICATION

Confirmation of certain characteristics provided by external organization

- Applies to Connected Vehicle devices
- Skill sets (individual / organizations)



WHY CERTIFICATION

- Required by law (e.g. FCC)
- May be required by USDOT NPRM?
- Focuses on assurance of minimum quality standards
- Interoperable with OEM equipment
 - The same interpretation of technical standards
 - The same application configuration
- Required during procurement
- Required to obtain security certificates
- Conducted by independent neutral party



**U.S. Department
of Transportation**



V2X Test Specifications supporting device certification

Test Specifications	Title / Scope
WAVE802.11-TSS&TP	Test Suite Structure and Test Purposes for IEEE 802.11 (scope of DSRC)
WAVEMCO-TSS&TP	Test Suite Structure and Test Purposes for Multi Channel Operation (IEEE 1609.4)
WAVENS-TSS&TP	Test Suite Structure and Test Purposes for Network Services (IEEE 1609.3)
WAVESEC-TSS&TP	Test Suite Structure and Test Purposes for Security Services (IEEE 1609.2)
J2945.1-TSS&TP	Test Suite Structure and Test Purposes for J2945.1
Test System Interface	Test Command Interface protocol specification Available on http://www.github.com

OUT OF SCOPE FOR CERTIFICATION TESTING

Humidity, Vibration, Shock,

Non-Intentional RF

Power Consumption

WiFi, Bluetooth,

Testing

TEST SPECIFICATION OVERVIEW

- Total test cases developed 126:
as follows:
 - SAE J2735 – 41 Test Cases
 - IEEE 1609.4 – 10 Test Cases
 - IEEE 1609.3 – 34 Test Cases
 - IEEE 1609.2 – 21 Test Cases
 - IEEE 802.11- 2012 – 20 Test Cases
- Summary
 - Positive/negative behavior testing
 - Protocol testing, message format and parameter testing
 - Radio performance in transmit and receive mode



WHO IS DOING DEVICE CERTIFICATION

Pre-commercial phase (2016-2017)

- Managed by the Certification Operating Council (USDOT project)
- Test specifications available
- 1st USDOT Plugtests for device interoperability in Nov 2016, Novi MI

Commercial certification phase (after 2017)

- Industry certification managed by an industry trade association - OmniAir

INTEROPERABILITY PLUGFEST

Interoperability Plugfest focused on V2V conformance testing and core DSRC standards required for the CV Pilot projects

Proposed Plugfest Dates: November 15-18, 2016

Location: Danlaw facilities in Novi, Michigan

Organizers: 7layers, Danlaw, OmniAir/SwRI

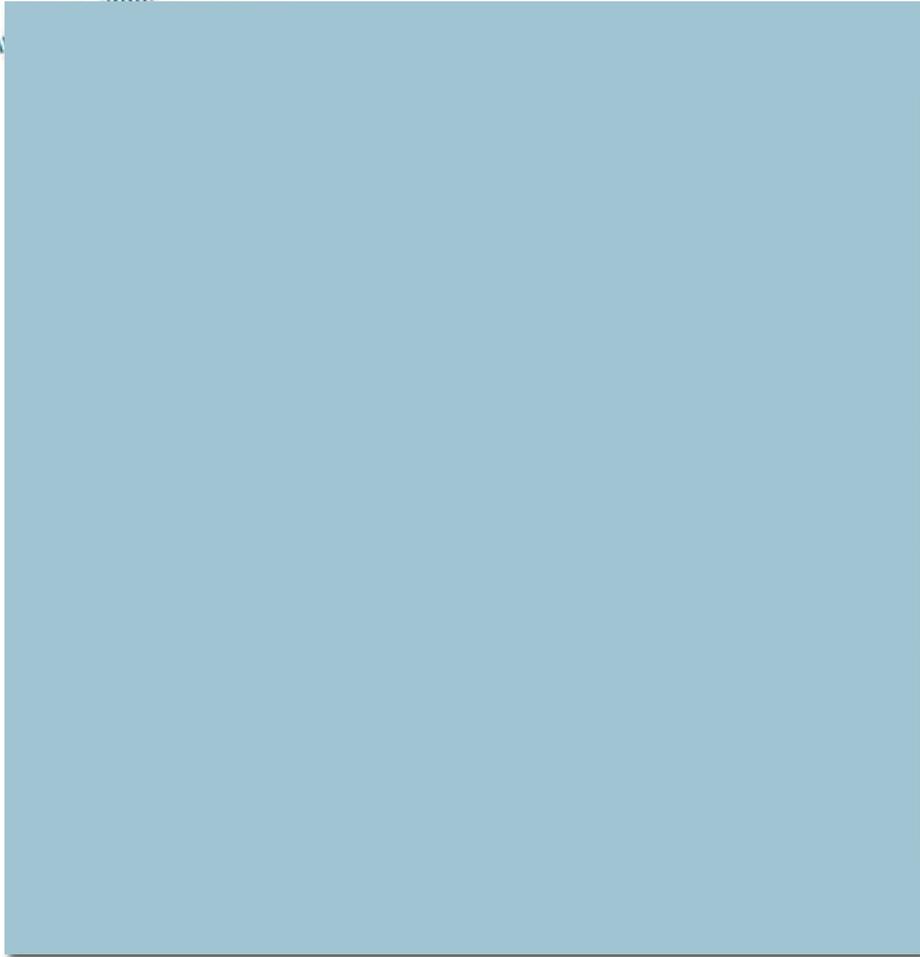
Participants: Device vendors, USDOT, Leidos, OmniAir, Test Equipment Vendors, and Test Labs

Key Activity Tracks: V2V (BSM), Conformance Testing for core test specifications, interoperability testing among vendors

Agenda: Day 1 : public forum – open to everyone in person or via Web
Day 2-4 : open to device vendors

Register: <https://goo.gl/forms/Y5CQ6wFRQTNIAzrw1>

WHAT CERTIFICATION ENTAILS



DEVICE INSTALLATION & SETUP

- Installation - similar to installation of other radio equipment
 - Antenna placement, cabling (RF, power, data), connectors
 - Radio testing
 - Setup with vehicle interfaces (power, CAN, USB, etc)
- System configuration
 - Security credential provisioning
 - Application configuration & testing
- Maintenance
 - Diagnostic & troubleshooting



CONNECTED VEHICLE PROFESSIONAL™ CREDENTIALING PROGRAM

- Professional credibility in the Intelligent Transportation System (ITS) Community
- Focused on connected vehicle and intelligent transportation best practices, in-vehicle safety, infrastructure, communication protocols, and security
- 3 courses:
 - Connected Vehicle Professional - Function, Protocols and Architecture
 - Connected Vehicle Professional II - Standards, Organizations, Programs, V2X
 - Connected Vehicle Professional III - Data, Markets, Policy and Regulations
- End-of-course learning assessment are awarded the SAE International/Connected Vehicle Trade Association Certificate of Competency.



WHERE TO GET MORE INFORMATION

Certification Test specifications:

http://www.its.dot.gov/research_archives/connected_vehicle/connected_vehicle_cert_progress.htm

Certification Operating Council:

certificationoperatingcouncil@gmail.com

Connected Vehicle Certification via OmniAir:

<http://omniaircertified.org/>

Connected Vehicle Professional Certification Program:

<http://www.connectedvehicle.org/connected-vehicle-professional/cvp@mobilecomply.com>

ITS ePrimer Presentation; Connected Vehicles

<https://www.pcb.its.dot.gov/eprimer/module13p.aspx>

CONTACTS

Dmitri Khijniak

dmitri.khijniak@7layers.com

949-732-8022

Automotive Technology Services
Development Manager

7layers - Irvine, California

7Layers is the wireless/smart world expert of Bureau Veritas

- founded in 1999
- worlds' leading wireless group
- located around the world with a strong footprint in Asia, Europe & North America.
- with more than 300 employees
- Independent test and validation services laboratory accredited to ISO 17025

NORTH AMERICA

USA

Irvine, CA

Phone +1.949.716.6512
E-Mail info.us@7layers.com

Sunnyvale, CA

Phone +1.669.600.5293
E-Mail info.us@7layers.com

EUROPE

Germany

Ratingen
Phone +49.2102.749.0
E-Mail info@7layers.com

Agency Spain

Bilbao
Phone +34.634.507.296
E-Mail info@7layers.com

Agency France

Paris
Phone +33.612.717.783
E-Mail info.fr@7layers.com

ASIA

P.R. of China

Beijing
Phone +86.10.6805.0368
E-Mail info.cn@7layers.com

Shenzhen

Phone +86.755.865.23100
E-Mail info.cn@7layers.com

Japan

Yokohama
Phone +81.45.949.6020
E-Mail info.jp@7layers.com

South Korea

Suwon
Phone +82.70.8853.2301
E-Mail info.kr@7layers.com

Agency Taiwan

New Taipei City
Phone +886.2.2696.2828.237
E-Mail info.tw@7layers.com

