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## DEPARTMENT OF TRANSPORTATION

### **Montgomery County's Connected Vehicles Pilot: Experimental License Application**

#### **1. Introduction**

Montgomery County is the largest county in the state of Maryland, with a population of over one million inhabitants. It is located northwest of Washington D.C. and is home to numerous rich and diverse communities, thousands of thriving small and large businesses, as well as federal, state, and local government agencies. Montgomery County is recognized as a national leader in innovation and technology. We were one of the first county governments in the country to initiate a Vision Zero plan. Our goal is to eliminate fatalities and serious injuries on our roads by 2030. To fight Climate Change and Global Warming, the County has committed to zero Greenhouse Gas Emissions by 2035. Spurred on by the U.S Department of Transportation's Smart City Challenge, we have taken steps to vigorously embrace, test and deploy innovative transportation technology, and use big data to improve services for our residents, visitors, and businesses. Connected Vehicles offer a better and safer driving experience, improved traffic efficiency, safer streets for pedestrians and individuals with disabilities, and optimized energy consumption, leading to lower emissions. This Connected Vehicles pilot project is of the utmost importance to public safety.

This application is requesting an experimental license for Cellular-Vehicles-To-Everything communications (C-V2X). Cellular 4G/LTE communication is a nascent technology in the field of Connected Vehicles, this project will aim to study its benefits and utility with regards to improving public safety on our roadways. The pilot project will deploy CV equipment at 10 proposed locations initially. Communication for the initial deployment will be enabled via C-V2X and DSRC.

#### **2. Test Overview**

This experimental license for the range 5905-5925 MHz (Channel 180) will be used to test Cellular Vehicles-to-Everything-capable Roadside Units (RSUs). Additionally, this experiment will evaluate cellular technology with the goal of studying safety applications and features related to Vehicle-to-Vehicle (V2V), Vehicle-to-Infrastructure (V2I) and Vehicle-to-Everything (V2X) communications. The pilot will be deployed in Gaithersburg, Maryland. The pilot project will use vehicle mounted OBUs and roadside infrastructure mounted units (RSUs). We intend to test the following safety features: Basic Safety Messages (BSM), Signal Phasing and Timing (SPaT) data, Forward Collision Warning, Intersection Movement Assist, Blind Spot Warning, School Zone Speed Warning, Speed Compliance, Red Light Violation Warning, Pedestrian in Signalized Intersection Warning, etc. The duration of this experiment is expected to be 36 months.

### 3. Transmitter Information

Montgomery County has partnered with Siemens Mobility Inc for this pilot deployment. Siemens Connected Vehicle Roadside Unit (RSU) will be used in this project. The Roadside Units are dual-mode, thus enabled with both DSRC and C-V2X communication capabilities. Transmitters will utilize Channel 180. Siemens' RSUs technical details are described in Table 1 below.

**Table 1: Siemens RSU Technical Information**

Item	Description	Siemens RSU Values
1	Radio Class	D
2	Channel Maximum	23
3	Antenna Manufacturer	Taoglas
4	Antenna Model Number	TD.80.6H31
5	Gain	6 dBi
6	Beamwidth	360 degrees horizontal
7	Centerline	Vertical
8	Azimuth	360 degrees
9	Elevation angle	15 degrees
10	DSRC Channels Used	172, 174, 175, 176, 180, 181, 182, 184
11	Maximum Power	23 dBm
12	EIRP	29 dBm
13	Height above Lane	13 ft. (adjust for actual installation)
14	Elevation above MSL	We used the elevation from street view

### 4. Proposed Test Sites

Montgomery County has selected ten (10) locations for the initial deployment, with the possibility of adding more locations throughout the County later. The proposed locations are shown in Table 2.

**Table 2: Proposed Test Locations**

Name	Latitude	Longitude
<b>Orchard Ridge Dr - Quince Orchard Rd (MD124) - Sioux Ln</b>	39° 7' 44.925"N	77° 14' 1.1544"W
<b>Quince Orchard Blvd - Quince Orchard Rd (MD124)</b>	39° 8' 3.93"N	77° 13' 25.5966"W
<b>Quince Orchard Rd (MD124) - Twin Lakes Dr</b>	39° 7' 44.9682"N	77° 13' 49.7346"W
<b>Darnestown Rd (MD28) - Quince Orchard Rd (MD124)</b>	39° 7' 4.3602"N	77° 15' 9.651"W
<b>Great Seneca Hwy (MD119) - Quince Orchard Rd (MD124)</b>	39° 7' 42.3804"N	77° 14' 15.1908"W
<b>Darnestown Rd (MD28) - Main St - Owens Glen Way</b>	39° 6' 43.9596"N	77° 14' 26.3616"W
<b>Kentlands Blvd - Longdraft Rd - Quince Orchard Rd (MD124)</b>	39° 7' 35.5908"N	77° 14' 37.6362"W
<b>Darnestown Rd (MD28) - Potomac Valley Shopping Center Driveway</b>	39° 7' 2.5134"N	77° 15' 4.0206"W
<b>Hillstone Rd - McDonald Chapel Dr - Quince Orchard Rd (MD124)</b>	39° 7' 44.925"N	77° 14' 1.1544"W
<b>Darnestown Rd (MD28) - Tschiffely Square Rd</b>	39° 8' 3.93"N	77° 13' 25.5966"W

**Division of Traffic Engineering and Operations**