

PUBLIC INTEREST STATEMENT

1. Introduction

By the instant application (“Application”), Continental Automotive Systems, Inc. (“Continental”) requests that the Commission grant a two year experimental license to permit Continental to operate the facilities (the “Facilities”) specified in the instant application.

2. Purpose and Nature of the Operation

As specified in the attached form, this authorization to be used for providing communications essential to a research project, in which radio communication is not the objective of the research project. In that regard, the following is provided.

Description of the Nature of the Research Project Being Conducted: Continental is among the leading automotive suppliers worldwide. As a supplier of brake systems, systems and components for powertrains and chassis, instrumentation, infotainment solutions, vehicle electronics, tires and technical elastomers, Continental contributes to enhanced driving safety and global climate protection. Continental is also an expert partner in networked automobile communication. This experiment is intended to allow for the development and subsequent validation testing of automotive onboard receivers. These receivers will have the ability to receive a combination of some or all of the following signals. Broadcast AM audio, broadcast FM audio, subscribed SDARS, and GPS for the purpose of navigation and emergency location service. Some products will also have the ability to transmit location information and/or receive data transmissions via cellular telephone. These products will be installed as OEM equipment within a broad range of vehicles that would include private and commercial sector as well as vehicles that may be used by first responders. The testing that will be conducted will validate the products ability to meet OEM requirements with regard to both reliability tests (Temperature, Humidity, Vibration, etc.) as well as their EMC requirements (Radiated Emissions, Radiated Immunity, Power disturbances, etc.)

Showing that the Communications Facilities Requested are Necessary: The intent of the experiment is to create, as close as possible, the same environment indoors as would be seen by the product when outdoors installed in a vehicle.

Showing that Existing Communications Facilities are Inadequate: To properly develop and test these products it is necessary to have visibility to existing broadcast RF signals. The building facilities in which Continental is located do not allow for the penetration of cellular, SDARS or GPS broadcast signals. As such, Continental wishes to erect repeater systems that would re-transmit, without alteration, the existing outdoor signals within our laboratory facilities.

A waiver of the Station ID requirements of Section 5.115 is respectfully requested.

3. **Transmitting Equipment**

<u>QL Maintained</u>			
<u>Lake Zurich</u>			
Manufacturer	Model Number	# Units	Experimental (Y/N)
<u>GPS</u>			
GPS Source	L1A-PM	1	N
GPS Source	A11-V-P110-30-NF	1	N
GPS Source	L1P-NF	1	N
GPS Source	L1A-PM-NF	1	N
GPS Source	S14-A-P110/5-NF	1	N
GPS Source	GPSRKL1-V-P110/5-NF	2	N
<u>Cellular</u>			
Cellphone Mate	CM2000-WL 62 dB	2	N
Cellphone Mate	CM288W	2	N
Andrew	CELLMAX-O-25	3	N
<u>QL Maintained</u>			
<u>Deer Park</u>			
Manufacturer	Model Number	# Units	Experimental (Y/N)
<u>GPS</u>			
GPS Source	L1A-PM	1	N
GPS Source	A11-V-P110-30-NF	1	N
GPS Source	L1P-NF		N
GPS Source	L1A-PM-NF	1	N
GPS Source	S14-A-P110/5-NF	1	N
GPS Source	GPSRKL1-V-P110/5-NF	1	N
<u>Cellular</u>			
Cellphone Mate	CM2000-WL 62 dB	1	N
Cellphone Mate	CM288W	1	N
Andrew	CELLMAX-O-25	1	N
<u>SDARS</u>			
Pixel Technologies	PRO-1 Dual Zone	1	N

<u>BU-IC Maintained</u>			
<u>Lake Zurich</u>			
Manufacturer	Model Number	# Units	Experimental (Y/N)
<u>SDARS</u>			
Averna	URT4000	1	N
Mini-Circuit	ZX60-242GLN-S+	1	N
Rohde-Schwarz	SMBV100A	2	N
Cellmax	D-CPUS	1	N
<u>BU-IC Maintained</u>			
<u>Deer Park</u>			
Manufacturer	Model Number	# Units	Experimental (Y/N)
<u>GPS</u>			
Motorola	T2000 Timing GPS antenna	1	N
Lightning Arrester	Model #MM50MHzNZ+6	1	N
Mini-Circuits	Model #ZN2PD-20	5	N
Mini-Circuits	Model #ZN12PD	3	N
Mini-Circuits	Model #ZHL-1217MLH	3	N
ACC GPS Antenna	Model GPS WPC P2	3	N
<u>FM</u>			
Radio Shack	15-291	1	N
Lightning Arrester	Model #MM50MHzNZ+6	1	N
Mini-Circuits	Model #ZN2PD-20	1	N
Mini-Circuits	Model #ZFL-500LN+	1	N
Mini-Circuits	ZFSC-3-1-S+	1	N
Continental	N/A	1	Y
<u>SDARS</u>			
Terk	XM-6 antenna	1	N
Lightning Arrester	Model #MM50MHzNZ+6	1	N
Mini-Circuits	Model #ZRL-2400LN+	4	N
Mini-Circuits	ZFSC-2-25000-S+	1	N
Cellmax	D-CPUS	2	N

4. Technical Information and Interference Mitigation

A. The transmit antennas are fixed, non-directional type. They will be mounted approximately 10 feet above the floor and aimed at an angle approximately 30 degrees below horizontal (toward the ground).

B. It is noted that the geographic coordinates set forth in the Application are provided based on measurements in WGS84 format. It is Continental's understanding that NAD83 is a subset of World Geodetic System of 1984 (WGS84) and for mapping and charting purposes the Commission considers NAD83 and WGS84 to be equivalent.¹ If the provision of coordinates in WGS format is unacceptable, Continental requests that the Commission advise as such and Continental will revise the coordinates as necessary.

C. The nature of the transmitted data will be a rebroadcast of existing signals. This signals will not be changed or modified during transmission. With respect to the proposed re-broadcast of GPS signals, attached hereto are Continental's calculations demonstrating compliance with NTIA GPS Re-Radiation Criteria – Section 8.3.28 of NTIA Regulations (Maximum Equivalent Isotropically Radiated Power).

D. The nature of the experiment for both development and validation is a series of indoor tests. Once operational the facility would be transmitting continuously. The intent is to create, as close as possible, the same environment indoors as would be seen by the product when outdoors installed in a vehicle. Because of this the transmit power will be minimized such that the nominal acceptable operational signal strength be achieved.

E. Stop Buzzer. Continental hereby advises that Ken Klimek will be available by wireless telephone at (224) 330-9768 and will act as a "stop buzzer" if any issues regarding interference arise during testing. For the foregoing reasons, approval of this application is in the public interest, convenience and necessity.

¹ See 13 FCC Rcd 9672, n.109 (1998); 18 FCC Rcd 5162, n.37 (2003)

Calculations for GPS signal strength from re-radiation system and demonstration of compliance to Section 8.3.28 of NTIA Regulations for Maximum Equivalent Isotropically Radiated Power

Continental uses GPS L1 signal at 1575.42 MHz. The re-radiation system used at Deer Park location consists of an active roof-top antenna, RF cable that carries the signal from the roof-top into the test area, two splitters, one amplifier and passive re-radiating antenna.

Paragraph 6 of Section 8.3.28 of NTIA Regulation requires that “the maximum equivalent isotropically radiated power (EIRP) must be such that the calculated emissions are no greater than -140 dBm/24 MHz as received by an isotropic antenna at a distance of 100 feet (30 meters) from the building where the test is being conducted.”

Calculations for EIRP at **Continental’s facility in Deer Park, IL** are as follows:

$$P_{\text{EIRP}} = P_{\text{Rec}} + G_{\text{Ant1}} - L_{\text{cable}} - L_{\text{splitter1}} - L_{\text{splitter2}} + G_{\text{Amp}} + G_{\text{Ant2}} - L_{\text{Free_Space}} + 2.148$$

Where:

P_{EIRP} = the re-radiated GPS L1 signal 100ft away from the building (EIRP)

$R_{\text{Rec}} = -128$ dBm dB, is the received signal from GPS satellites (-128 dBm)

$G_{\text{Ant1}} = 30$ dB, gain of the active roof-top antenna (Motorola T2000 Timing GPS antenna)

$L_{\text{cable}} = 9.3$ dB, loss due to RF cable (425ft total length of HL4RF cable)

$L_{\text{splitter1}} = 3$ dB, loss due to a 2-way RF splitter (Mini-circuit Model #ZN2PD-20)

$L_{\text{splitter2}} = 3$ dB, loss due to a 2-way splitter (Mini-circuit Model #ZN2PD-20)

$G_{\text{Amp}} = 30$ dB, gain of the amplifier (Mini-Circuits Model#ZHL-1217MLH)

$G_{\text{Ant2}} = 5$ dB, gain for a passive re-radiating antenna (ACC model# GPS WPC P2)

$L_{\text{Free_space}} = 67$ dB, calculated value.

2.148 = conversion factor from ERP to EIRP

Substituting values into the equation (1) to calculate EIRP in the **Deer Park, IL**, facility:

$$P_{\text{EIRP}} = -127.5 + 30 - 9.3 - 3 - 3 + 30 + 5 - 67 + 2.148 = -145.2 \text{ dBm,}$$

which **meets** NTIA Regulation for EIRP.

Calculations for EIRP at **Continental’s facility in Lake Zurich, IL** are as follows:

$$P_{\text{EIRP}} = P_{\text{Rec}} + G_{\text{Ant1}} - L_{\text{cable}} + G_{\text{Amp}} + G_{\text{Ant2}} - L_{\text{Free_Space}} + 2.148$$

Where:

P_{EIRP} = the re-radiated GPS L1 signal 100ft away from the building (EIRP)

R_{Rec} = -127.5 dBm dB, is the received signal from GPS satellites (-128 dBm)

G_{Ant1} = 38 dB, gain of the active roof-top antenna (GPS Source L1A-PM-NF)

L_{cable} = 14 dB, loss due to RF cable (150ft total length of RG-8 cable)

G_{Amp} = 20 dB, gain of the amplifier (GPS Source GPSRKL1-V-P110/5-NF)

G_{Ant2} = 5 dB, gain for a passive re-radiating antenna (ACC model# GPS WPC P2)

$L_{\text{Free_space}}$ = 66.3 dB, calculated value.

2.148 = conversion factor from ERP to EIRP

Substituting values into the equation (1) to calculate EIRP in the **Lake Zurich, IL**, facility:

$P_{\text{EIRP}} = -127.2 + 38 - 14 + 20 + 5 - 66.3 + 2.148 = -142.7 \text{ dBm}$,

which meets NTIA Regulation for EIRP.