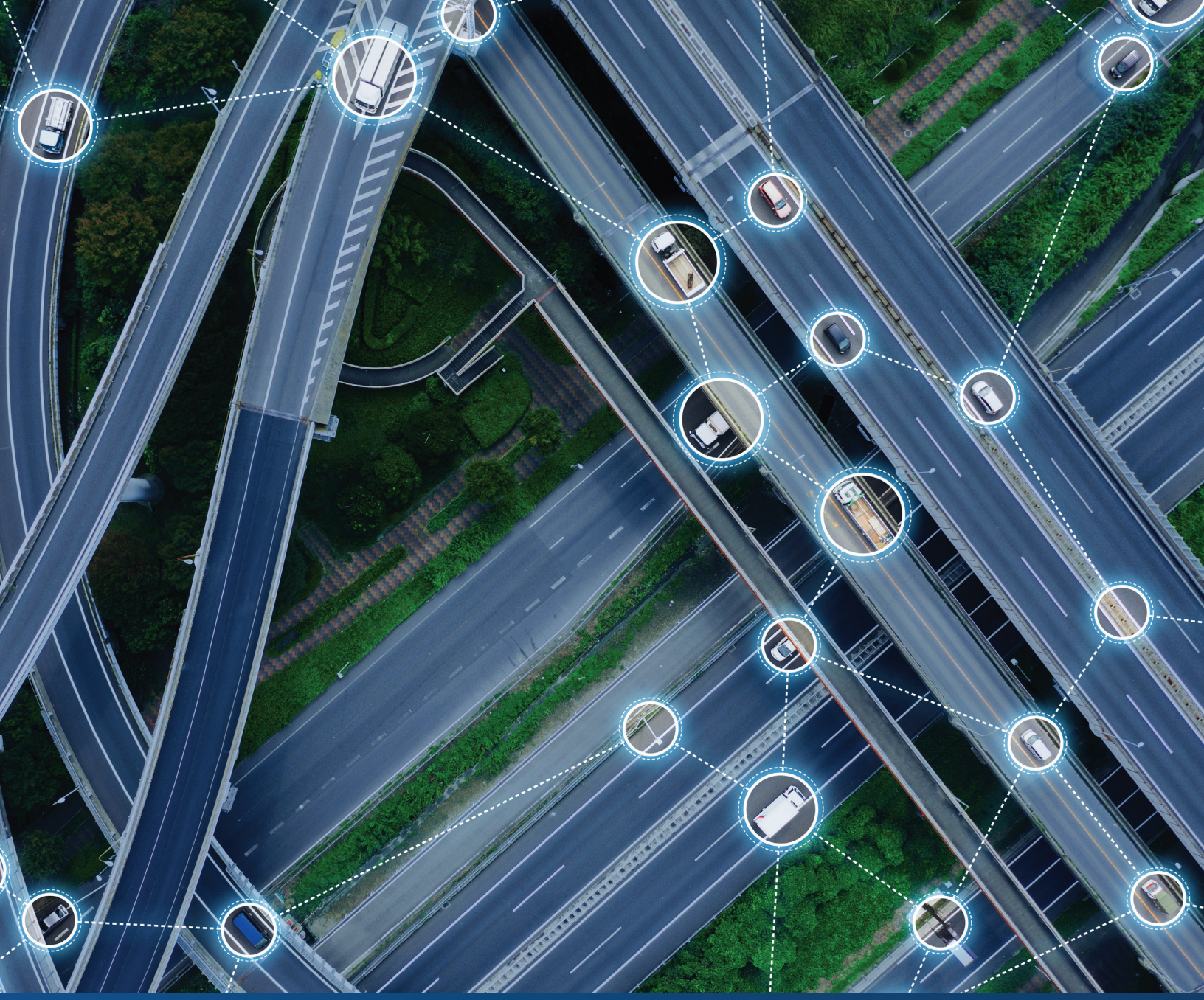


V2X MOBILE ANTENNAS FOR INTELLIGENT TRANSPORTATION SYSTEMS (ITS)

SINCLAIR
A DIVISION OF NORSAT INTERNATIONAL INC.

CONTENT

WHO IS SINCLAIR TECHNOLOGIES?

Sinclair Technologies, a division of Norsat International, is a leading designer and manufacturer of antenna and RF signal conditioning products, systems, and coverage solutions. Sinclair products are used extensively in public safety and private industry communication networks, such as emergency services, transportation, natural resources, and utilities. With nearly 70 years of industry-leading expertise in all aspects of antenna and RF signal conditioning design and manufacturing, Sinclair has a strong focus on R&D and continues to expand its product offering to meet the needs of an ever-evolving market.

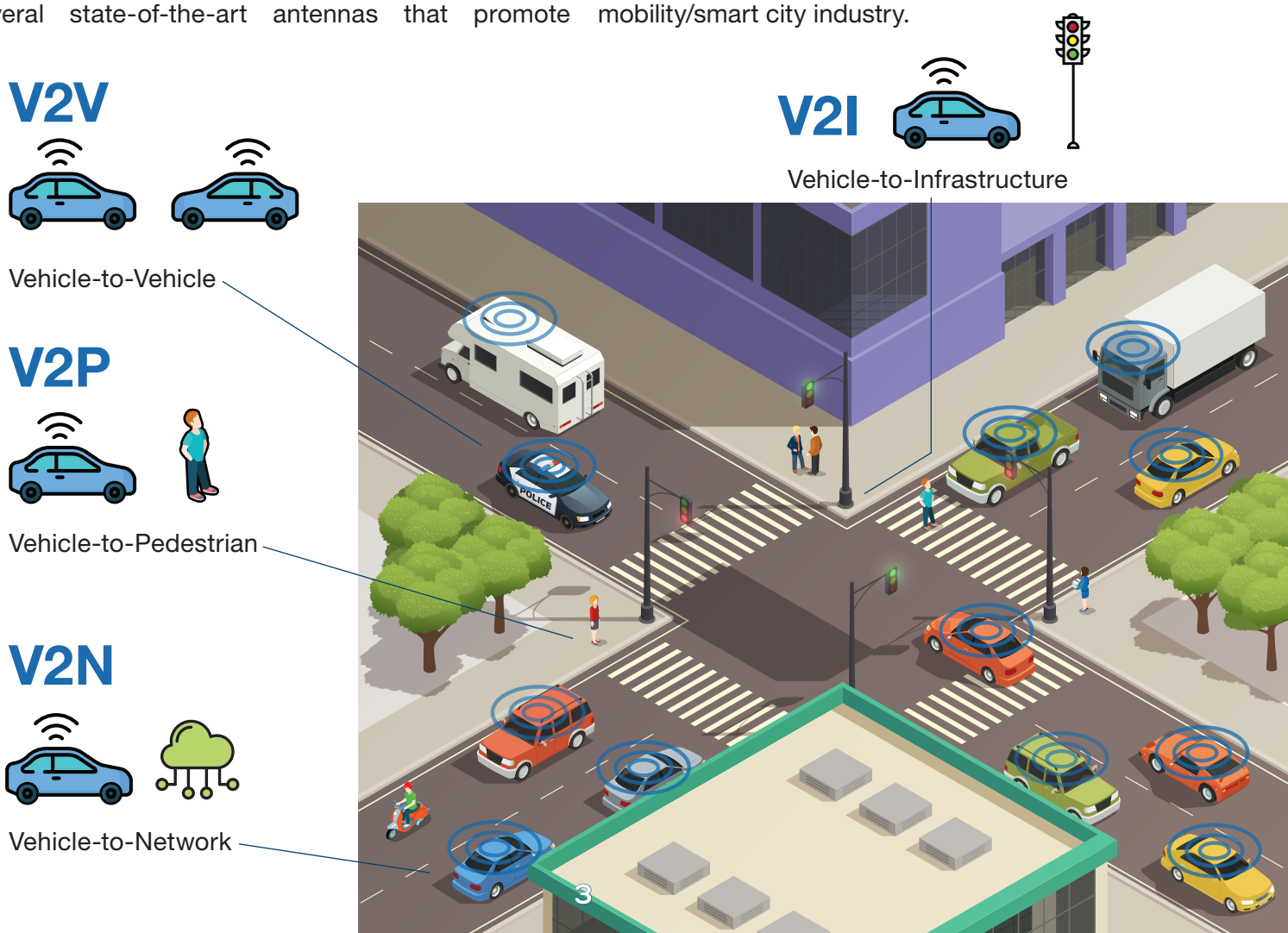
MOBILE ANTENNAS FOR THE FUTURE

Wireless communication has become an essential part of life in today's modern society, especially in public safety communication. Intelligent Transportation Systems (ITS) is a combination of cutting-edge information and communication technologies used in transportation and traffic management systems to improve the safety, efficiency, and sustainability of transportation networks; to reduce traffic congestion; and to enhance drivers' experiences.

With over 60 years of industry-leading expertise and a global reputation for its design and manufacturing capability, Sinclair Technologies understands how important reliability and durability are for ITS market application with V2X-DSRC technology and offers a wide range of mobile antenna family covering 5.9 GHz band. Sinclair's durable, high-quality products provide its customers with reliable product performance and seamless wireless communication experience.

Sinclair's innovative product portfolio includes several state-of-the-art antennas that promote vehicle-to-everything (V2X) communication. Its wideband TRANSeon™ mobile antennas are rugged, high-performance vehicle/transit antennas built to deliver superior reception for vehicle-to-vehicle (V2V) applications through on-board-units (OBU). The highly customizable platform supports both dedicated short-range communications (DSRC) and cellular vehicle-to-everything (C-V2X) communications. It also includes an embedded GNSS antenna that utilizes a high-performance LNA for all global navigation satellite systems for GPS, Galileo, GLONASS, and Beidou.

Sinclair's expertise also extends to vehicle-to-infrastructure (V2I) applications. It supplies both Omni-directional and directional antennas for road-side-units (RSU). Sinclair can customize these platforms to support multi-band applications and cater to the unique needs and requirements of its customers. Sinclair welcomes opportunities in industrial collaboration and looks forward to contributing to the future of the smart mobility/smart city industry.



SINCLAIR V2X MOBILE ANTENNA SOLUTION

Sinclair's vehicle-to-everything (V2X) mobile antenna family offers:

- An uncompromised design to achieve optimal signal reception and reliable communication in intelligent transportation systems (ITS)
- A low-profile form factor that is visually pleasing and minimizes potential damage from overhead objects such as tree branches
- Industry leading multiple-input multiple-output (MIMO) design to achieve fast internet download speed in LTE/5G networks
- Rugged design that optimizes product durability and longevity, especially in harsh usage environments and conditions
- A modular design that enables customization for specific customer needs and requirements

SM701

SM715

SM2601D

Product Series	Frequency Range	Number of Ports	Application				
			V2X	5G Ready	WIFI	GPS	GNSS
SM701	694-6000 MHz	2	✓	✓		✓	
SM715	698-5900 MHz	5	✓	✓	✓		✓
SM2601D	219-223 MHz 694-6000 MHz	5	✓	✓	✓		✓

SM715 MIMO ANTENNA

- Outstanding electrical performance that covers all LTE bands
- 5 feed cable design to support MIMO connectivity
- Future proof that is 5G/CBRS/DSRC/C-V2X ready
- Compatible with all mainstream cellular routers
- Built-in high-gain GNSS module for precise positioning services
- Rugged built and industry leading 2.6-inch low-profile design that is aesthetically pleasing
- LSZH and fire-retardant cable for safety requirement

Electrical Specifications	
Frequency, port 1 & 2 (LTE)	698-5600 MHz
Frequency, port 3 & 4 (WiFi)	2400-2500, 4900-5900 MHz
Gain (Typ), port 1 & 2 (LTE)	1.9 to 3.9 dBd (4 to 6 dBi)
Gain (Typ), port 1 & 2 (WIFI)	2.9 to 3.9 dBd (5 to 6 dBi)
Connector	SMA-male
Input VSWR (typ)	1.5:1
Input VSWR (max)	2:1
Polarization	Vertical
Impedance	50 Ω
Pattern	Omni- directional
Average Input Power (max)	LTE ports: 50 W; WIFI ports: 10 W
Lightning protection	DC ground
GNSS Frequency	1559-1606 MHz

Mechanical Specifications	
Width	6.3 in (160 mm)
Depth	6.3 in (160 mm)
Height	2.6 in (66 mm)
Radome Material	UV stabilized ASA, UL94 HB
Ingress protection	IP67

Environmental Specifications	
Temperature range	-40° to +140°F (-40° to +60°C)

SM701 LOW PROFILE ANTENNA

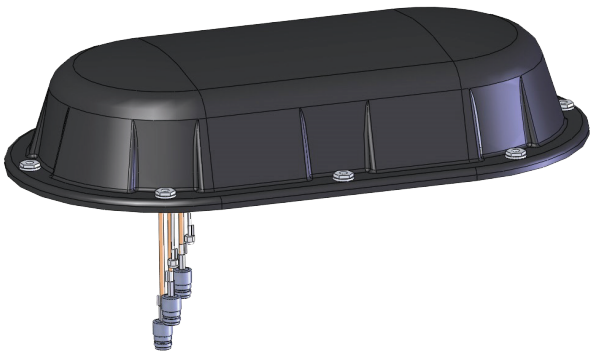
- Ultra wide band design that covers all LTE bands and 5G up to 6 GHz
- Future proof that is 5G/CBRS/DSRC/C-V2X ready
- Built-in high-gain GPS module for precise positioning services
- Rugged built and industry leading 2.6-inch low-profile design that is aesthetically pleasing
- LSZH and fire-retardant cable for safety requirement

Electrical Specifications	
Frequency Range	694 to 6000 MHz
Bandwidth	5306 MHz
Connector	Various options avail.
Gain (nominal)	2.1 dBi
Input VSWR (typ)	2:1
Polarization	Vertical
Impedance	50 Ω
Pattern	Omni- directional
Average Input Power (max)	200 W
Lightning protection	DC ground
GPS Center Frequency	1575.42 MHz

Mechanical Specifications	
Height	2.6 in (66 mm)
Overall Diameter	6.3 in (160 mm)
Radome material	UV stabilized ASA, UL94 HB
Weight	1.35 lbs (0.61 kg)
Ingress protection	IP67

Environmental Specifications	
Temperature range	-40° to +140°F (-40° to +60°C)
Wind Loading Area (1/2” ice)	0.06 ft^2 (0.01 m^2)
Horizontal Wind Resistance	1.53 lb

SM2601D RUGGED MOBILE ANTENNA FARM



- Multi-in-one low profile antenna that offers PTC (VHF), LTE and 5G connectivity
- The extra dual-band WiFi element also supports DSRC 5.9 GHz for V2X applications
- Built-in high-gain GNSS module for precise positioning services
- A maximum height of 4-1/4 inches complies with restriction for locomotives and other vehicles
- Black weather resistant and fire rated radome provides excellent environmental protection

Electrical Specifications	
Frequency Range 1 (F1)	219 to 223 MHz
Input VSWR 1 (nominal)	1.5:1
Frequency Range 2 (F2)	694 to 2700 MHz
Bandwidth (F2)	2006 MHz
Input VSWR 2 (nominal)	1.5:1
Frequency Range 3 (F3)	694 to 2700 MHz
Bandwidth (F3)	2006 MHz
Input VSWR 3 (nominal)	1.5:1
Frequency Range 4 (F4)	2400 to 6000 MHz
Input VSWR 4 (nominal)	1.5:1
Connectors	PTC=NM, CELL=SMA-male, WiFi=TM, GNS=BM
Gain (nominal)	2.1 dBi
Polarization	Vertical
Impedance	50 Ω
Pattern	Omni-directional
Average Input Power (max)	5~125 W
Lightning protection	DC ground
GNSS Frequency	1559-1606 MHz

Mechanical Specifications	
Width	11.5 in (292 mm)
Length	20.88 in (530 mm)
Height	4.25 in (108 mm)
Weight	12.3 lbs (5.58 kg)

Environmental Specifications	
Temperature range	-40° to +140°F (-40° to +60°C)
Wind Loading Area (Flat Plate Equivalent)	0.2 ft^2 (0.02 m^2)
Horizontal Wind Resistance	5.03lb@100mph

SINCLAIR TECHNOLOGIES

Sinclair Technologies is a global leader in the design and manufacture of high-quality fixed and mobile antennas, filters, combiners, and related products. Designed to function in extreme conditions, Sinclair's products have a globally recognized reputation for quality, reliability, durability, and value. For over 60 years, Sinclair has provided custom-designed antennas and RF signal conditioning products to fit our customer's unique requirements. From simple to complex issues, Sinclair offers antenna and RF signal conditioning solutions for utilities industry paired with the industry's best RF expertise.

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