

# COMPATIBLE WITH

**PATCH, SINUOUS, DIPOLE, SLOT, AND OTHER ARCHITECTURES**

RF/Microwave Antennas

➤ **IMPROVED ANTENNA PERFORMANCE**

Phased array, dipole, sinuous, and patch antennas with superior dielectric (Dk) and loss tangent specifications



① **ANTENNA ELEMENT**

Custom-designed antenna element rests on thin glass rails, surrounded by 95%+ air

② **GLASS SUPPORT RAILS**

150 micron thick, 15 micron wide glass supports maintain structural integrity of antenna

③ **AIR GAP**

Dielectric constants from 1.5 to 6.4 are achievable by controlling the glass to air gap ratios

④ **GLASS SUBSTRATE AND FRAME**

Easy handling of device with glass support structure

## Features and Benefits

- Narrowband with high gain
- Broadband from MHz to GHz in a single compact antenna
- Selective removal of glass structure for a configurable dielectric constant of 1.5 - 6.4
- Millimeter wave capable
- Build antenna elements with SMT connections for direct die attach to PCBs
- Integrate directly with other passive elements, such as bandpass filters, into monolithic sub-systems
- Directly integrate RFIC for full Antenna-in-Package (AiP) solution

## Applications

- 5G Wireless at 28GHz Phased Array
- Dipole and sinuous antenna
- Radio Access Network (RAN) and CRAN
- 79GHz Automotive Radar Systems
- DVB-S and VSAT Terminals
- Distributed Antenna Systems (DAS)
- 60GHz Wireless Systems
- Advanced Driver Assistance Systems (ADAS)
- Advanced Defense, EW and SIGINT Systems

performance with very low loss. This requires a support material with low Dielectric and Loss Tangent properties.

Our unique design and manufacturing capabilities enable antenna designers to generate radiative antenna structures with dielectric constants as low as 1.5.

Tailorable dielectric performance ranging from 1.5 to 6.4 is realized by integrating radiative metal patterns on a matrix of glass and air. Designs are optimized for Dk, loss tangent, and environmental durability in the field.

## High Q and Low Loss Tangent

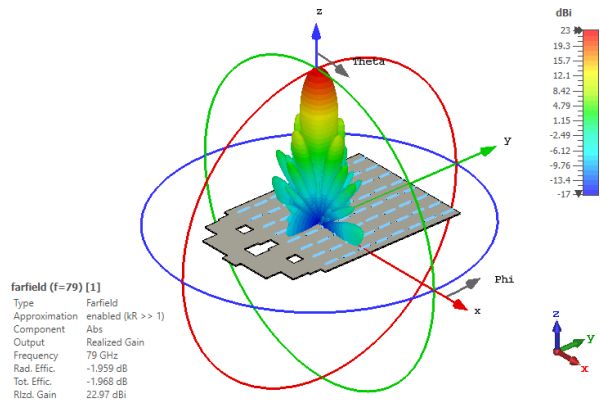
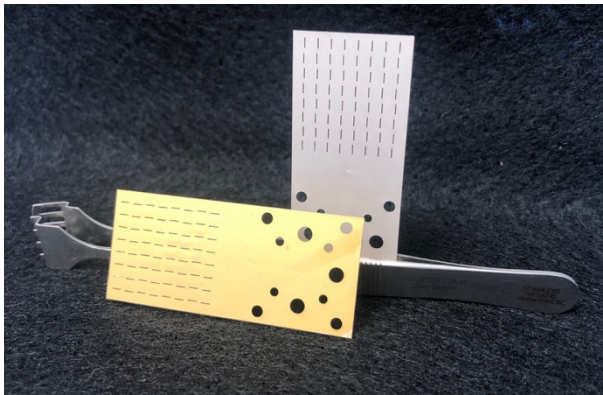
Today's wireless communications and collision avoidance systems demand superior antenna

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## 79GHz 8-Element Antenna In collaboration with **NOKIA** Bell Labs



### Wide Variety of Designs

Custom single element, dual element, MIMO, and phased arrays designs demonstrate robust performance.

Advanced manufacturing processes in our proprietary APEX® Glass enable:

- Micron-scale precision with metal features
- Thick metal for high power applications
- Integrated through glass vias for topside-to-backside interconnects such as Microstrip patch antennas and spiral antennas
- Robust shock and vibration tolerance

### Custom Packaging

Antenna packaging is customer defined: may include SMT, probe-launched, or coplanar waveguide-launched.

### Design Limits

Parameters	Typical
Frequency Ranges	1 – 200 GHz
Dielectric Constant	1.5 to 6.4 configurable
Connection Type	Customer defined
Compliance	ROHS compliant, Lead-free