

# FAB S and LAB S

## A Passion for Dielectric Materials



In 1995, two Ph.D.'s were inspired to commercialize high Q, low loss dielectric materials, the fruits of research at the College of Engineering & Applied Sciences at Stony Brook University on Long Island. They formed MCV Microwave, with MCV an acronym for the pillars of the new company: materials, customer centric and vertically integrated. In the ensuing 23 years, MCV has applied and extended its materials expertise to offer dielectric resonators, filters, antennas and interference services.

Beginning with materials, MCV Microwave offers proprietary dielectric resonators operating in TE, TM or TEM mode, with dielectric constants from 6 to 190 and Q•f up to 300,000 at 10 GHz. The resonators, suitable for microstrip and stripline networks, are widely used in voltage controlled oscillators, dielectric resonator oscillators and microwave filters from 6 to 100 GHz.

Competence with high Q materials naturally leads to designing high performance filters. MCV's filter and multiplexer products encompass cavity, ceramic and LC designs, including ultra-narrowband—down to 0.03 percent passband bandwidth—and wideband filters from 2 MHz to 70 GHz and in all configurations: bandpass, band rejection, lowpass, highpass and multiplexers. Products have been developed that meet the most stringent requirements of defense, aerospace and wireless systems. MCV is recognized for ultra-low passive intermodulation (PIM) filters and duplexers for wireless communications, including a line of cavity-based duplexers with better than  $-173$  dBc PIM levels for the standard communications bands from 350 MHz to 3.5 GHz. Using frequency selective surface metamaterials, the company's designers are developing filters and multiplexers to cover the 5G mmWave bands.

MCV has also applied its dielectric materials capability to develop patch antennas for GPS, Wi-Fi and

cellular, including a patented hybrid antenna for six LTE bands. The rectangular microstrip antennas have strict dimensional accuracy and use the company's proprietary dielectric materials with tight dielectric constant tolerance and temperature stability, yielding excellent antenna sensitivity and stability.

Because PIM is such a critical performance parameter in wireless communications and PIM problems are very challenging to identify and solve—particularly sites with co-located services—MCV offers engineering consulting to carriers and in-building operators to identify and mitigate sources of frequency interference, whether in cellular networks or Wi-Fi hot spots.

To meet the company's high standards, MCV is largely vertically integrated, from dielectric materials produced in Japan through product design and manufacturing. Design teams are located in Delaware and at MCV's headquarters in San Diego, where the filter and antenna products are manufactured. MCV has machining and plating operations in San Diego, with additional machining and plating capacity in China, when needed for high volume production. The comprehensive test capability supports the development and production of all products, as well as the "PIM hunting" services. MCV's staff has grown to around 300, with some 25 in engineering and 250 supporting production.

Reflecting its vision of being "customer centric," MCV Microwave strives to understand each customer's unique needs and to respond quickly with a customized solution at a competitive price, always with exceptional quality and delivery. MCV is ISO 9001:2015 and AS9100D certified and ITAR registered. The firm's many customers include well-known Fortune 500 companies and start-ups, an endorsement of its strong technical capabilities and commitment to quality and responsiveness.

[www.mcv-microwave.com](http://www.mcv-microwave.com)