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Composite Ceramic Technologies, LLC—GigaCircuits, Inc. IP expands into Antenna Modules

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AUSTIN, TEXAS—Composite Ceramic Technologies, LLC, Austin, TX, (“CCTech”) is pleased to announce that the first of many patents relating to devices incorporating material structures with thermally stable performance properties has been allowed by the US Patent and Trademark Office. The company’s proprietary materials technology enables the full integration of microelectronic circuitry into a single component. This represents a breakthrough that could be as meaningful as the semiconductor chip, which integrated millions of transistors into a single manufactured part. This new patent application relates to fully integrated antenna modules. The thermally stable dielectric materials are used to make an efficient antenna element much smaller in size. In addition to achieving new levels of miniaturization, this key effect permits the stable tuning of the element’s frequency response, so the antenna is sensitive only to those specific signal frequencies useful to handheld wireless communications.

“Dielectric materials are used in microelectronic systems to tune a circuit’s frequency response and are found in passive components (resistors, capacitors, and inductors),” L. Pierre de Rochemont, CCTech’s Founder, explained. “Unfortunately, when these ceramic materials are made from powders, which is the traditional method established for millennia, they will have performance values that vary with temperature. This causes the circuit’s frequency tuning to shift as it is heated or cooled. Our proprietary nanotechnology, developed to meet the needs of next generation manufacturing requirements, overcomes this limitation.”

The inability of passive components to maintain “tight performance tolerances” as a function of temperature is the reason why microelectronic systems are not fully integrated 40+ years after the introduction of the semiconductor chip.

“The ability to integrate millions of transistors, or active components, into a single part created vast economic wealth for our nation and the world by paving the way for much more sophisticated circuits with dramatically improved reliability to be assembled at much lower cost. However, nearly 50 years after the development of the semiconductor chip we are still inserting passive components as discrete parts one at a time on the surface of a circuit board so the ‘out-of-tolerance’ components can be replaced when they fail during final test,” de Rochemont continued.

The absence of technologies that allow fully integrated microelectronic solutions has driven manufacturing and higher value design jobs into lower cost labor markets to offset the extraordinary cost of unskilled and laborious assembly practices. The ability to meet the technical criteria needed to fully integrate passive components into a printed circuit board or directly onto the semiconductor chip will introduce dramatic efficiencies into the assembly process that will allow manufacturers to assemble their products directly in the markets they serve.

This is an all-inclusive patent application that lays the foundation for claiming high-dielectric value materials with stable performance as a function of temperature in passive interconnects (printed circuit boards and ceramic packaging), composite ceramic bodies or “meta-materials”, artificial magnetic conducting ground planes, and the Company’s proprietary frequency-selective radios, as divisional patents to the parent application.