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# Micro Harmonics Releases Hybrid Circulators for 70-133 GHz

*Greater isolation and bandwidth enable designers to fully capitalize on the mm-wave spectrum.*

Fincastle, VA – Micro Harmonics Corporation has announced the release of its hybrid circulators in three new millimeter waveguide bands: WR-12 (70-86 GHz), WR-10 (85-104 GHz), and WR-8 (107-133 GHz).

These patent-pending hybrid circulators can cover 24% fractional bandwidths with low insertion loss and more than 20 dB of isolation. Their wideband performance is verified from the comprehensive test data that Micro Harmonics provides with every component.

“The new hybrid circulator gives microwave engineers the option of specifying one component that can operate over multiple sub-bands, making instrument architecture much easier,” states David Porterfield, Founder and CEO of Micro Harmonics Corporation (MHC). “For example, a single WR-12 hybrid circulator can cover 70-86 GHz which encompasses the popular 71-76 GHz and 81-86 GHz sub-bands. Two separate Y-junction circulators are needed to cover those two bands.”

At the higher mm-wave frequencies, even a state-of-the-art Y-junction circulator is effective only within a very narrow bandwidth and can place a severe bandwidth limitation on the entire system. For instance, a typical Y-junction circulator designed for operation near 170 GHz has a bandwidth of only 2 GHz, but a hybrid circulator can cover the entire band from 150-190 GHz.

The significant increase in bandwidth is possible because the mode of operation of the hybrid circulator is fundamentally different from that of the Y-junction. The hybrid uniquely combines an inherently broadband Faraday rotator with an orthomode transducer to create the circulator function.

The hybrid circulator comes with diamond heat sinks for improved power handling, internal waveguide screw access, anti-cocking waveguide flanges, and is resistant to stray magnetic fields. Additionally, each one is tested on a vector network analyzer to ensure conformity, and the test data are provided to the customer. Actual test data for the three new hybrid circulator lines demonstrated more than 20 dB isolation and less than 1 dB insertion loss.

Previously, Micro Harmonics had released the hybrid design in WR-15 (54-68 GHz) and WR-5.1 (150-190 GHz). Under a two-phase Small Business Innovation Research (SBIR) contract awarded by NASA, the company is in the process of completing its entire line of hybrid circulators that will operate up to 333 GHz.

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