

Compact High-Bandwidth, Low-Signal-Error Waveguide

Compact inline two-way power combiner/divider in a waveguide structure

Radio frequency (RF) and microwave systems typically require power distribution networks to divide an input signal into any number of out-put signals. Inversely, power distribution networks can also be used to combine RF input signals from multiple inputs into a single RF output signal. RF rectangular waveguide technology is applicable to power distribution networks due to the technology's in-herent advantages in power handling capacity and signal integrity. Such devices have the benefit of very low power loss at high frequencies. Unfortunately, the existing RF waveguide power distribution devices have very limited frequency bandwidth, generate unacceptable amplitude and phase errors, and can be too large for many applications. This new technology was used to design a compact structure as a two-way and a four-way power combiner/divider. The system has a conductive body that includes a waveguide input portion and several waveguide output portions in the same plane. The waveguide further includes a common junction joining the input waveguide portion and the output waveguide portion. Three iris elements next to the common junction, together with the divider, produce unexpected beneficial results as they work in concert to match the impedance of the structure across the entire bandwidth of the waveguide. The respective dimensions and relative place-ment of these elements result in very low levels of reflected pow-er from an input signal, across the entire operational frequency band, which minimizes amplitude and phase errors in the compact structure.

BENEFITS

Smooth corners allow for maximum power transmission through the waveguide device by softening discontinuities in the waveguide walls, thereby minimizing associated charge buildup and standing waves that cause breakdown.

Fewer Amplitude and Phase Errors

Low Levels of Reflected Power from Input Signal

Compact Structure

Conductive Body

OPPORTUNITIES

US patent 9,666,927 available for license

Collaboration with Air Force researchers

READY TO COLLABORATE?

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One example of the waveguide with input (12) and outputs (14 and 16) making a folded Y-junction power divider. The device is machined from black aluminum or other high conductive material.

