Abstracts

A Novel Harmonic Balancing Bridge for Characterizing Microwave Modules for Phased Array Antenna Service

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A novel microwave bridge incorporating fundamental and harmonic balancing has been developed for measuring amplitude and phase characteristics of items, such as phased array antenna amplifiers, that exhibit small but significant nonlinear behaviour. Measured characteristics relate to the output traveling waves from the item which may, however, be terminated in any safe load. Successful bridge design and operation in a fundamental range of 2 to 4 GHz, a second harmonic range 4 to 8 GHz and a third harmonic range 6 to 12 GHz has been achieved. Sensitivity and resolution are such that it is possible to differentiate between leading and trailing edge phase characteristics of pulse operated microwave amplifiers. Results obtained with various load impedances can be used to plot equi-amplitude and equi-phase contours on a Smith chart at fundamental and harmonic frequencies.

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