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Title:Design and development of thermistor based power meter at 140 GHz frequency band
Authors:Roy, Rajesh (1); Kush, Abhimanyue Kumar (1); Dixit, Rajendra Prasad (1)
Author affiliation:(1) Defence Electronics Applications Laboratory, Raipur Road, Dehradun, Uttarakhand 248 001, India
Corresponding author:Roy, R.(rajesh.roy@deal.drdo.in)
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Abstract:Design and development of thermistor based power meter at 140 gigahertz (GHz) frequency band have been presented. Power meter comprises power sensor, amplifier circuit and dialog based graphical user interface in visual C++ for the average power measurement. The output power level of a component or system is very critical design factor. Thus there was a need of a power meter for the development of millimeter wave components at 140 GHz frequency band. Power sensor has been designed and developed using NTC (Negative Temperature Coefficient) thermistors. The design aims at developing a direct, simple and inexpensive power meter that can be used to measure absolute power at 140 GHz frequency band. Due to absorption of 140 GHz frequencies, resistance of thermistor changes to a new value. This change in resistance of thermistor can be converted to a dc voltage change and amplified voltage change can be fed to computer through data acquisition card. Dialog based graphical user interface (GUI) has been developed in visual C++ language for average power measurement in dBm. WR6 standard rectangular waveguide is the input port for the sensor of power meter. Temperature compensation has been achieved. Moderate sensor return loss greater than 20 dB has been found over the frequency range 110 to 170 GHz. The response time of the power sensor is 10 second. Average power accuracy is better than ±0.25 dB within the power range from -10 to 10 dBm at 140 GHz frequency band.
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