Detection and removal of undesirable objects is an important issue in many material processing industries. This paper presents a microwave-based measurement technique for detection of dielectric objects in powder materials flowing through metal pipes. A nonintrusive microwave sensor is developed, which uses multiple resonant modes to obtain high sensitivity with respect to permittivity variations inside the pipe. Undesirable objects are detected based on the scattering parameters of the sensor, which are measured using a fast-sampling microwave transmitter and receiver unit. We present a detection algorithm derived from the likelihood-ratio test, which includes a parametric model of the local statistical distribution of the measured scattering parameter data. The model involves a set of Möbius transformations that map the measured scattering parameters to a domain where the data are Gaussian distributed. All unknown parameters in the model are estimated from data using maximum likelihood. Based on measurement results from a gravity-fall experimental setup, we conclude that small dielectric objects can be reliably detected in heterogeneous flows of dielectric powder.