Abstracts

Single-Frequency Relative Q Measurements Using Perturbation Theory

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Traditionally, Q measurement requires a nonzero frequeucy bandwidth or time period. Contrasted to this, the principle of a new single-frequency relative Q measurement method is developed. It is found that Q is directly or inversely proportional to the normalized input resonant resistance if a moderate perturbation condition is satisfied. Theoretical proof and experimental verification of the single-frequency method's validlty are presented. Consequently, a relative Q, often used in dielectric measurements, can be measured using a much simpler measurement system. Moreover, error analysis shows that, in making a relative Q measurement, the error in the single-frequency method is smaller than that in the traditional bandpass method when using a reflectometer.

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