REVIEW OF METHODS FOR DETERMINING THE LOADED Q-FACTOR OF MICROWAVE RESONATORS.

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Abstract

Measurements of material properties such as loss tangent and surface resistance at microwave frequencies require the accurate determination of the quality factor Q of the resonating structure in which the sample is incorporated. We review various techniques used so far to determine the loaded quality factor Q_L of microwave resonators. We also present a method developed to accurately obtain Q_L from measurements of complex transmission coefficients S_{21} close to the resonant frequency using fractional linear curve-fitting. Verification of the technique was done using a sapphire rod resonator with $YBa_2Cu_3O_7$ end-plates.

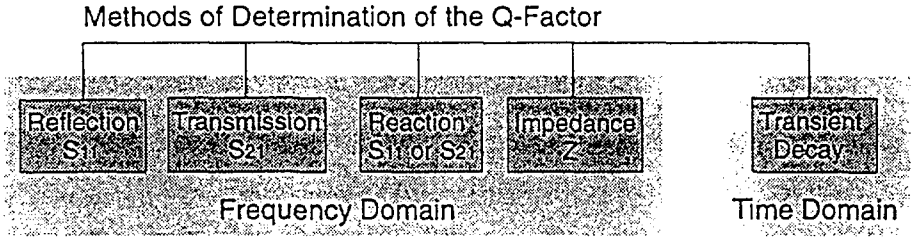

Figure 1 *Techniques used to find Q-factor*

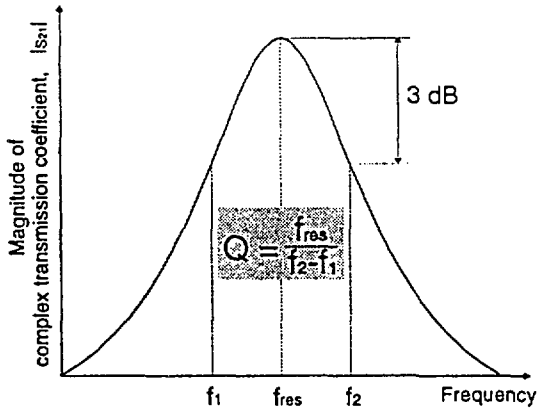

Figure 2 3 dB Method

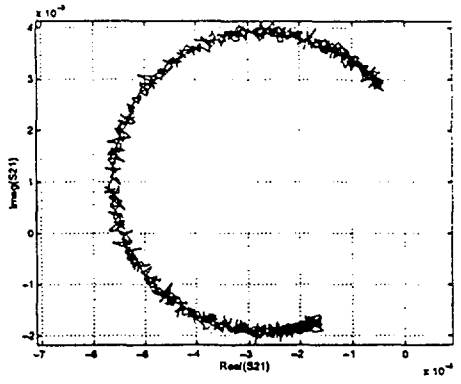

Figure 3 Experimental S_{21} Q-circle

References

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