

# Device Modeling Report

COMPONENTS: RESISTOR  
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**Bee Technologies Inc.**

## Theory: Auto Balancing Bridge Method

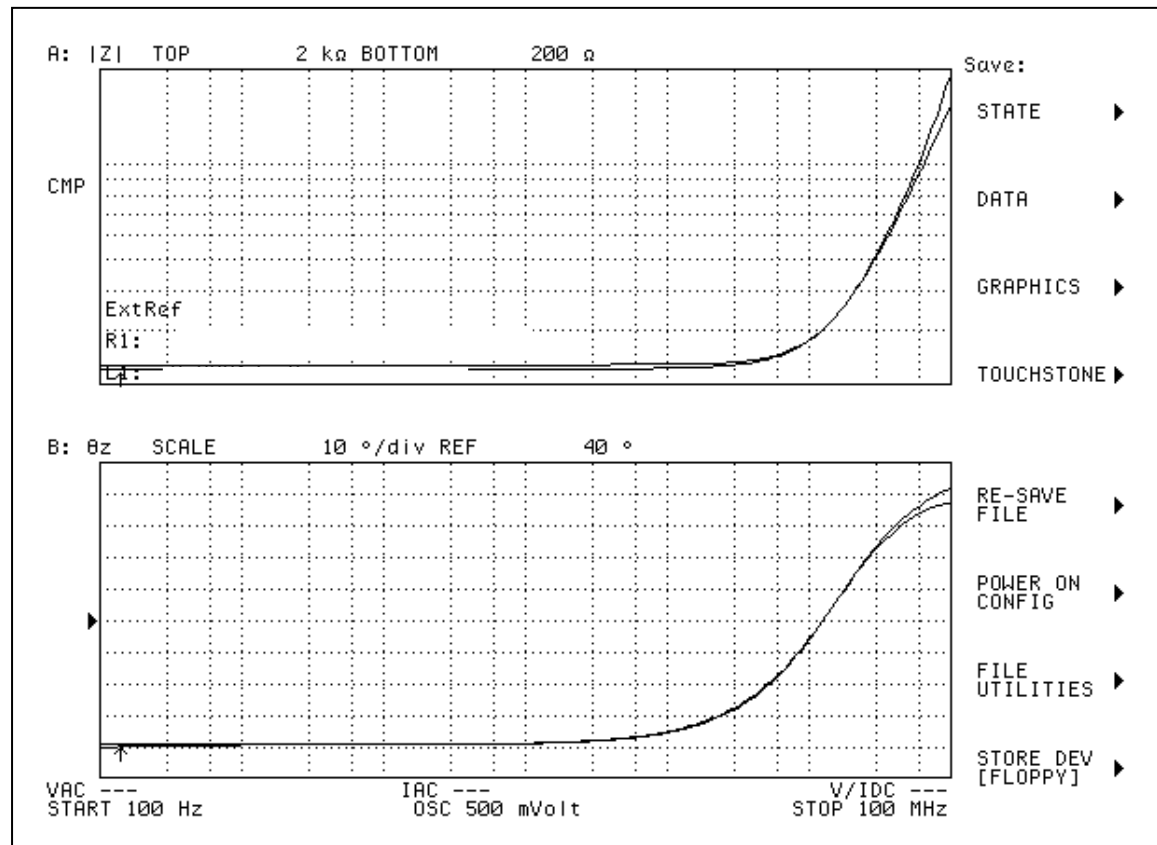
### Optimization of Simulation

Range of adjustment Frequency: 100 to 100M(Hz)

Frequency vs.  $|Z|$  and Frequency vs.  $\theta z$  Characteristic

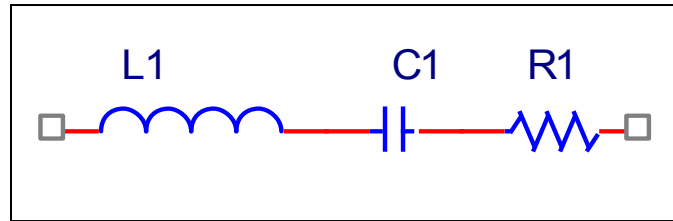
Attention

*Please use SPICE MODEL within the range from 100 to 100M(Hz)*



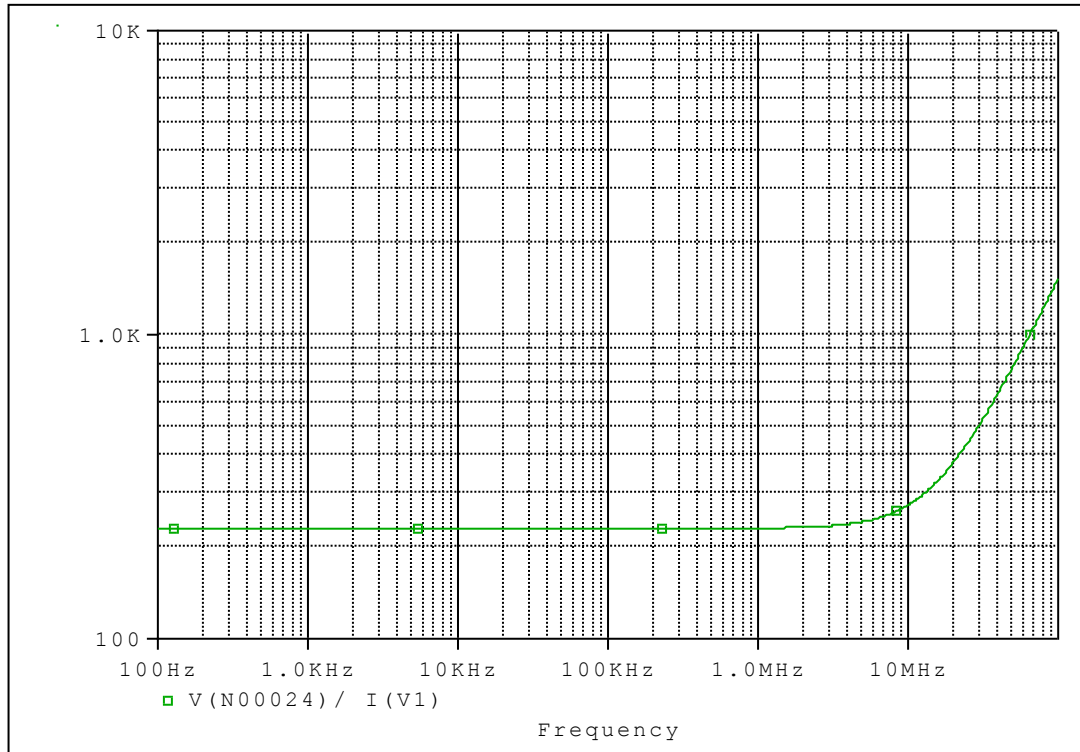
| Measurement |  |  |
|-------------|--|--|
| R1          |  |  |
| L1          |  |  |
| C1          |  |  |

Equivalent circuit

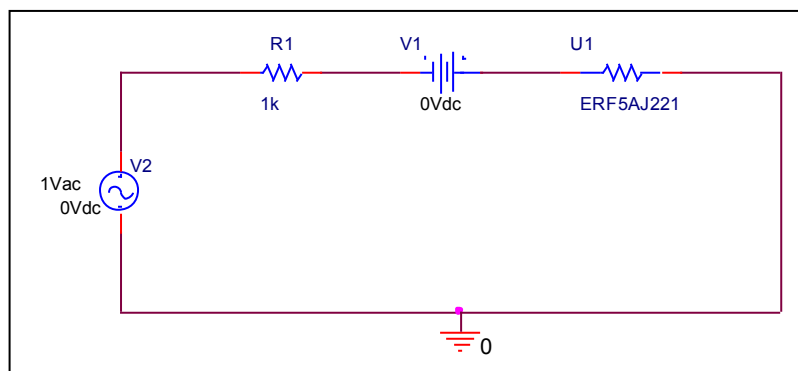


## Frequency vs. $|Z|$ Characteristic

Circuit simulation result



Evaluation Circuit



## Simulation Result

| <b>Frequency(HZ)</b> | <b> Z (ohm)<br/>Measurement</b> | <b> Z (ohm)<br/>Circuit Simulation</b> | <b>%Error</b> |
|----------------------|---------------------------------|----------------------------------------|---------------|
| <b>100</b>           | <b>223.756</b>                  | <b>230.771</b>                         | <b>3.135</b>  |
| <b>1K</b>            | <b>223.759</b>                  | <b>230.682</b>                         | <b>3.094</b>  |
| <b>10K</b>           | <b>223.756</b>                  | <b>230.682</b>                         | <b>3.095</b>  |
| <b>100K</b>          | <b>223.809</b>                  | <b>230.687</b>                         | <b>3.073</b>  |
| <b>1M</b>            | <b>224.899</b>                  | <b>231.619</b>                         | <b>2.988</b>  |
| <b>10M</b>           | <b>273.762</b>                  | <b>275.123</b>                         | <b>0.497</b>  |