

# Device Modeling Report

COMPONENTS: CAPACITOR/ CERAMIC  
PART NUMBER: DE1B3KX101KA5B  
MANUFACTURER: MURATA  
REMARK: TA=80 °C



**Bee Technologies Inc.**

## Theory: Auto Balancing Bridge Method

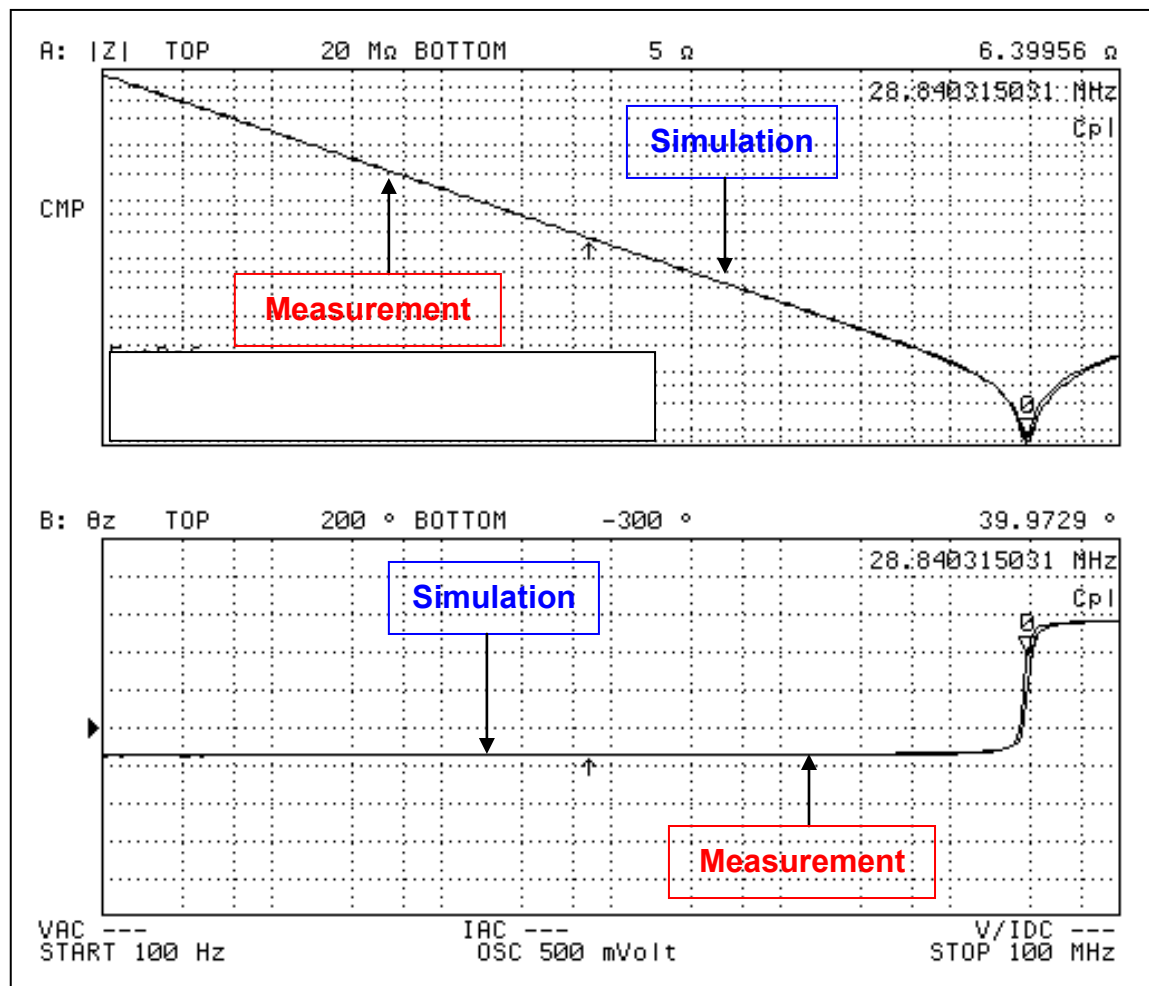
### Optimization of Simulation

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

Frequency vs.  $|Z|$  and Frequency vs.  $\theta_z$  Characteristic

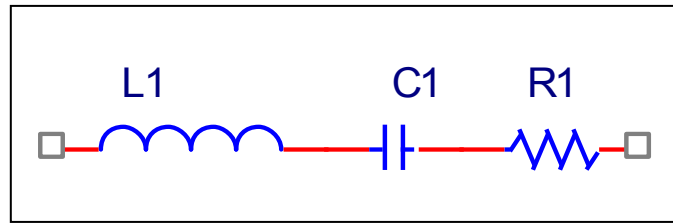
Attention)

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



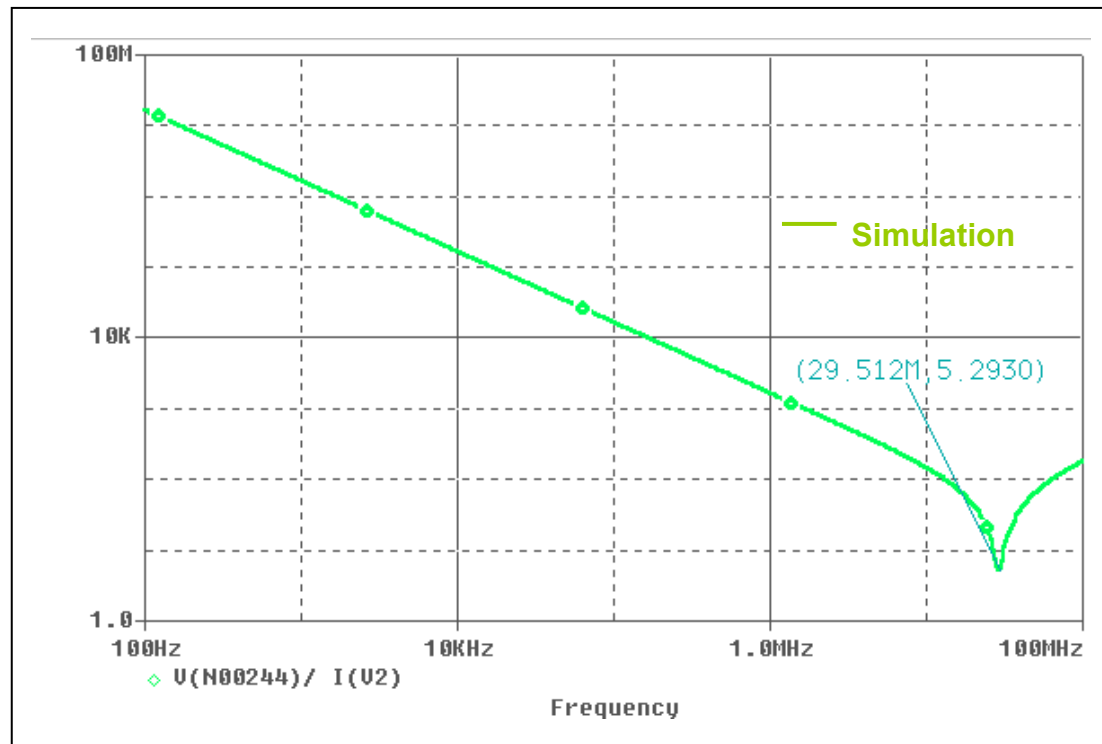
|    |  |
|----|--|
| L1 |  |
| C1 |  |
| R1 |  |

Equivalent circuit

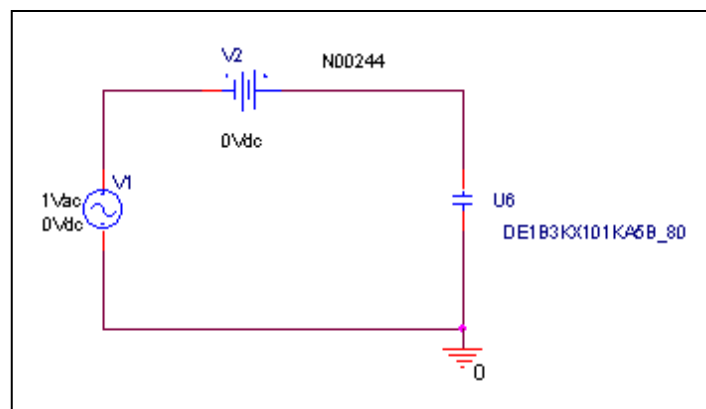


## Frequency vs. |Z| Characteristic

### Circuit Simulation result



### Evaluation Circuit



**Simulation result**

| <b>Frequency<br/>(Hz)</b> | <b>IZI (ohm)<br/>:Measurement</b> | <b>IZI (ohm)<br/>:Simulation</b> | <b>% Error</b> |
|---------------------------|-----------------------------------|----------------------------------|----------------|
| 100                       | 15.7178M                          | 16.684M                          | 6.1472         |
| 1K                        | 1.63823M                          | 1.6684M                          | 1.8416         |
| 10K                       | 164.157K                          | 166.8380K                        | 1.6332         |
| 100K                      | 16.5627K                          | 16.6840K                         | 0.7324         |
| 1M                        | 1.67829K                          | 1.6664K                          | 0.7085         |
| 10M                       | 153.22                            | 147.408                          | 3.7932         |
| 100M                      | 165.838                           | 178.602                          | 7.6967         |

|                  | <b>Measurement</b> | <b>Simulation</b> | <b>%Error</b> |
|------------------|--------------------|-------------------|---------------|
| <b>FSRF(Hz)</b>  | 28.9639M           | 29.512M           | 1.8924        |
| <b>IZI (ohm)</b> | 5.17146            | 5.2930            | 2.3502        |