

# Device Modeling Report

COMPONENTS: CAPACITOR/ CERAMIC  
PART NUMBER: DE1E3KX472MA5B  
MANUFACTURER: MURATA  
REMARK: TA=25C



**Bee Technologies Inc.**

## Theory: Auto Balancing Bridge Method

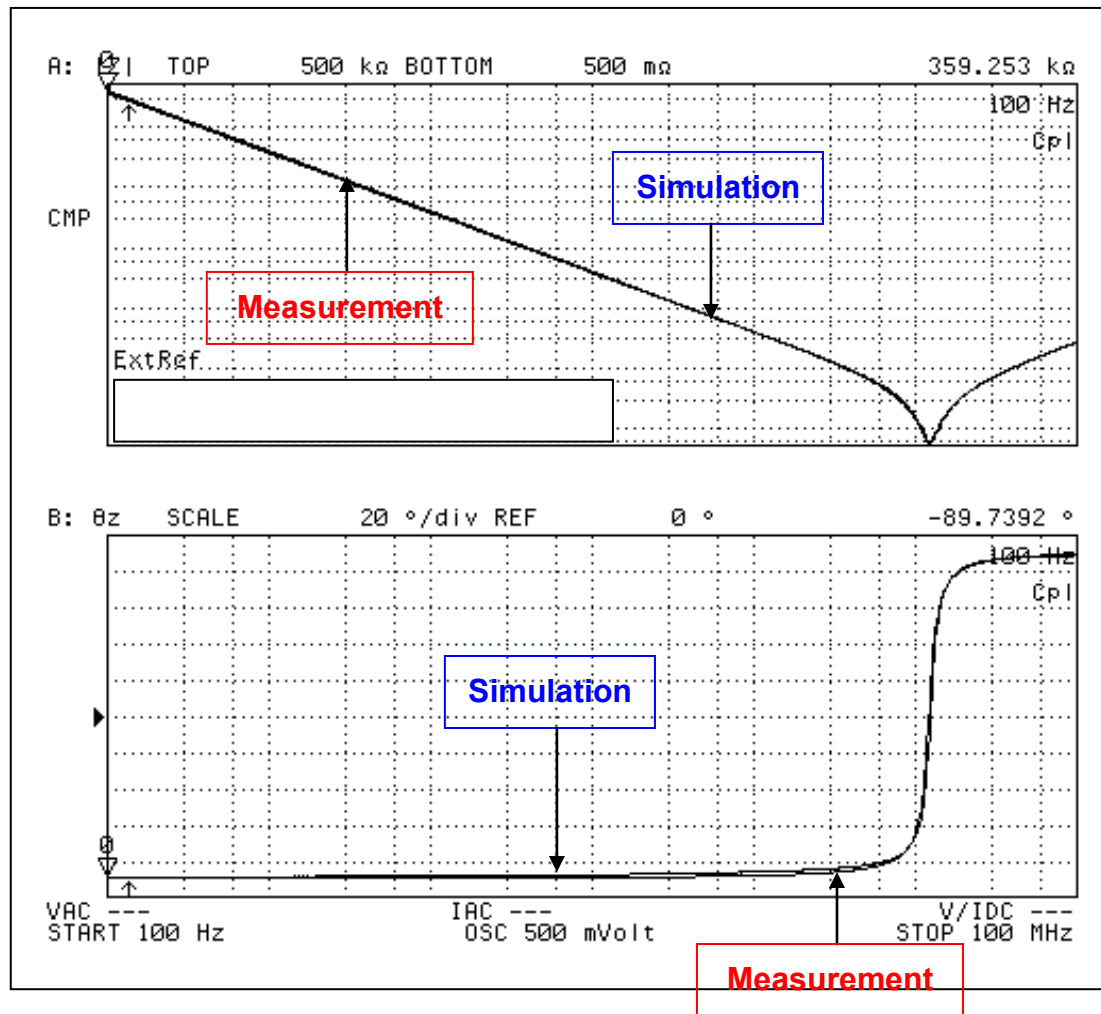
### Optimization of Simulation

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

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

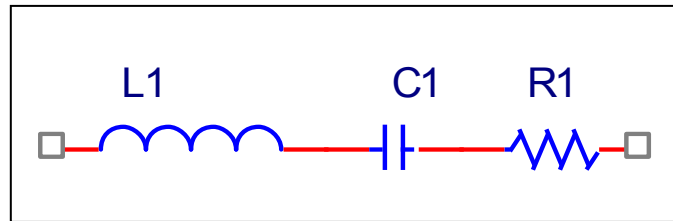
Attention)

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



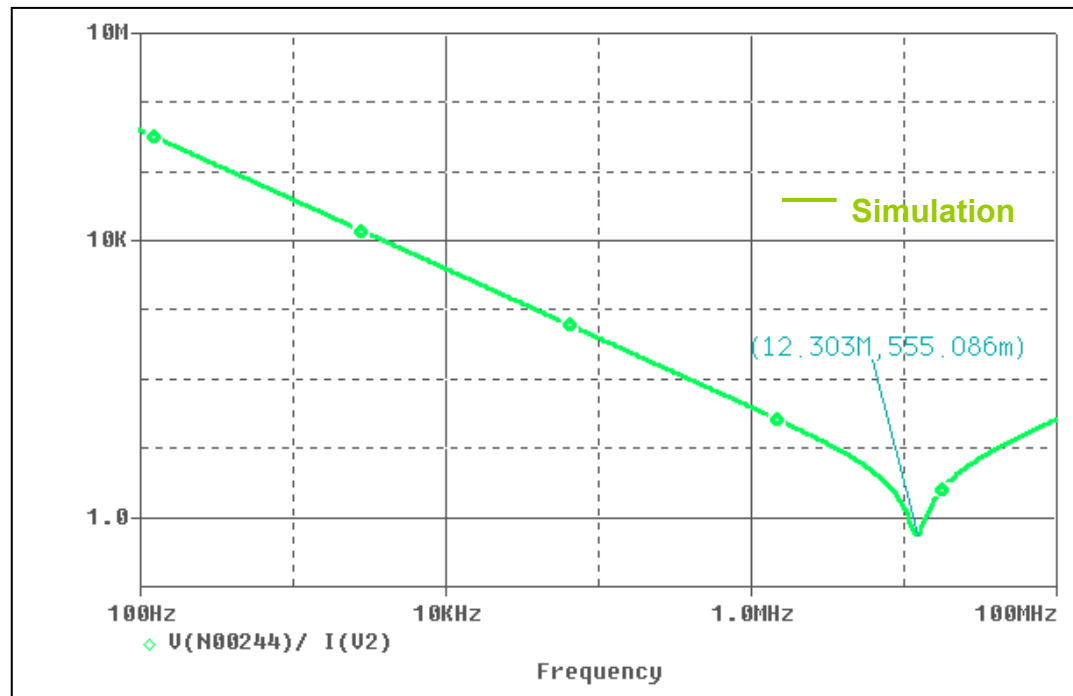
L1	
C1	
R1	

Equivalent circuit

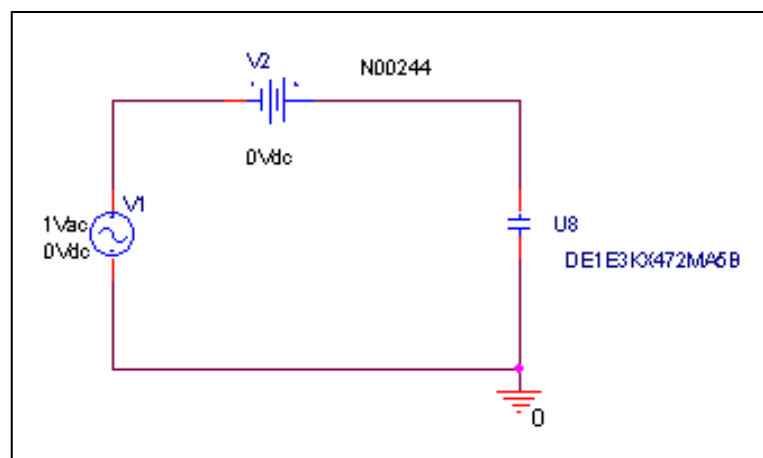


## Frequency vs. |Z| Characteristic

### Circuit Simulation result



### Evaluation Circuit



**Simulation result**

<b>Frequency (Hz)</b>	<b>IZI (ohm) :Measurement</b>	<b>IZI (ohm) :Simulation</b>	<b>% Error</b>
100	359.331K	391.185K	8.8648
1K	36.1789K	39.119K	8.1266
10K	3.65784K	3.9119K	6.9456
100K	372.913	391.16	4.8931
1M	38.7029	38.863	0.4137
10M	1.62528	1.4241	12.3782
100M	25.8451	25.617	0.8826

	<b>Measurement</b>	<b>Simulation</b>	<b>%Error</b>
<b>FSRF(Hz)</b>	12.5892M	12.303M	2.2734
<b>IZI (ohm)</b>	555.339m	555.086m	0.0456