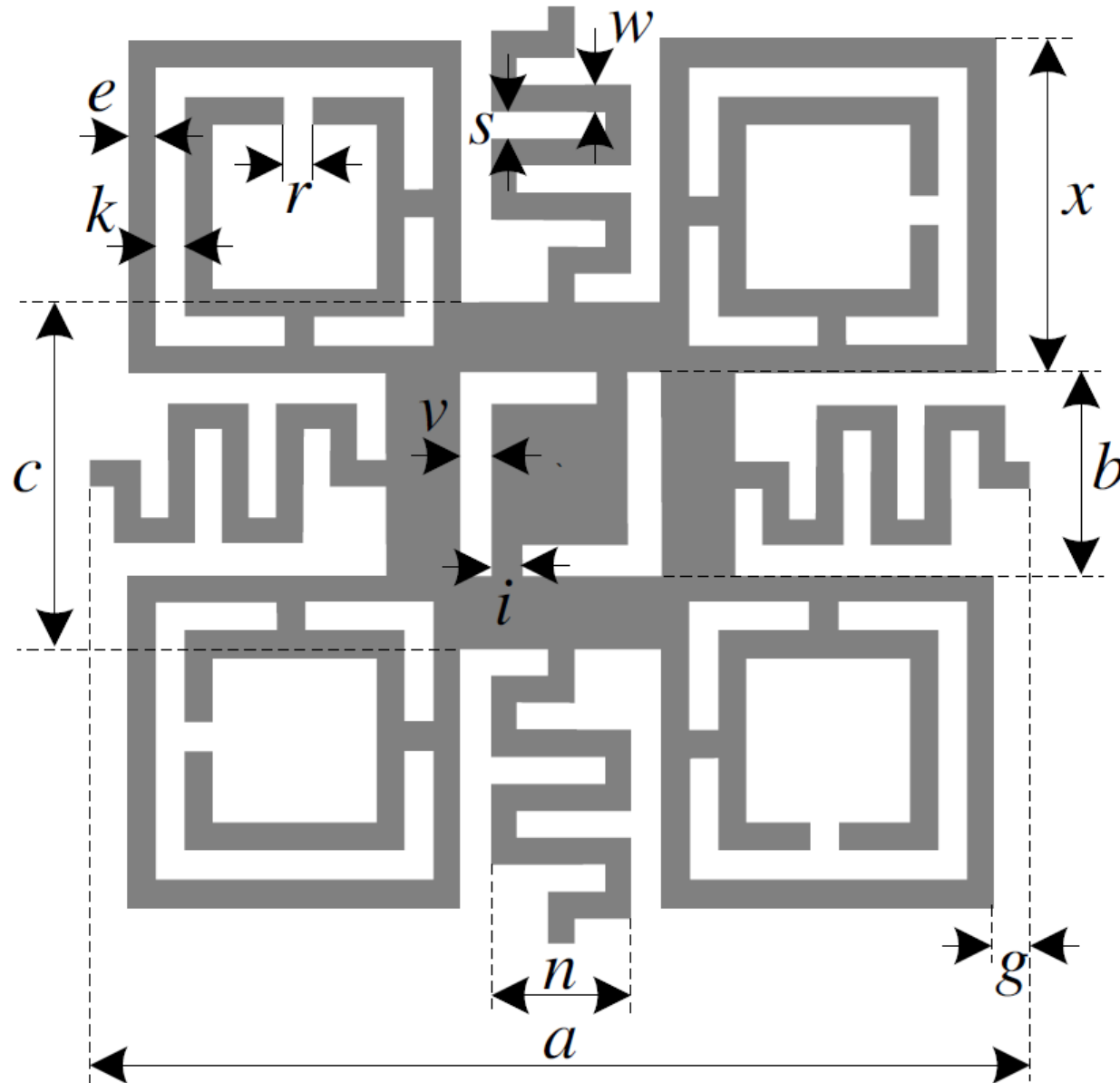




EBG AND AMC PROPERTIES OF FSS STRUCTURES

Jiawei Zhang | Elena Chong | Nathan Brooks

EBG – ELECTROMAGNETIC BANDGAP STRUCTURE



$$a = 12 \text{ mm}$$

$$b = 2.6 \text{ mm}$$

$$c = 4.3 \text{ mm}$$

$$e = 0.3 \text{ mm}$$

$$g = 0.5 \text{ mm}$$

$$l = 0.35 \text{ mm}$$

$$k = 0.35 \text{ mm}$$

$$l = 1.5 \text{ mm}$$

$$r = 0.35 \text{ mm}$$

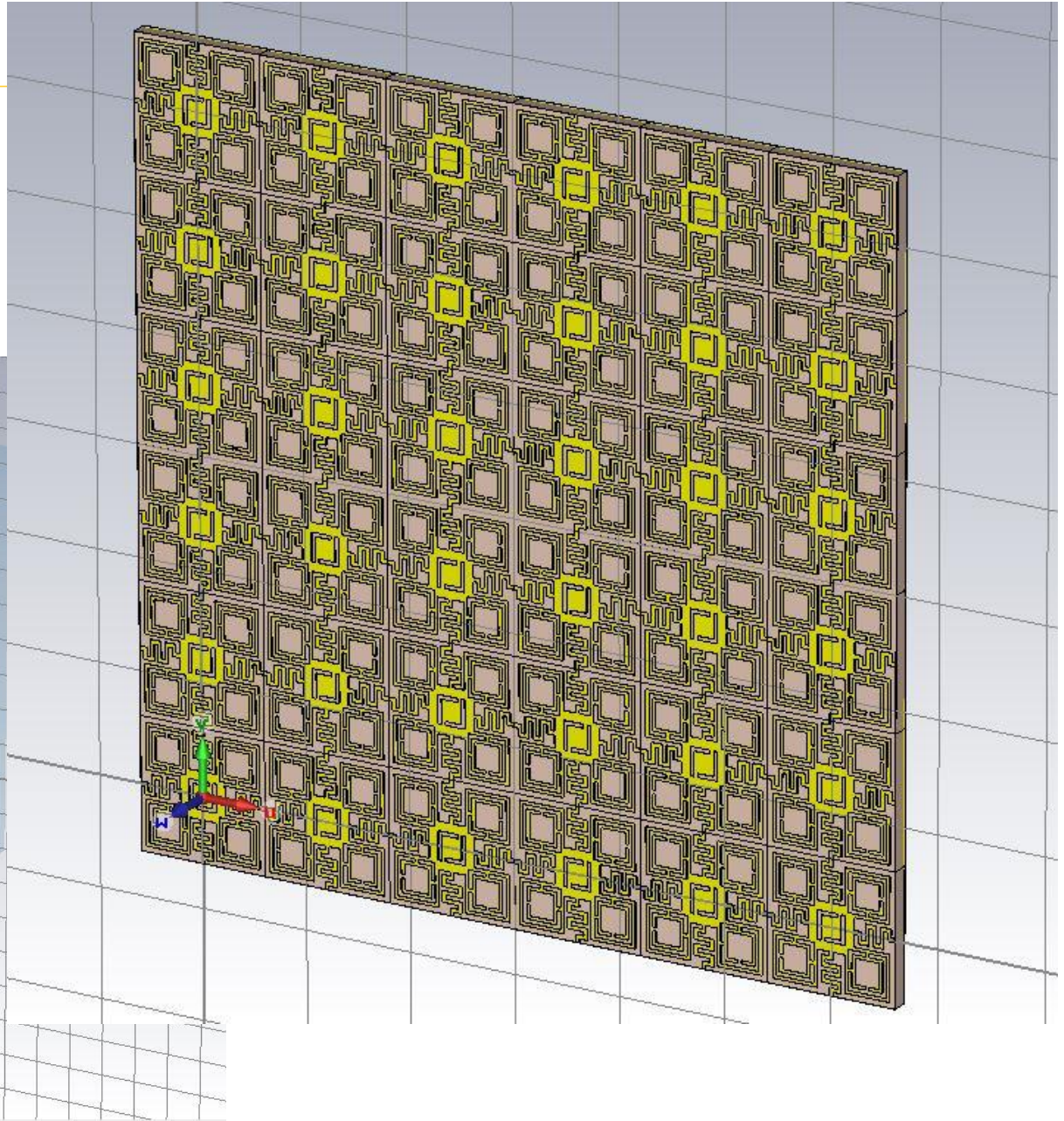
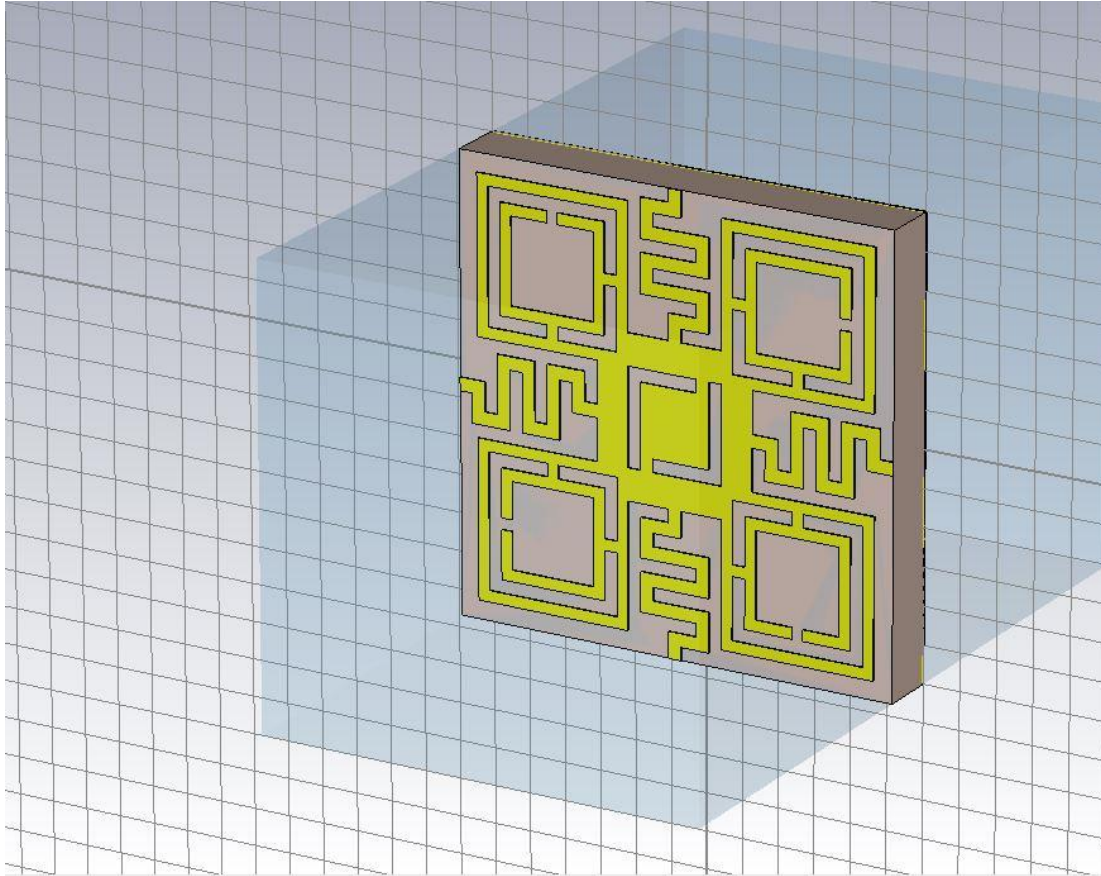
$$s = 0.35 \text{ mm}$$

$$v = 0.35 \text{ mm}$$

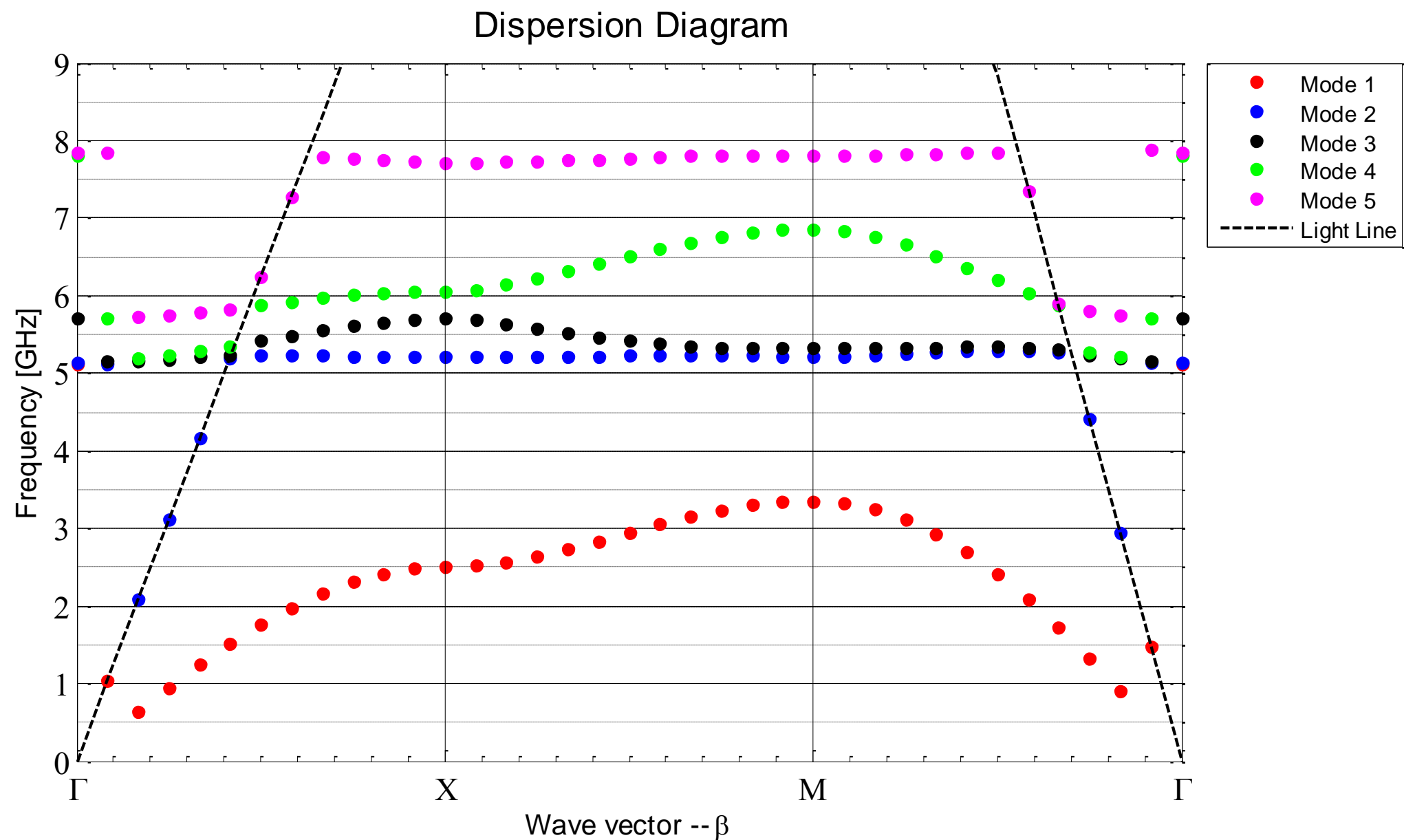
$$w = 0.35 \text{ mm}$$

$$x = 4.2 \text{ mm}$$

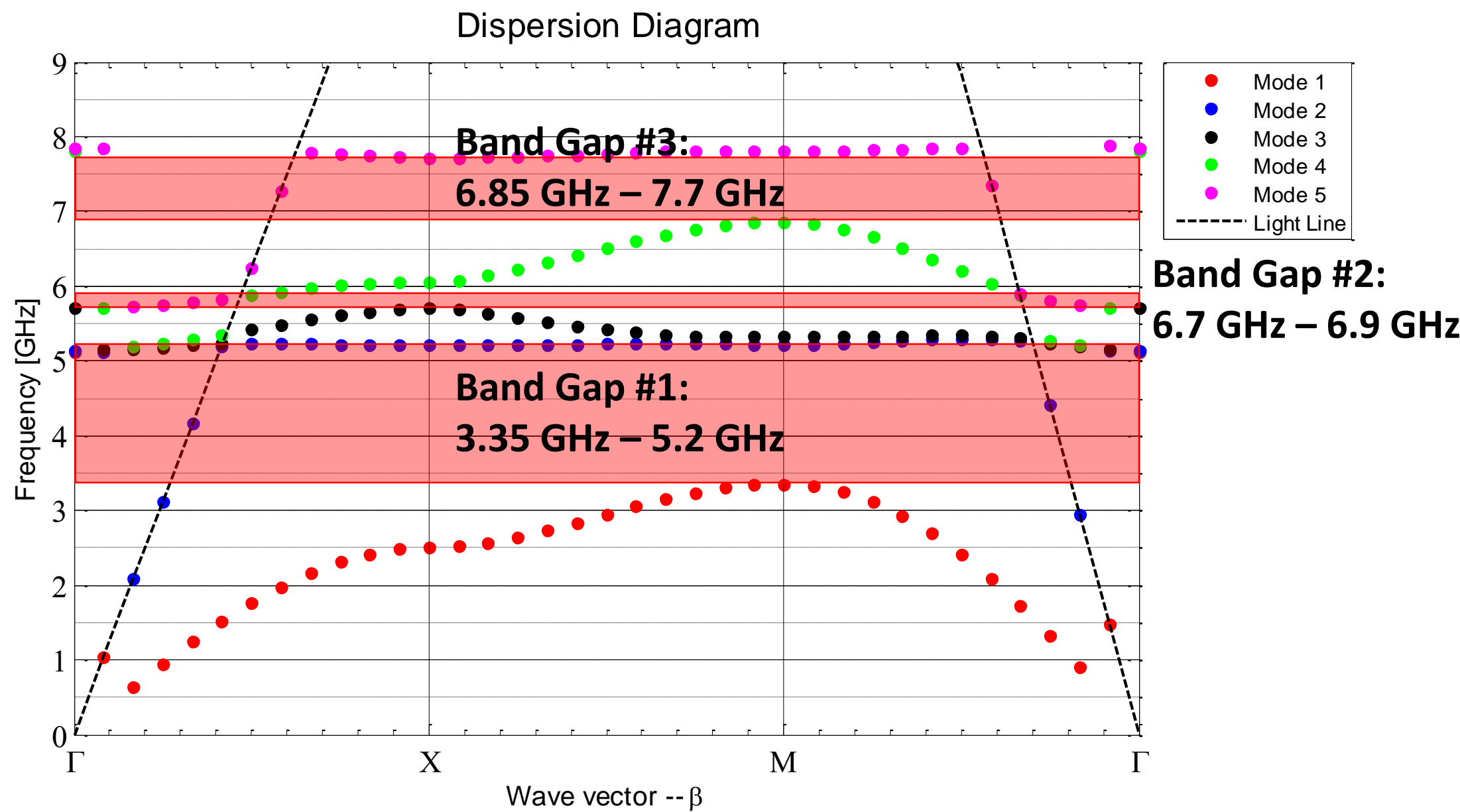
SIMULATED STRUCTURE



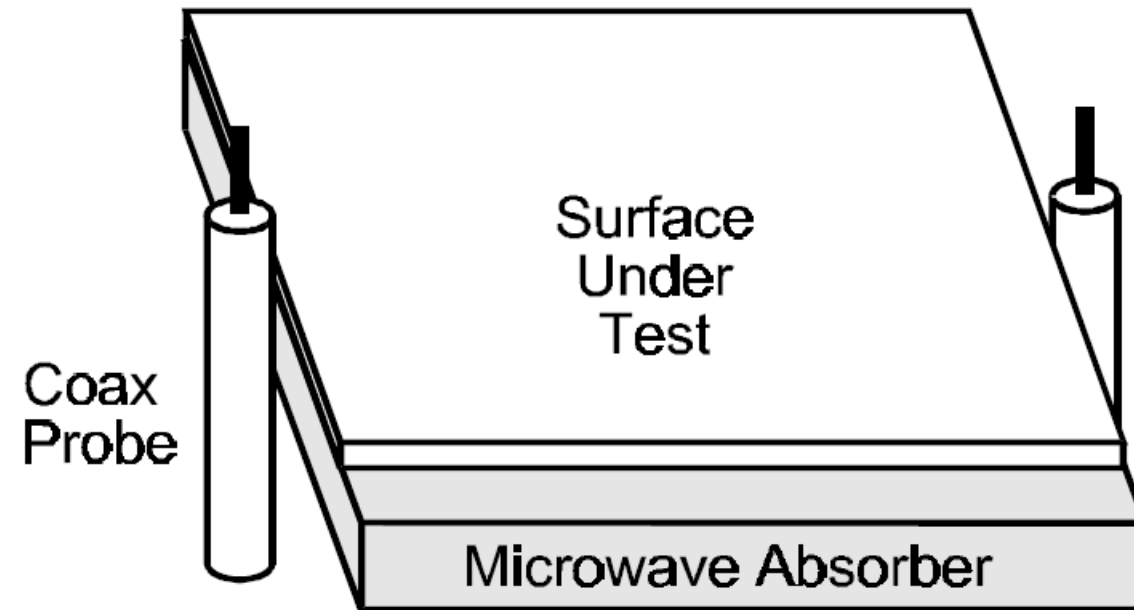
SIMULATED DISPERSION DIAGRAM



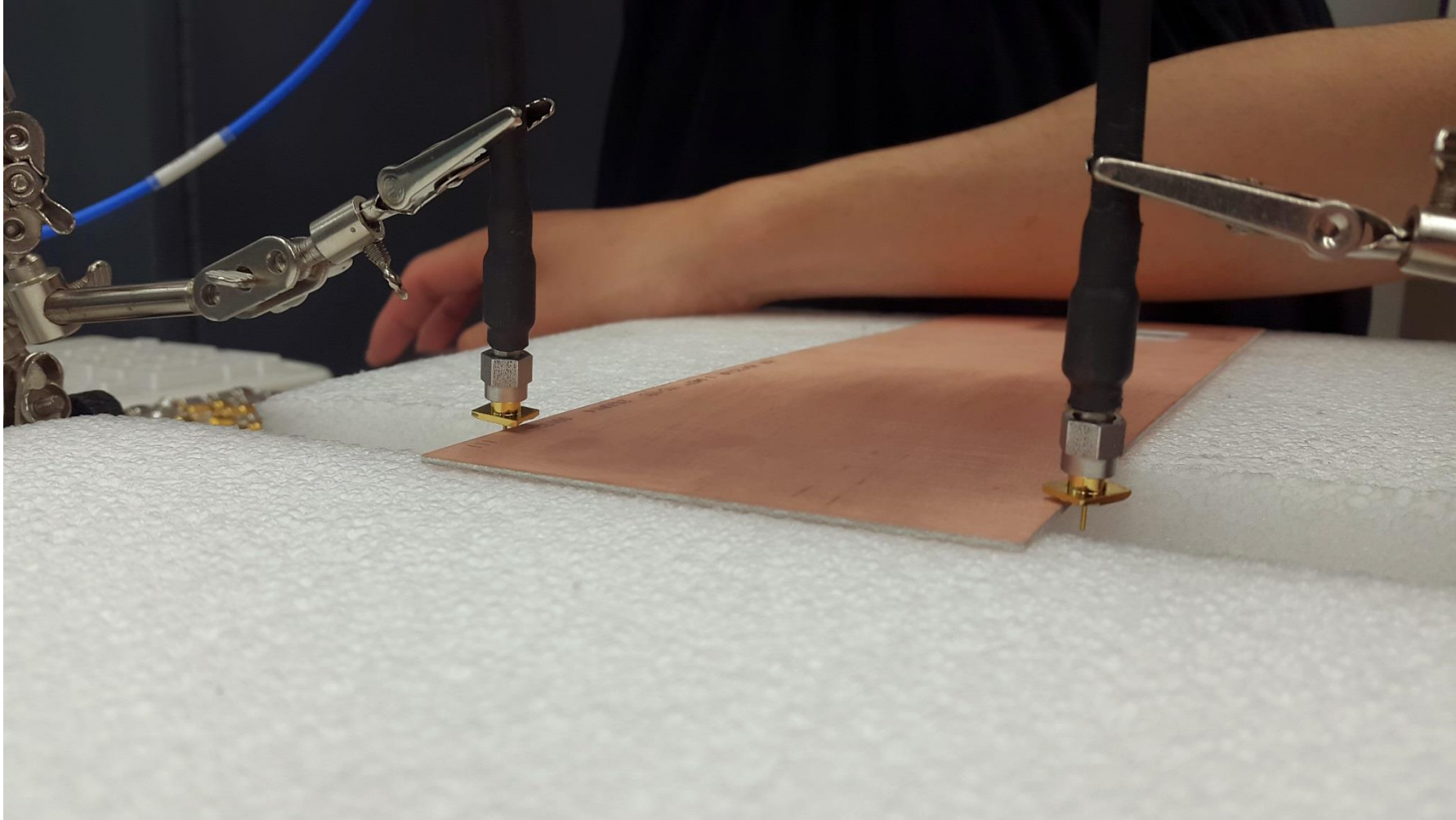
SIMULATED DISPERSION DIAGRAM



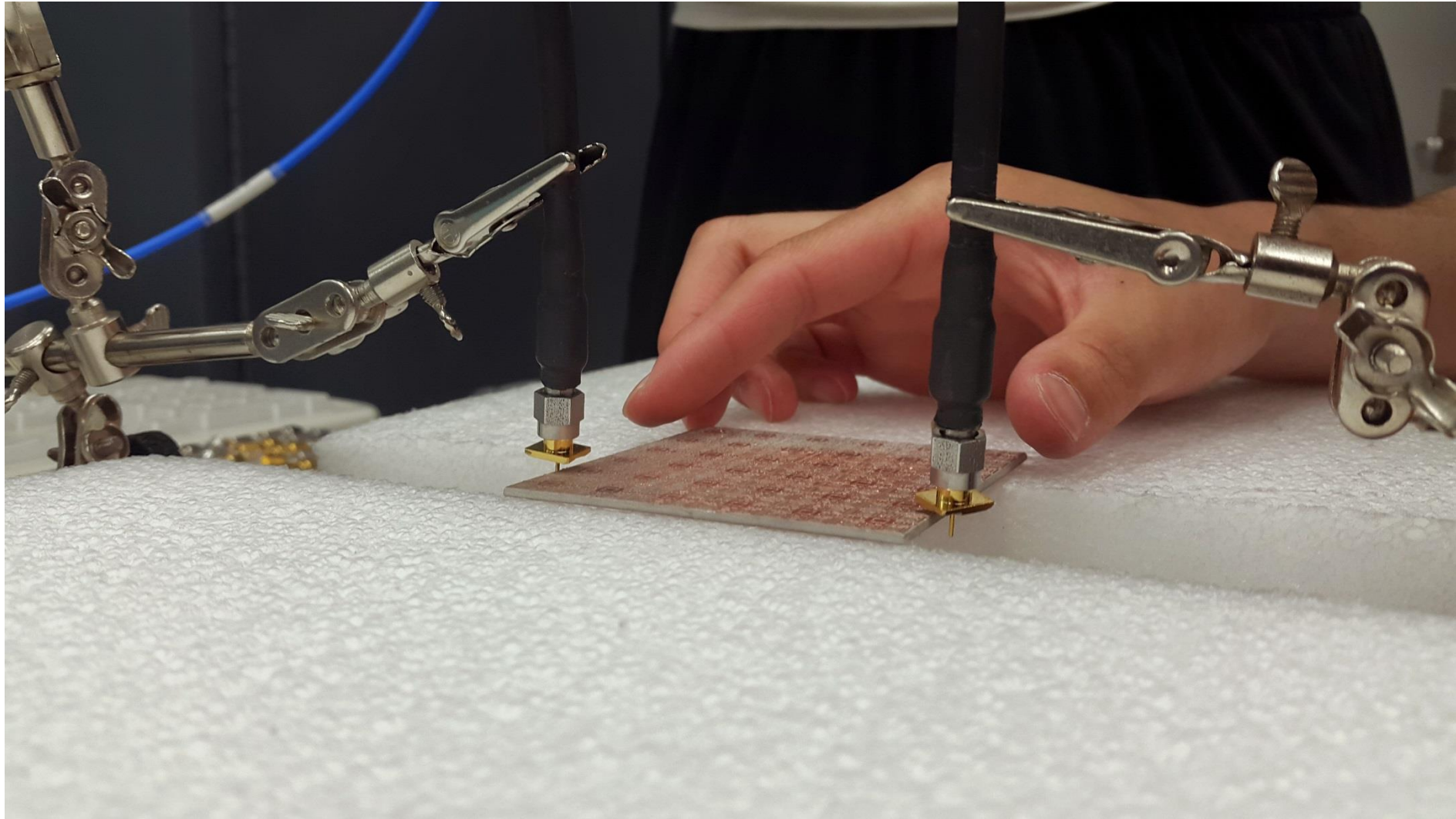
TM SURFACE WAVES – SET-UP



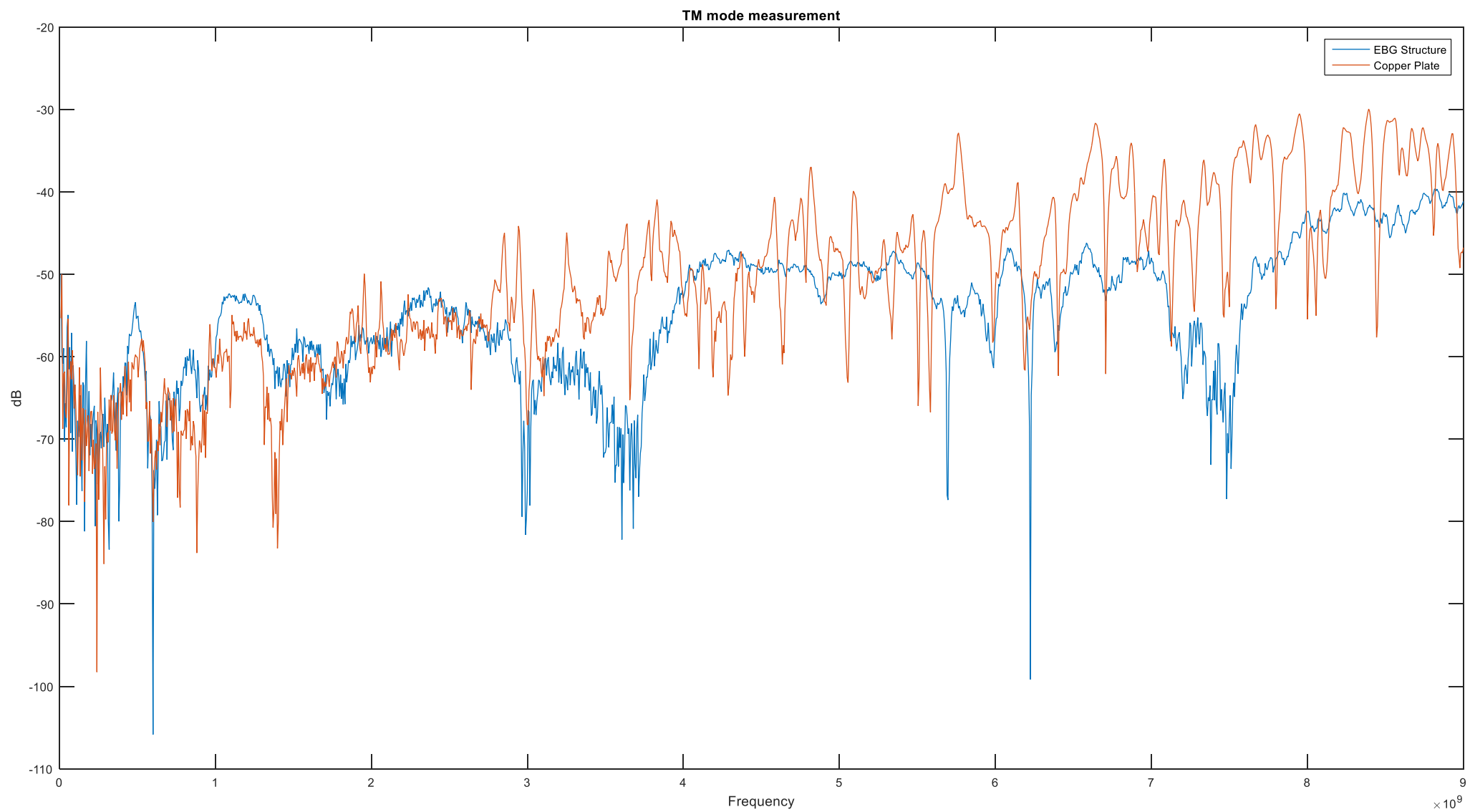
TM SURFACE WAVES – SET-UP



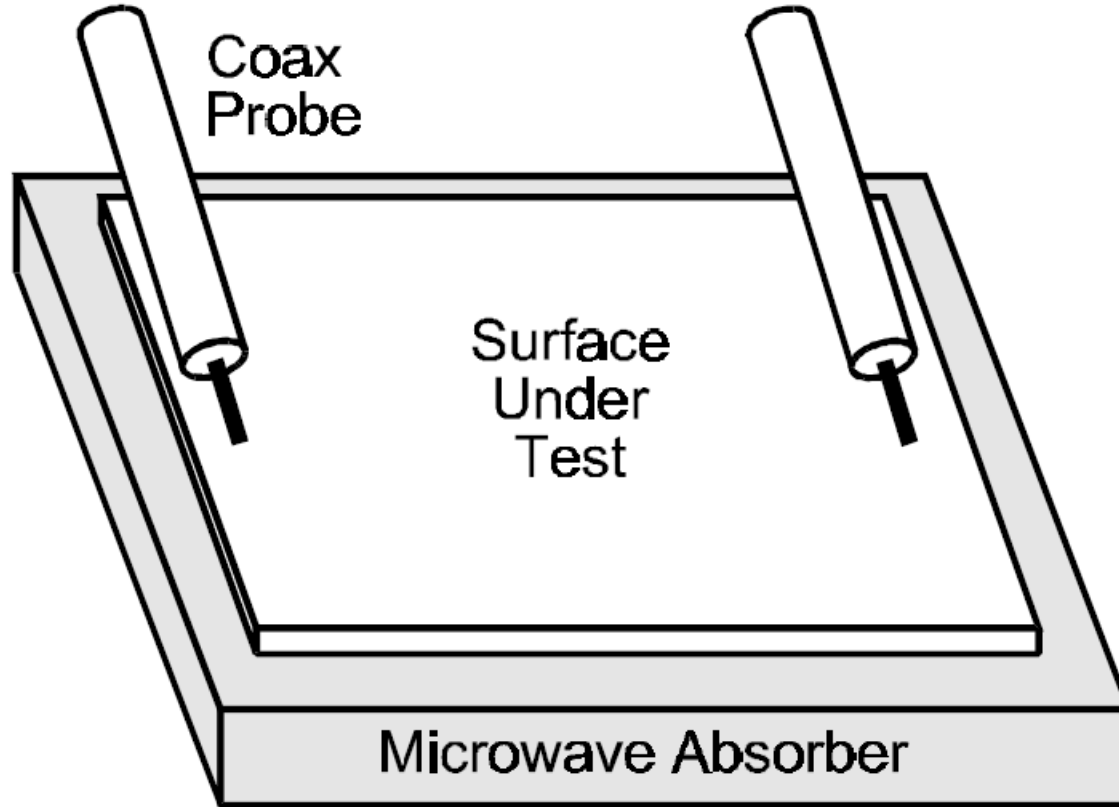
TM SURFACE WAVES – SET-UP



MEASURED RESULTS – TM MODE



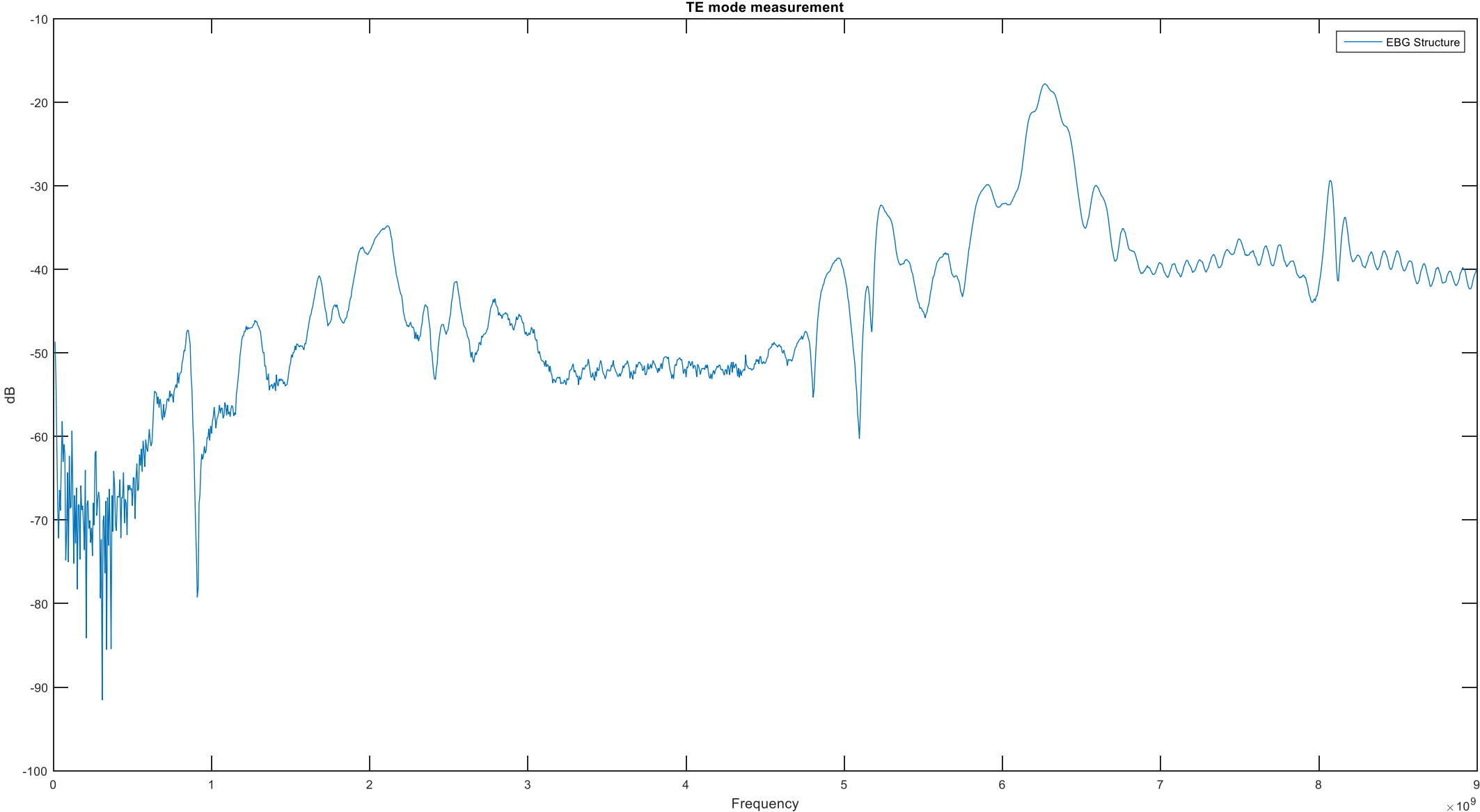
TE SURFACE WAVES – SET-UP



TE SURFACE WAVES – SET-UP



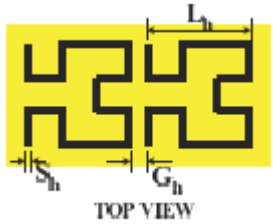
MEASURED RESULTS – TE MODE



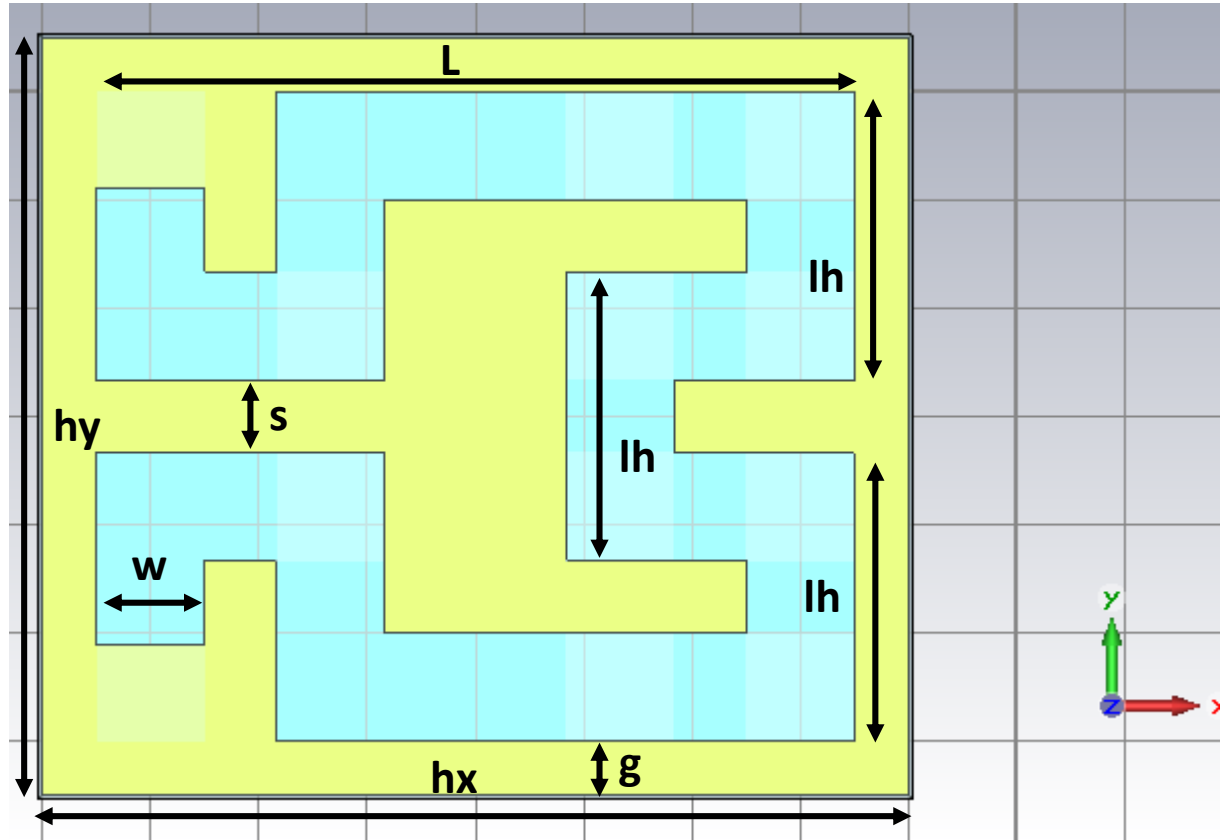
- A TE surface-wave measurement produces no significant signal because any antenna that excites TE waves is shorted out on a conducting surface. It is only on the textured surface, with its unusual surface impedance, that significant TE transmission signal levels can be obtained.

-D. Sievenpiper, 'High-Impedance Electromagnetic Surfaces with a Forbidden Frequency Band'

'COMPARATIVE STUDY ON VARIOUS ARTIFICIAL MAGNETIC CONDUCTORS FOR LOW-PROFILE ANTENNA', J. R. Sohn



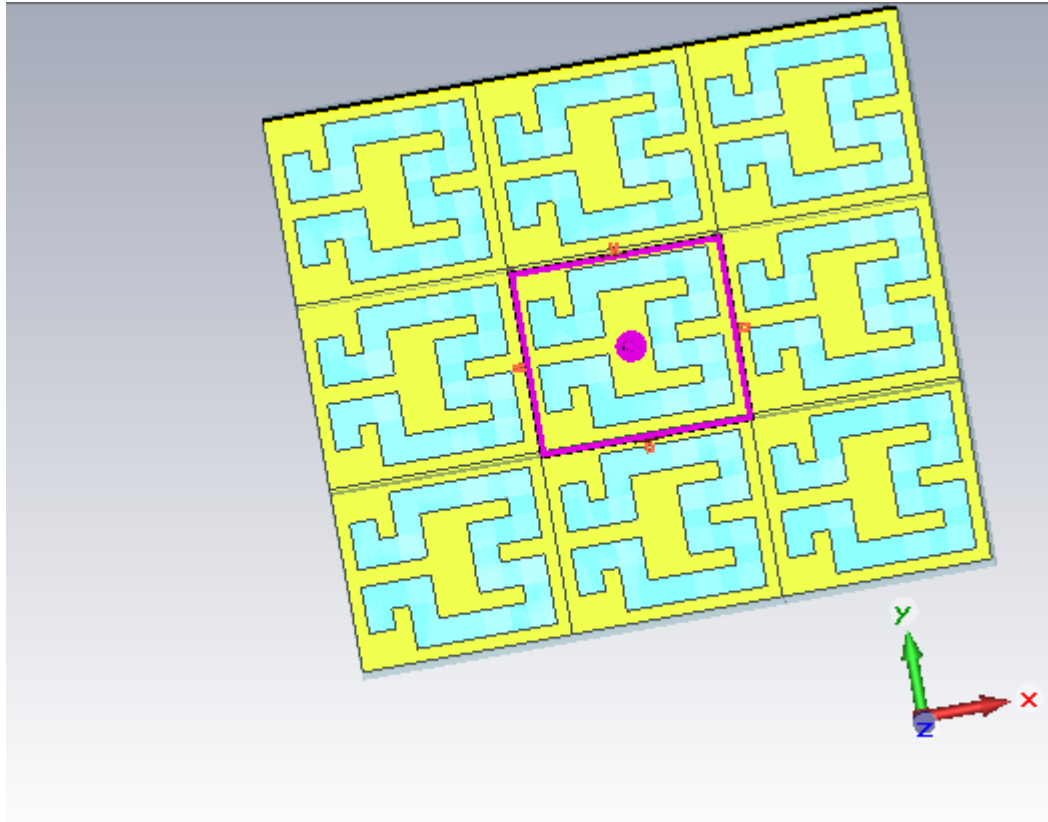
AMC – Artificial Magnetic Conductor



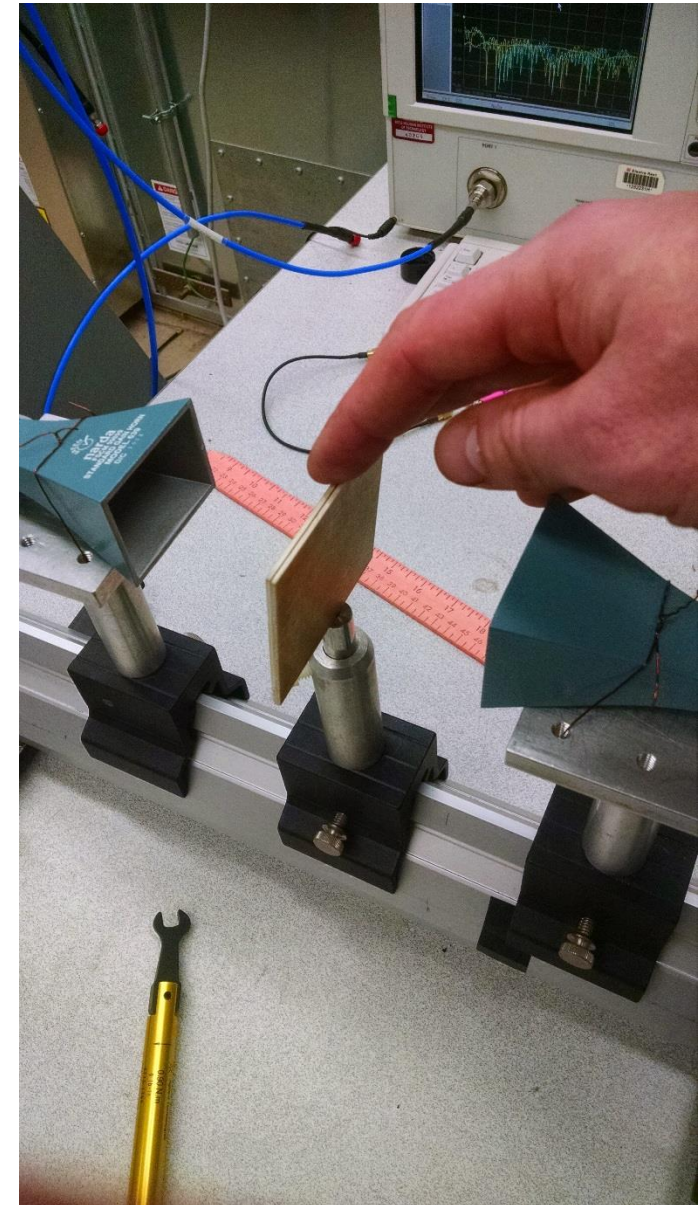
$$\begin{aligned}w &= 1\text{mm} \\L &= 8\text{mm} \\l_h &= 2.66\text{mm} \\h_x &= 9\text{mm} \\h_y &= 7.22\text{mm} \\g &= 0.5\text{mm} \\s &= 0.88\text{mm}\end{aligned}$$

Copper thickness = 0.035mm
Dielectric thickness = 1.54mm
Relative Permittivity = 2.55

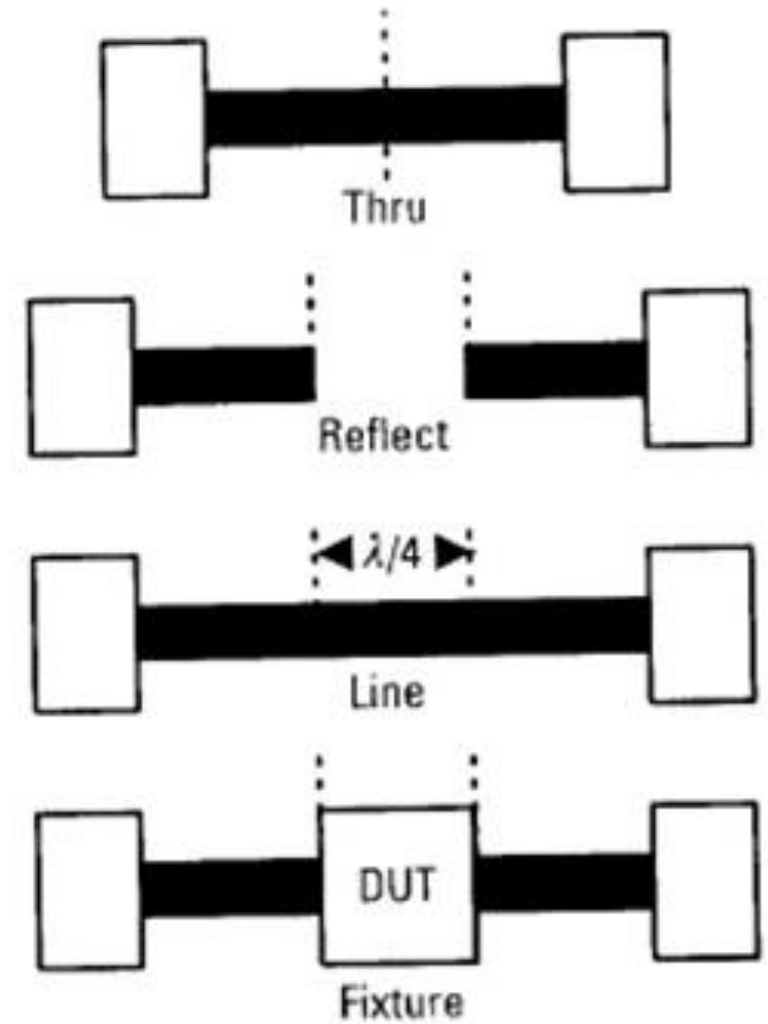
Model:

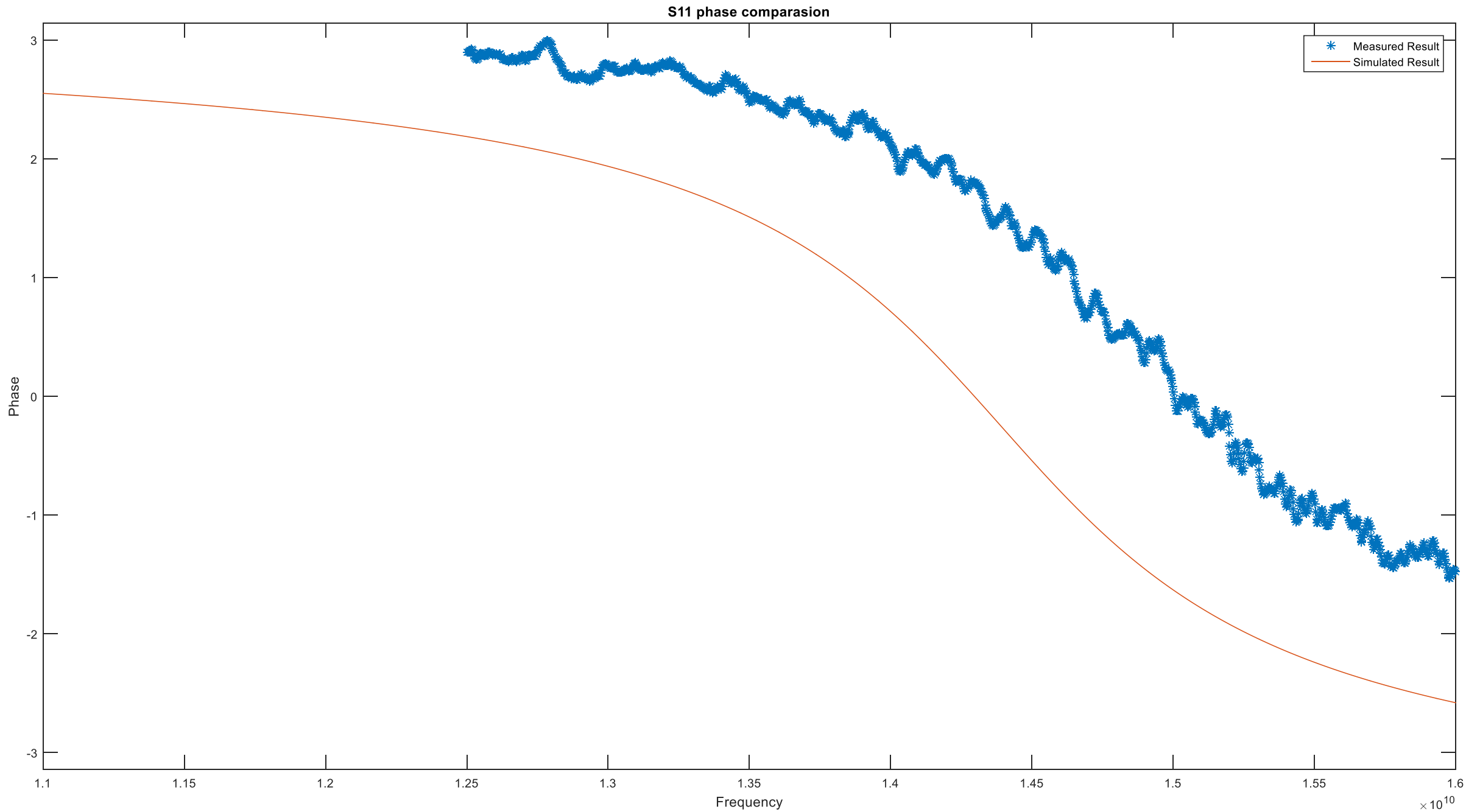


Test Setup:



Open-air TRL Calibration





CITATION & FURTHER READING

- H. Phuong, D. Chien and T. Tuan, 'A Triple-bandgap Uni-planar EBG Structure for Antenna Applications', *PIERS Proceedings*, 2012.
- J. Coonrod, 'Different Copper Foils for Different Reasons', *The PCB Magazine*, pp. 60-64, 2012.
- J. R. Sohn et al. "COMPARATIVE STUDY ON VARIOUS ARTIFICIAL MAGNETIC CONDUCTORS FOR LOW-PROFILE ANTENNA", *Progress In Electromagnetics Research, PIER 61*, 27–37, 2006.



Questions
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