

# Antenna review

2.4GHz inverted F antenna on a 0.8mm FR4 PCB

Alternative layout

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# General

Original source of the antenna:

[https://github.com/sad-electronics/wch-kicad-lbr/blob/main/footprints/wch-antenna.pretty/ANT-F-2-2.4G-0.8MM-FR4-WCH.kicad\\_mod](https://github.com/sad-electronics/wch-kicad-lbr/blob/main/footprints/wch-antenna.pretty/ANT-F-2-2.4G-0.8MM-FR4-WCH.kicad_mod)

Modified by Xdevelop: No

Simulation software: Dassault Systems CST Studio Suite® 2023

Number of tetrahedrons: 50,737

Matched: No

If you have any questions, contact

*Bernhard Wörndl-Aichriedler*

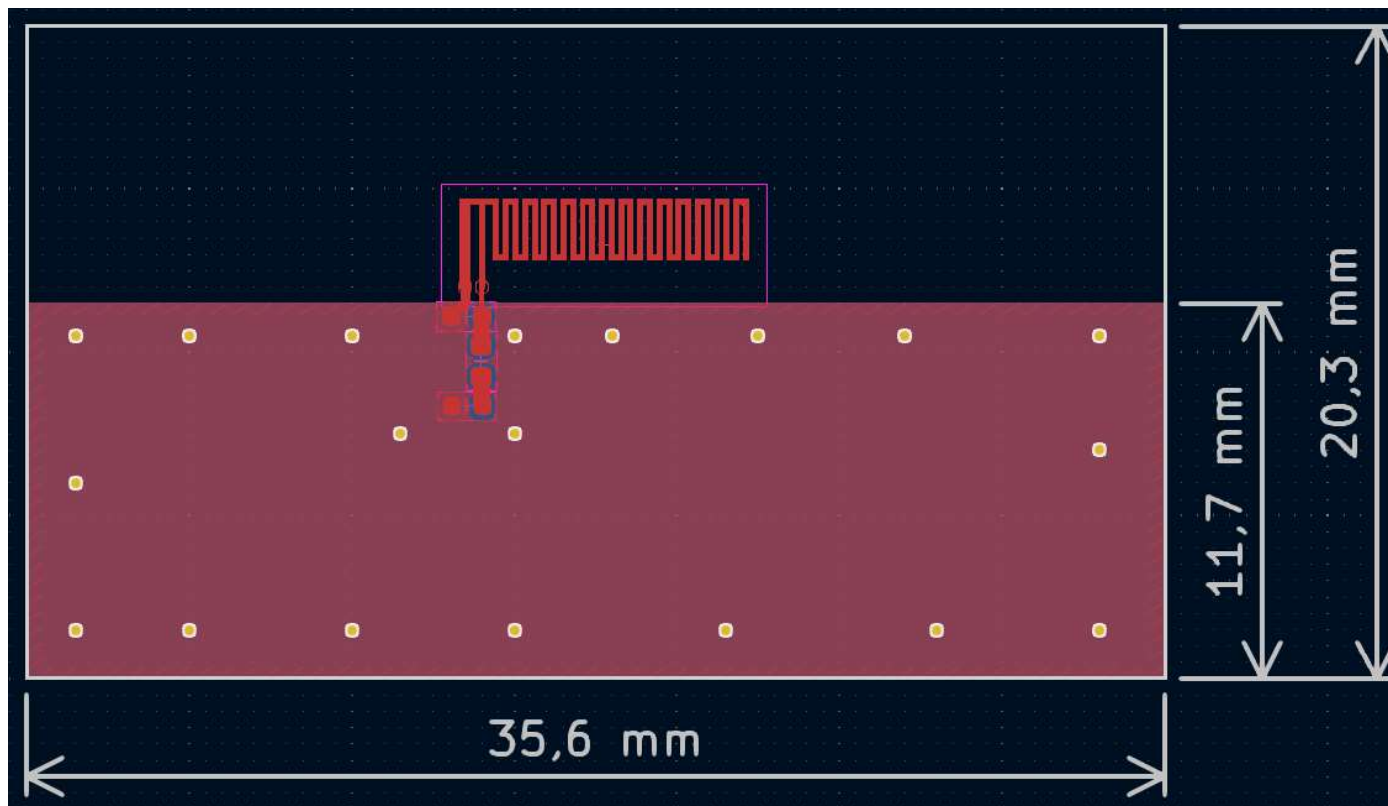
[bwa@xdevelop.at](mailto:bwa@xdevelop.at)

# PCB data

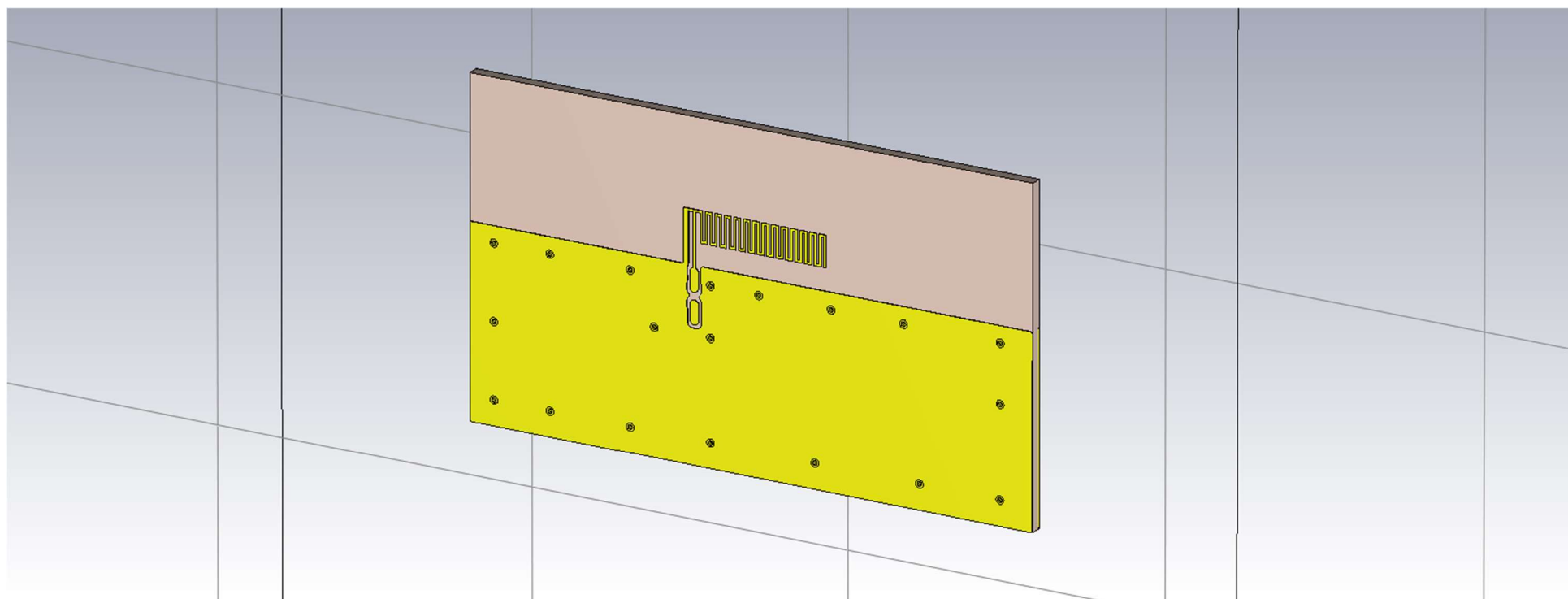
## Stackup:

Layer	Thickness	Material	Dielectric constant $\epsilon_r$
Top	35 $\mu$ m	Copper	Not relevant
Core	0.73mm	FR4 (epoxy resin + fiberglass)	4.3
Bottom	35 $\mu$ m	Copper	Not relevant

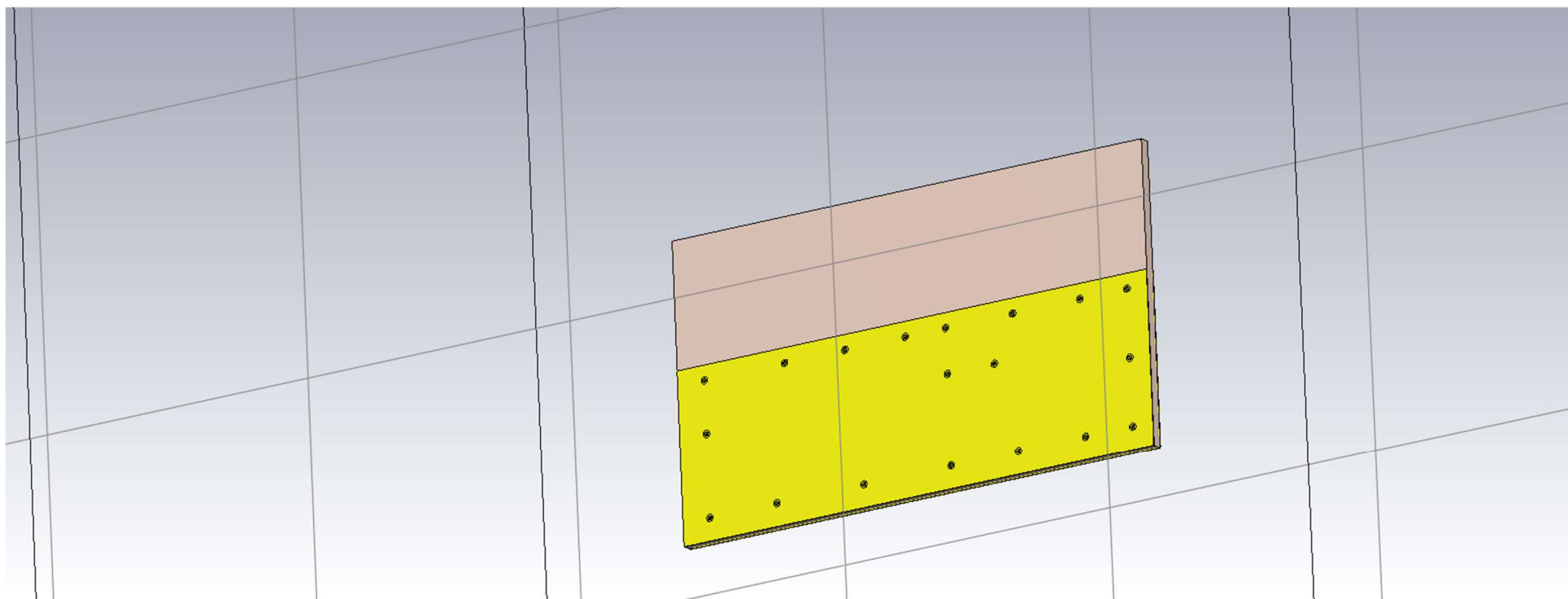
# PCB dimensions & layout



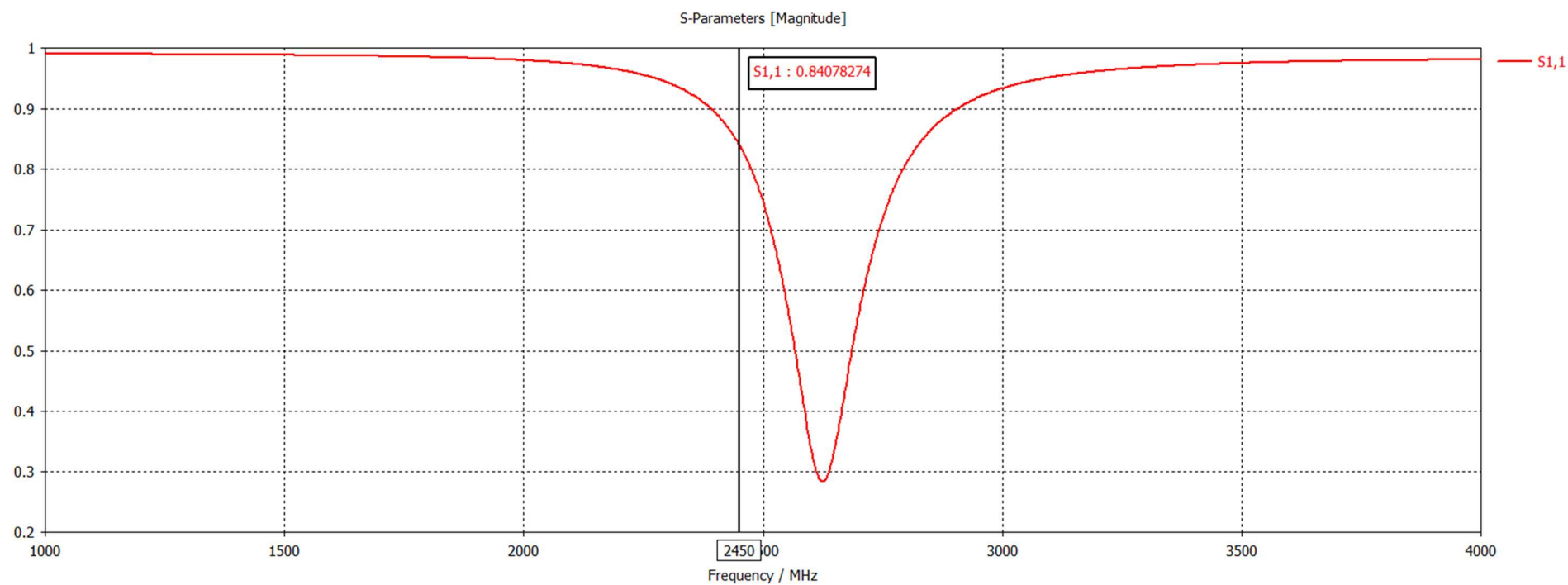
## 3D model of the PCB from the front



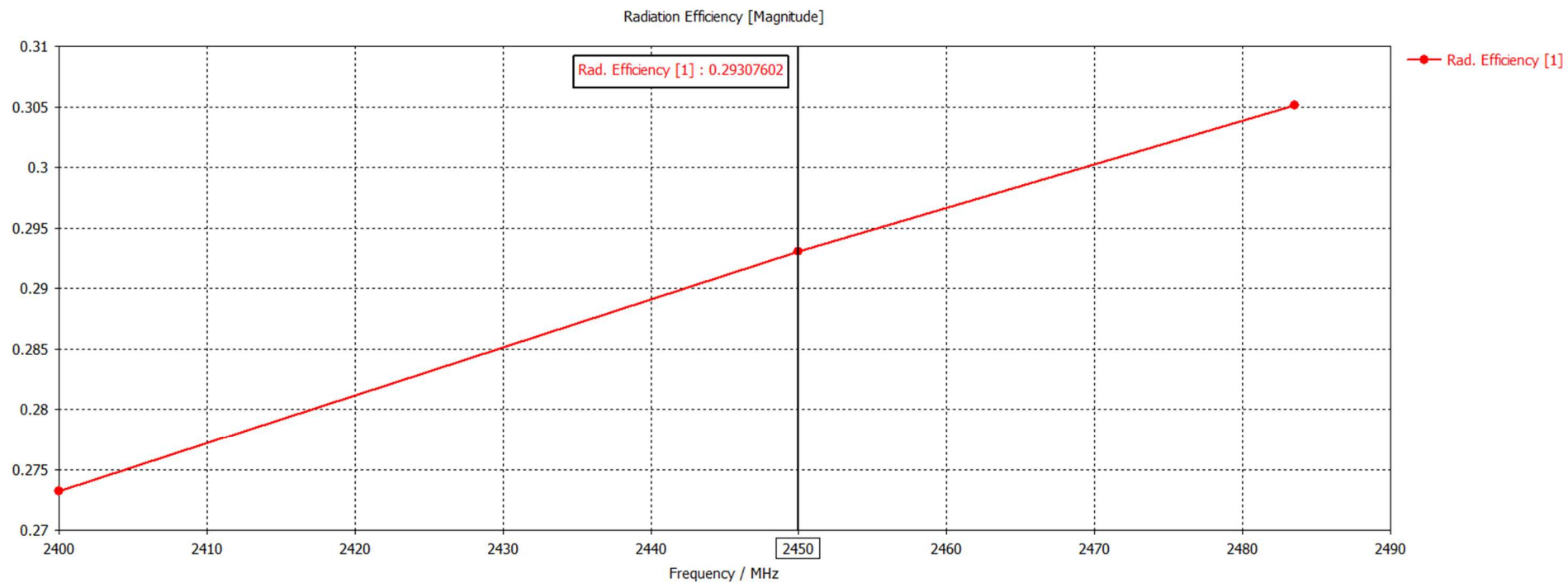
## 3D model of the PCB from the back



# S-parameter



# Radiation efficiency

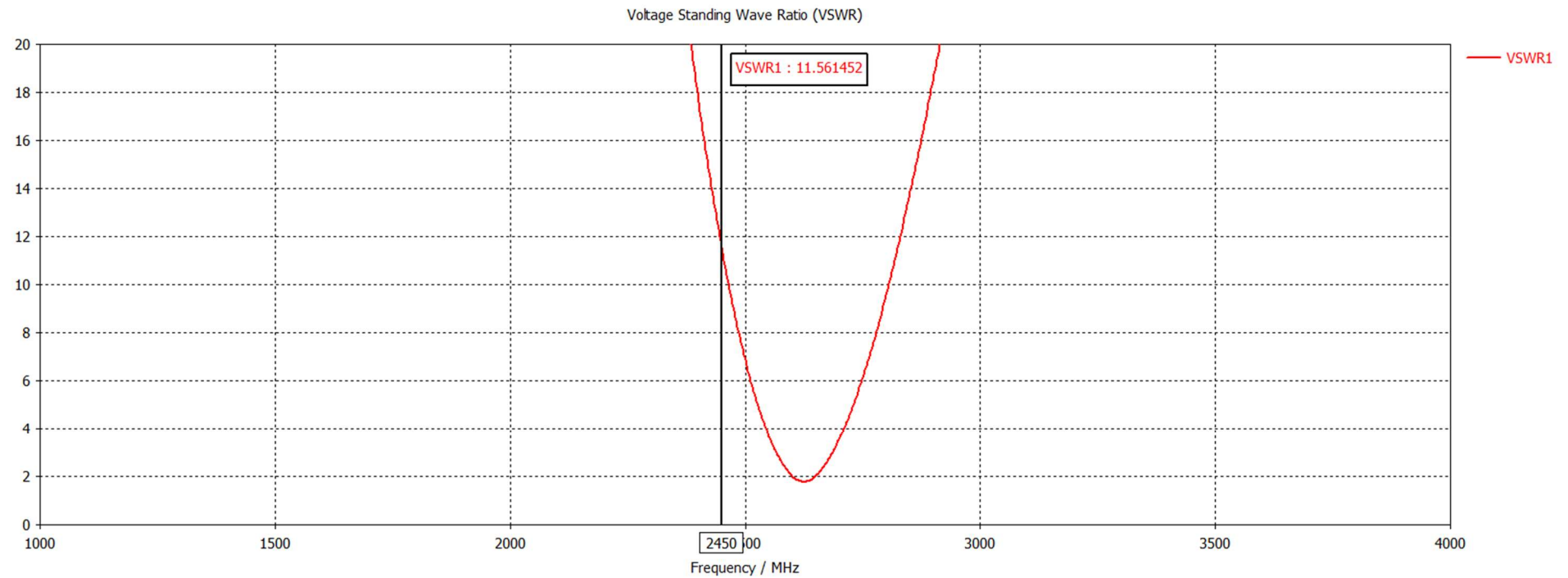




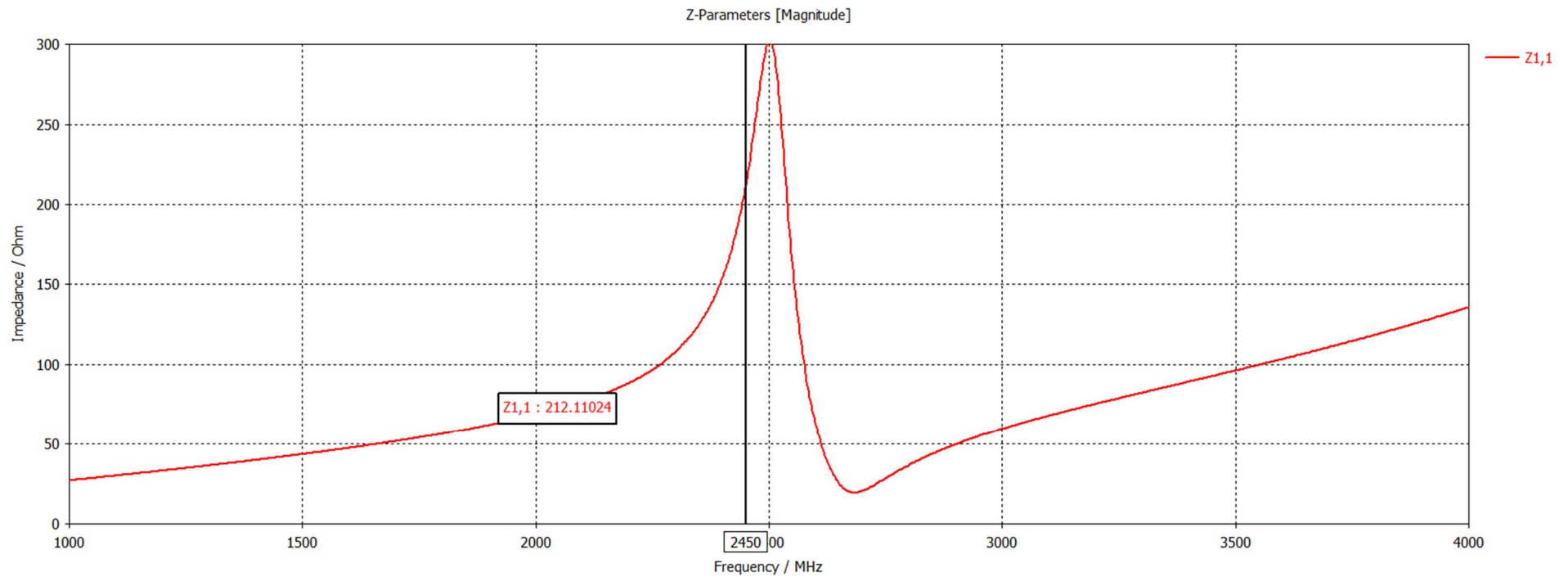
# Total efficiency



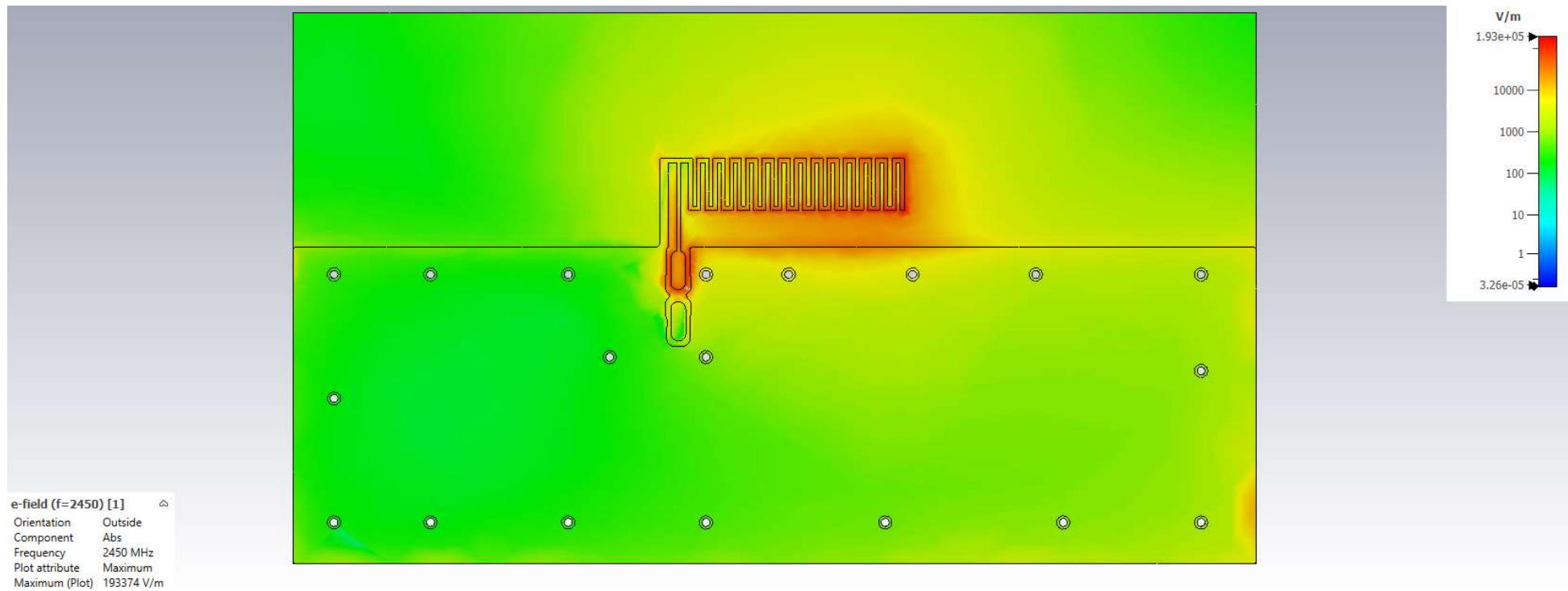
# VSWR



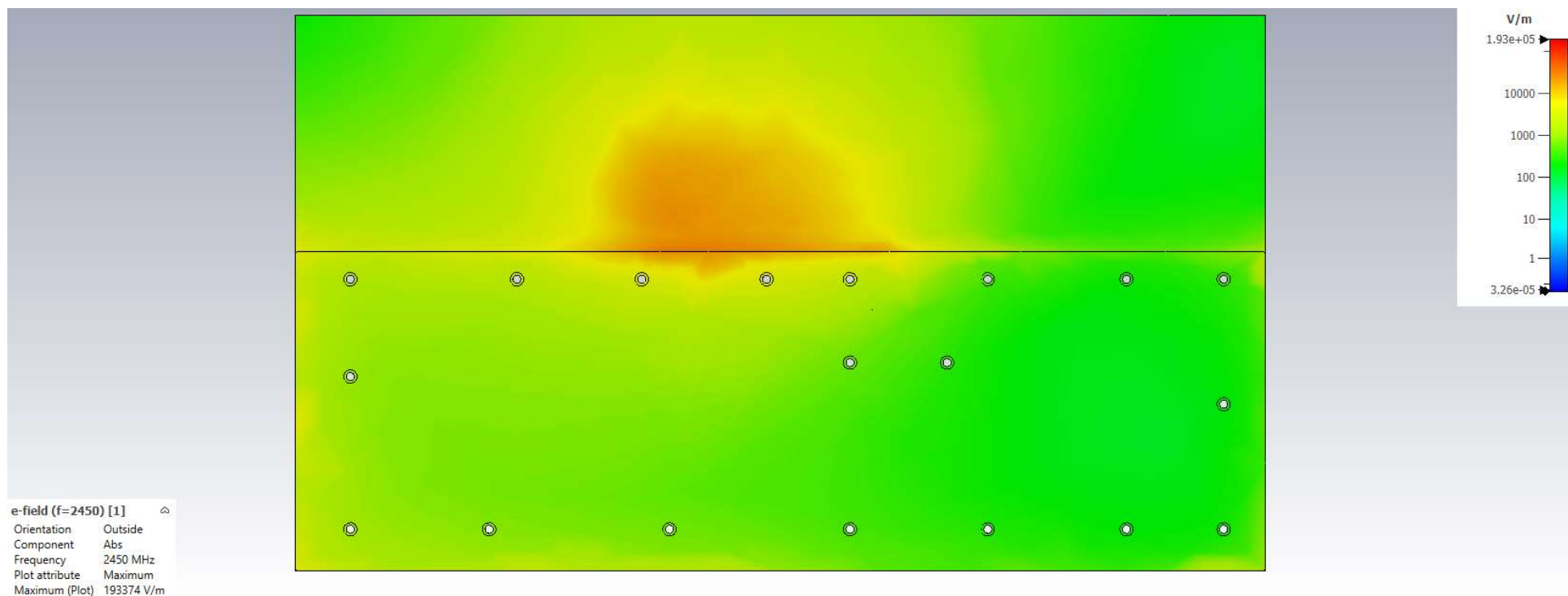
# Impedance Z



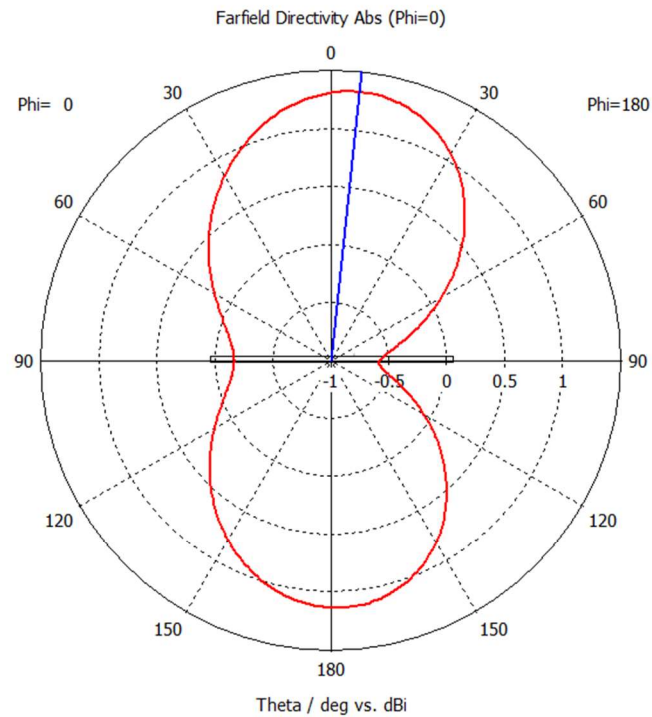
# Maximum E-field (front)



# Maximum E-field (back)



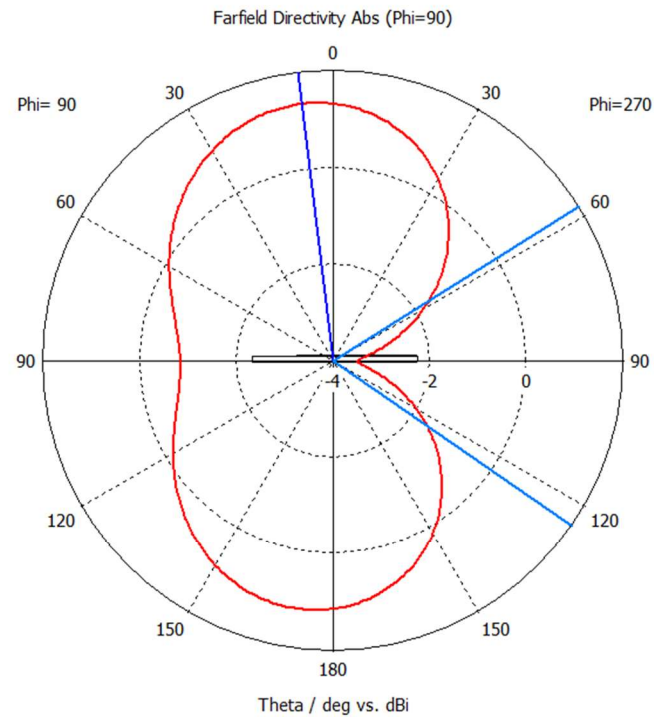
# Farfield viewed from the upper edge (-y) of the PCB



— farfield (f=2450)

Frequency = 2450 MHz  
Main lobe magnitude = 1.33 dBi  
Main lobe direction = 6.0 deg.

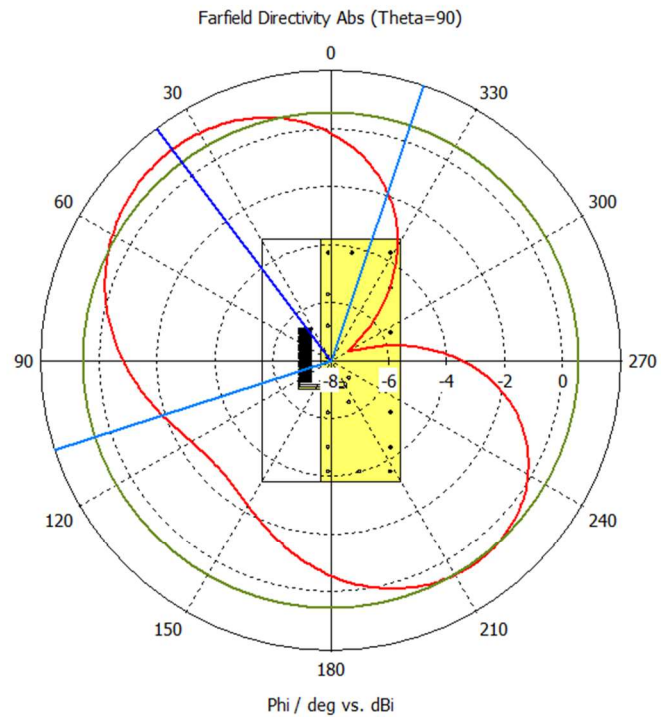
# Farfield viewed from the right edge (-x) of the PCB



— farfield (f=2450)

Frequency = 2450 MHz  
Main lobe magnitude = 1.34 dBi  
Main lobe direction = 7.0 deg.  
Angular width (3 dB) = 293.3 deg.

# Farfield viewed from the top (-z) of the PCB

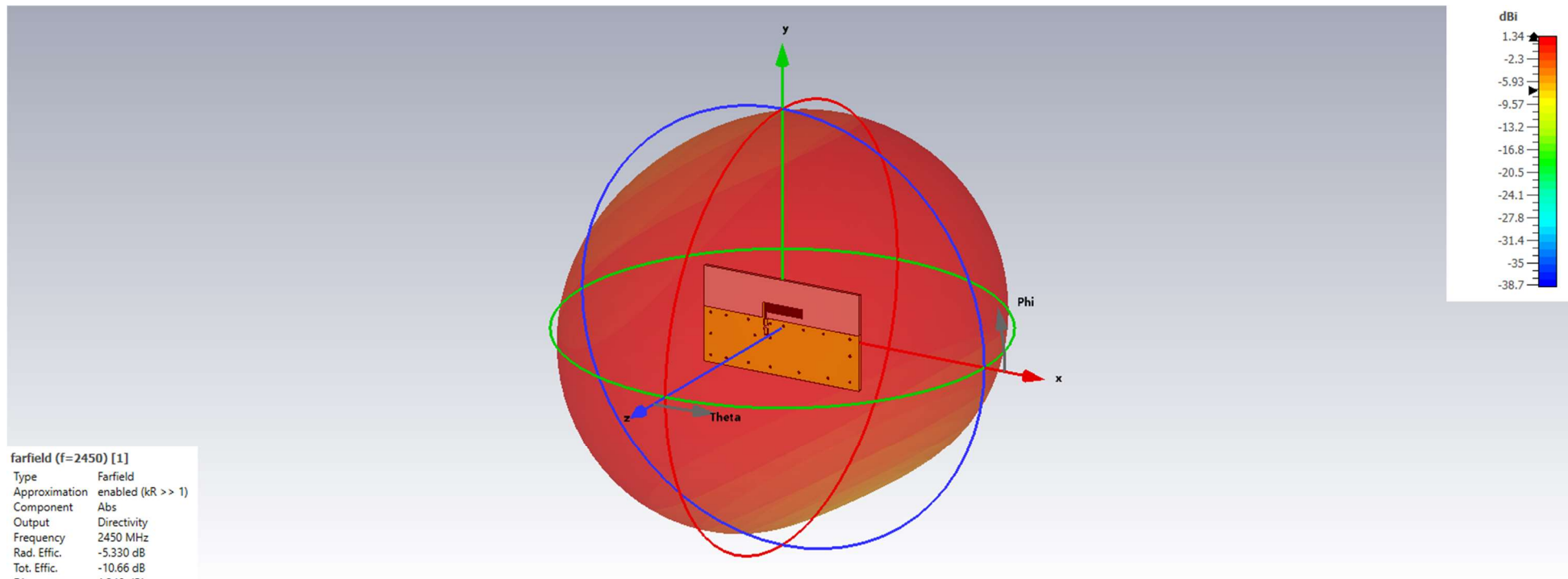


— farfield (f=2450)

Frequency = 2450 MHz  
Main lobe magnitude = 1.1 dBi  
Main lobe direction = 37.0 deg.  
Angular width (3 dB) = 126.4 deg.  
Side lobe level = -0.5 dB



# 3D-Farfield (perspective)



# 3D-Farfield (perspective)

