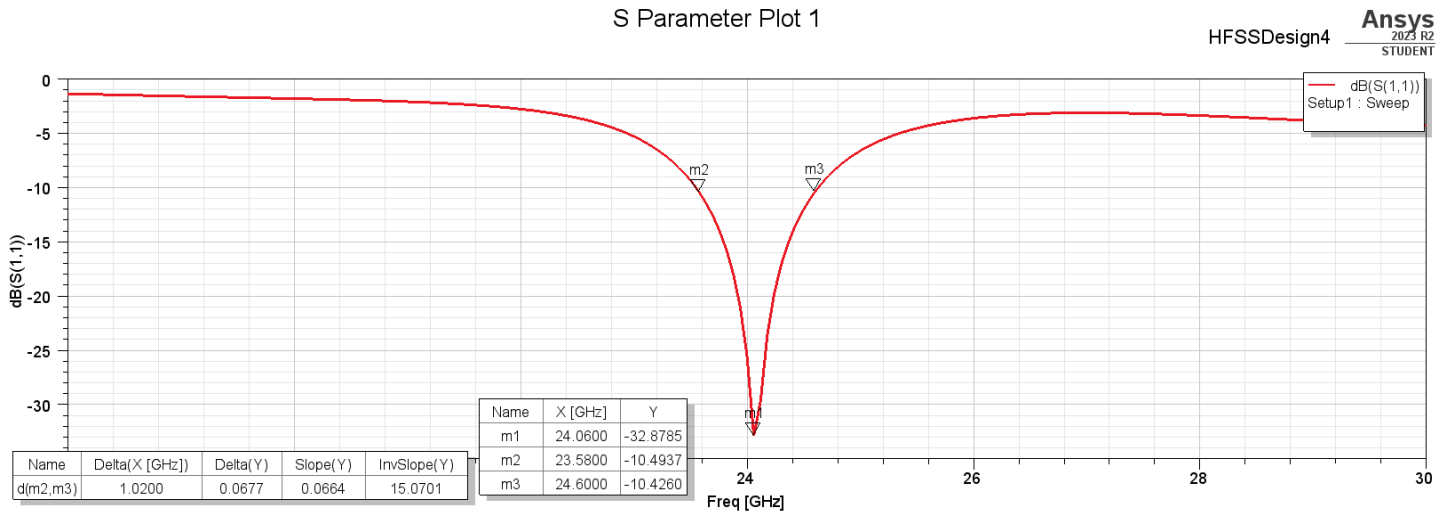


S-parameter (s11) Plot

a) Using HFSS



b) Using Vector Network Analyzer (VNA)

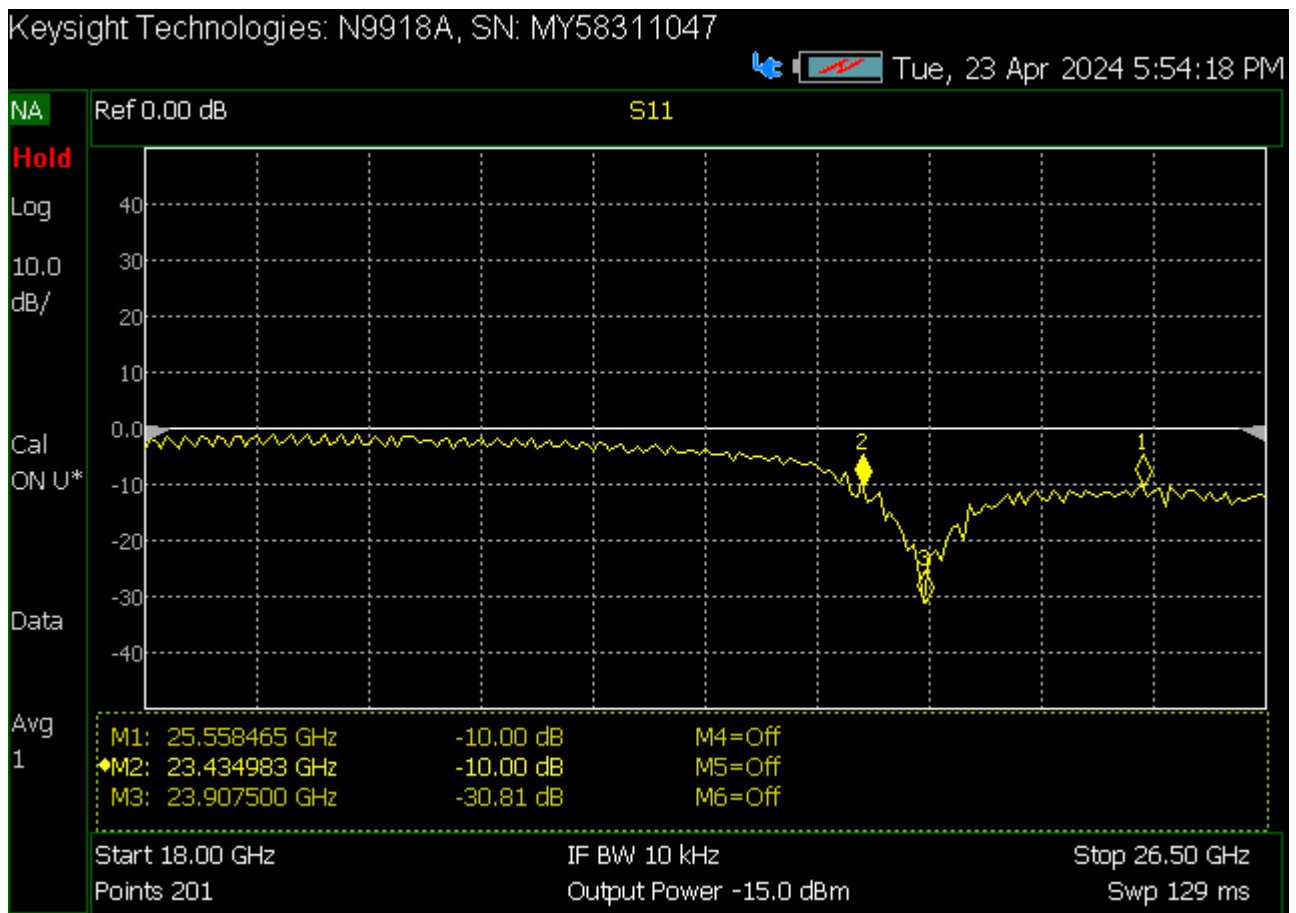
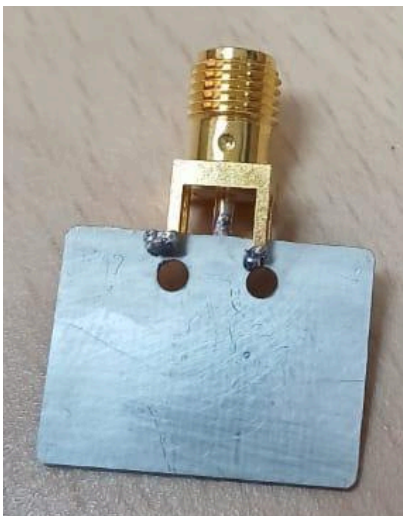
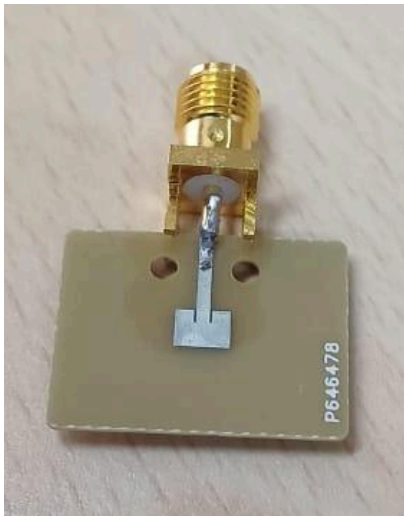


Table. 1. Results of microstrip patch antenna with inset feed on HFSS software and VNA for 24 GHz resonant frequency

Parameters	HFSS	VNA
Center frequency	24.0600 GHz	23.9075 GHz
Minimum return loss	-32.8785 dB	-30.8100 dB
Bandwidth	1.0200 GHz	2.1235 GHz

Microstrip patch antenna with connector



Hardware setup of VNA for testing

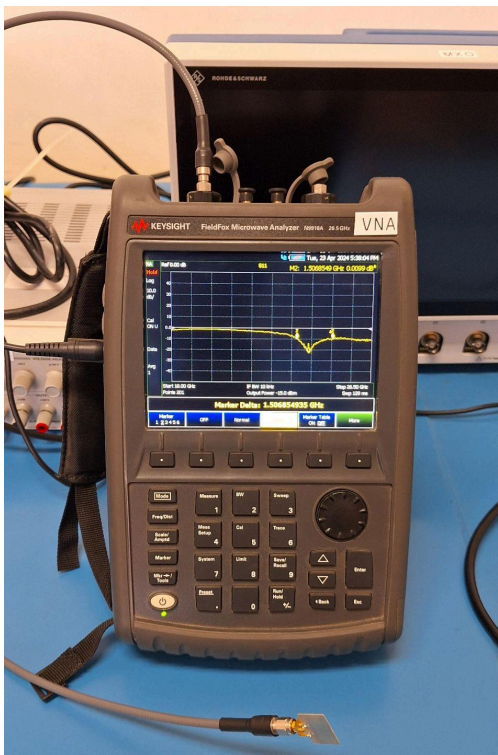


Table. 2. Comparative analysis of Machine Learning models applied on the radiation pattern data of linear array antenna (4 X 1) by varying design parameters, i.e. width of patch (Wp) and length of patch (Lp)

Model	Mean Square Error (MSR) for GainTotal (dB)
ElasticNet	30.88
LinearRegression	30.72
KNeighborsRegressor	6.86
RandomForestRegressor	0.04