

Matching Network Service

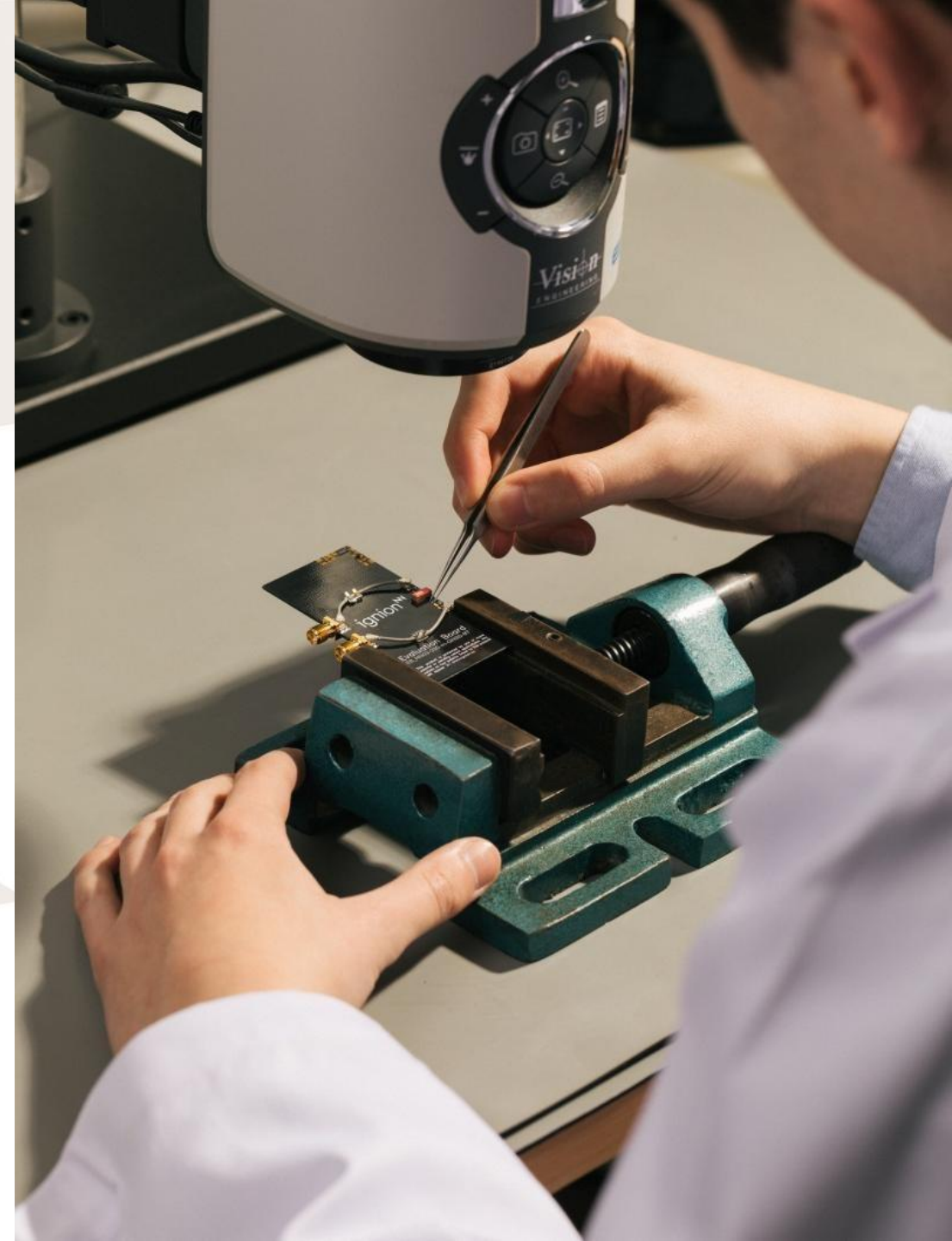
Invasion

USB Dongle

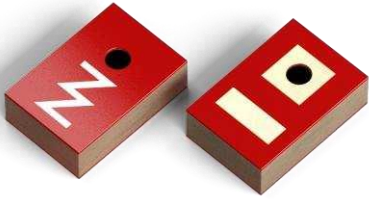


Outline

1. Objectives
2. Proposed Antenna
3. Set-up
4. Proposed Matching Network
5. Performance Analysis
 1. S-Parameters (dB)
 2. Antenna Efficiency (%)
 3. Radiation Patterns
6. Summary



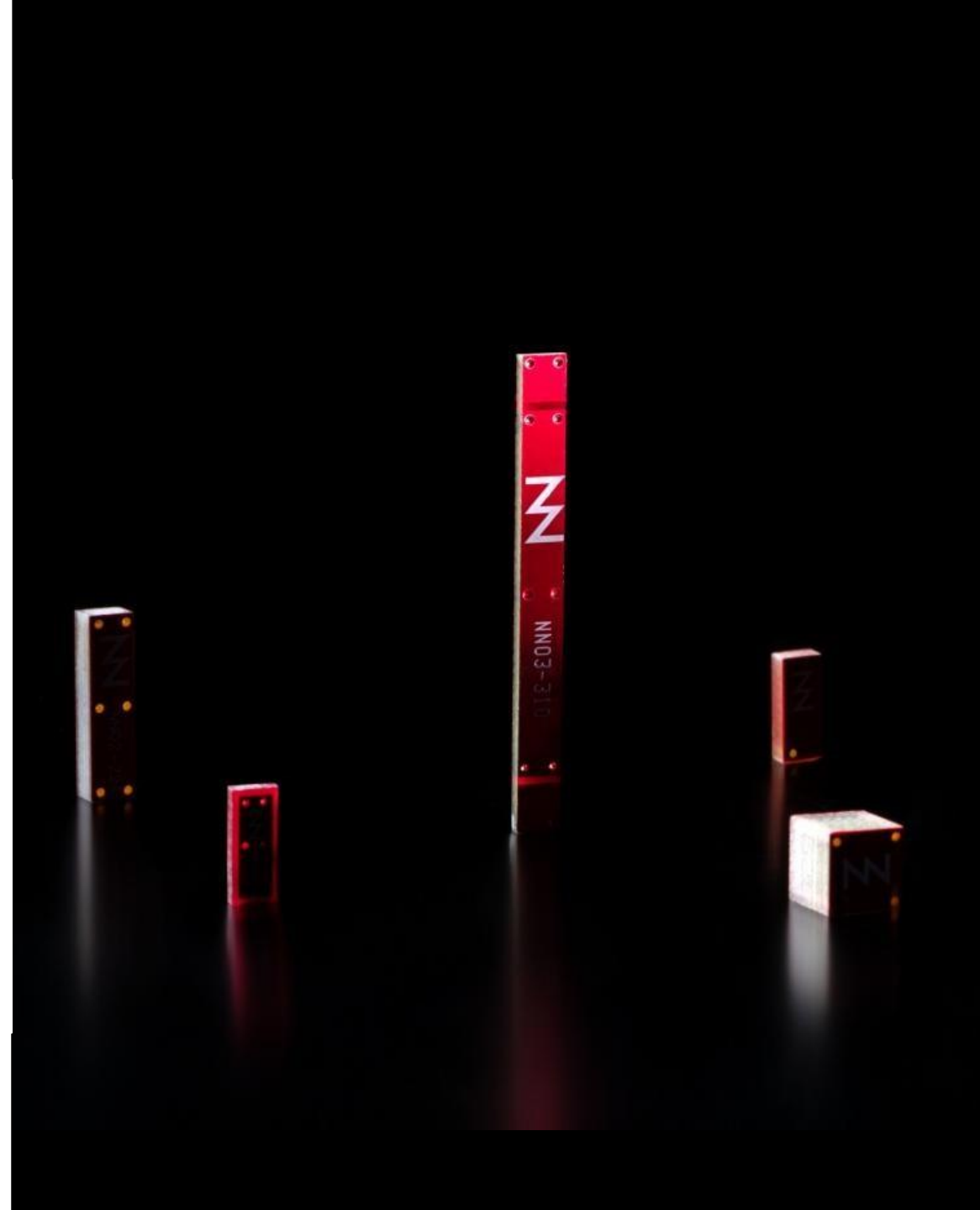
2. Recommended Antenna



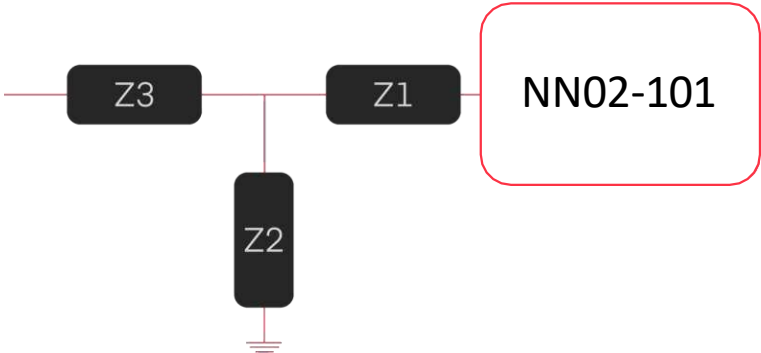
PN: NN02-101

NANO mXTEND™ ANTENNA BOOSTER (NN02-101)

This product and/or its use is protected by at least the following patents and other domestic and international patents pending. Any update on new patents linked to this product will appear in <https://ignion.io/files/Patent-list-NN.pdf>

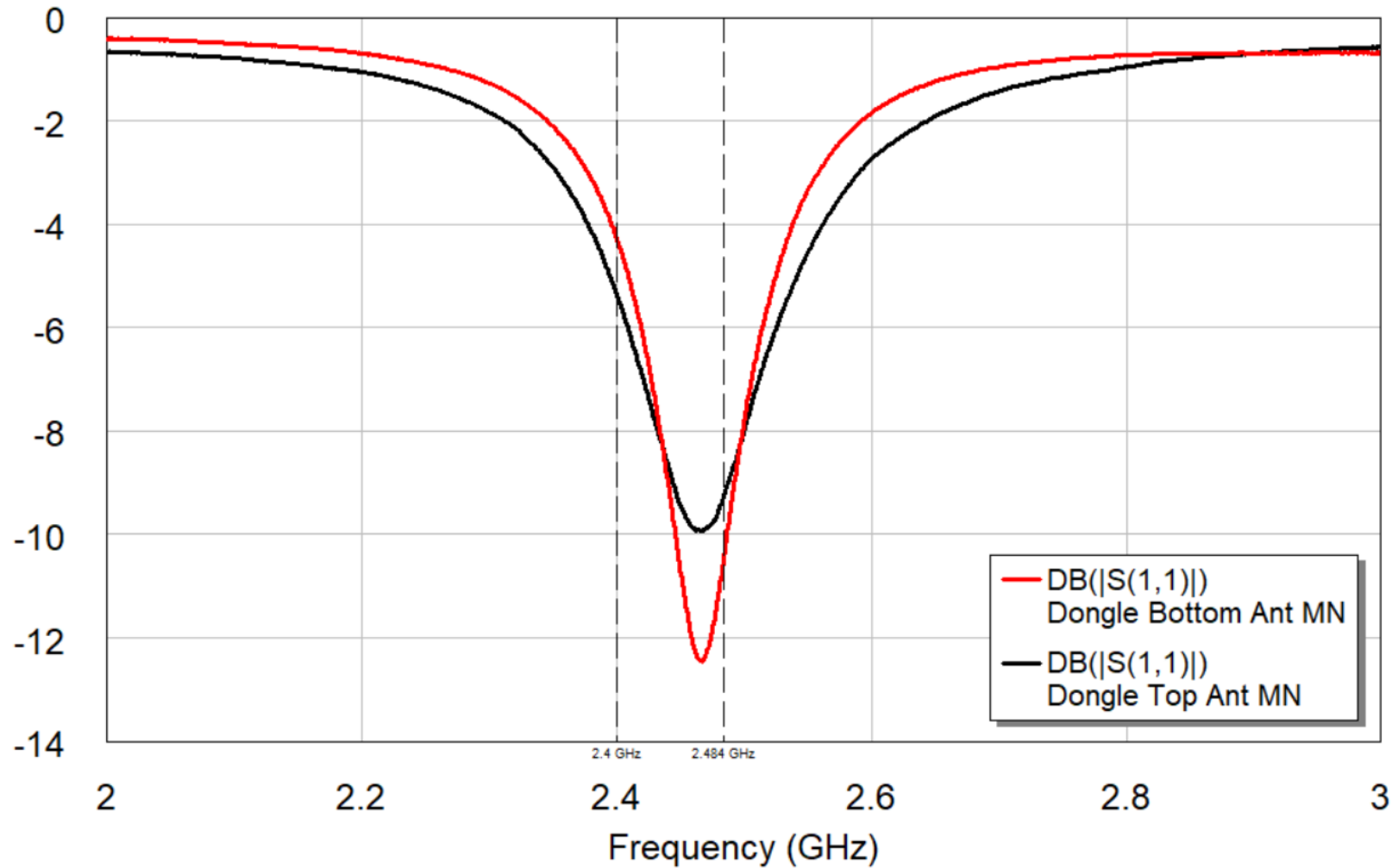


4. Proposed Matching Network



Top Layer MN			Bottom Layer MN	
Z	Value	Part Number	Value	Part Number
Z ₁	9.9nH	LQW18AN9N9G80	12nH	LQW18AN12NG80
Z ₂	4.3nH	LQW15AN4N3G80	1.3pF	GJM1555C1H1R3WB01
Z ₃	3.0nH	LQW15AN3N0G80	0 Ohm	Resistor

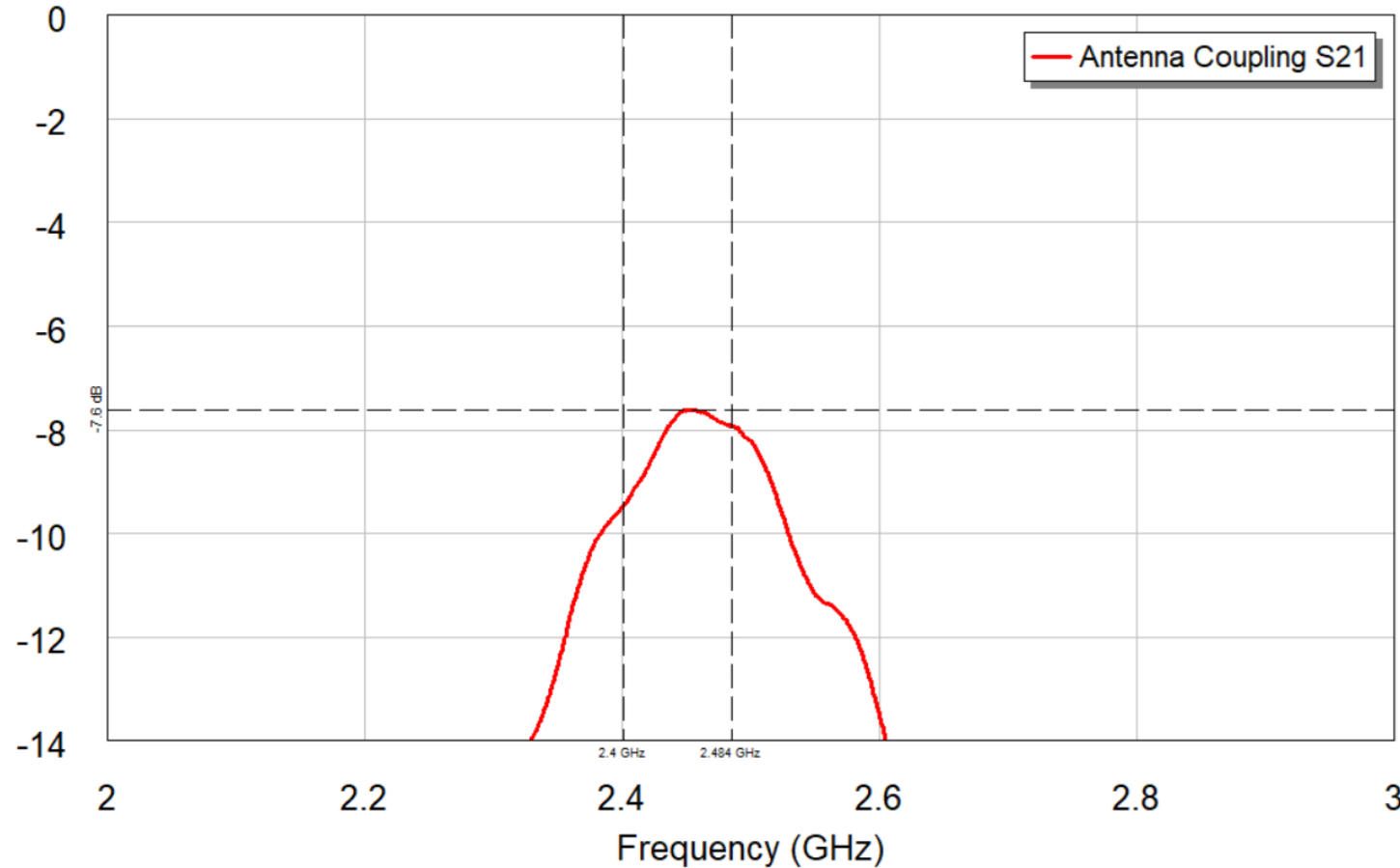
5.1 Performance Analysis: Reflection Coefficient (dB)



- Reflection coefficient (dB) measured with the device plugged into a user laptop.

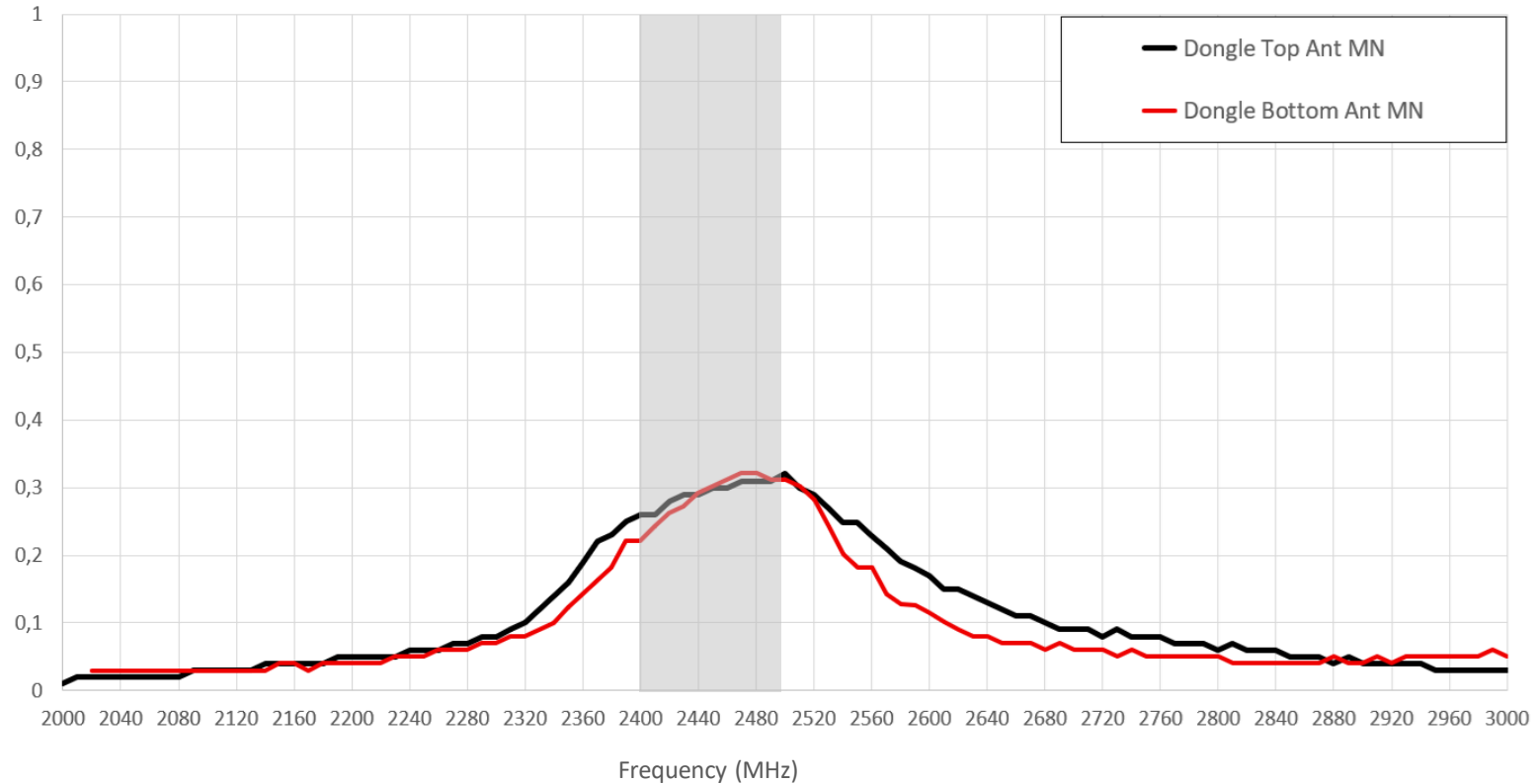


5.1 Performance Analysis: Forward Transmission Coefficient Coefficient (dB)



- Highest value in coupling -7.6dB (at 2.45GHz)

5.2 Performance Analysis: Antenna Efficiency (%)



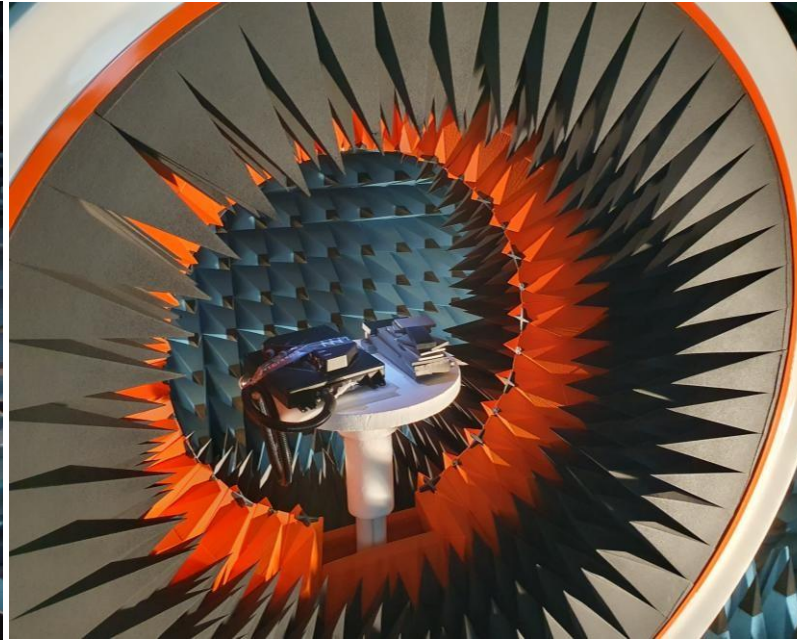
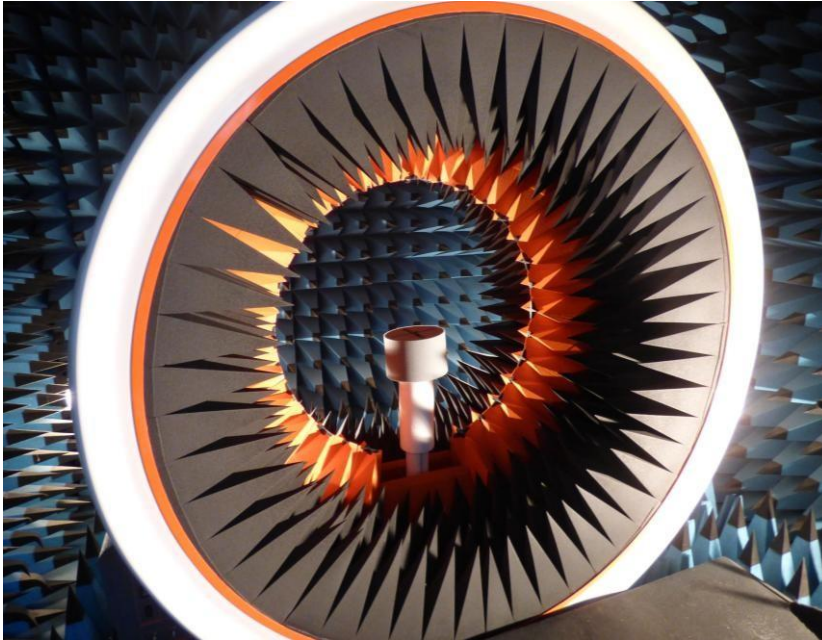
- Efficiency (%) measured with the device plugged into a user laptop.



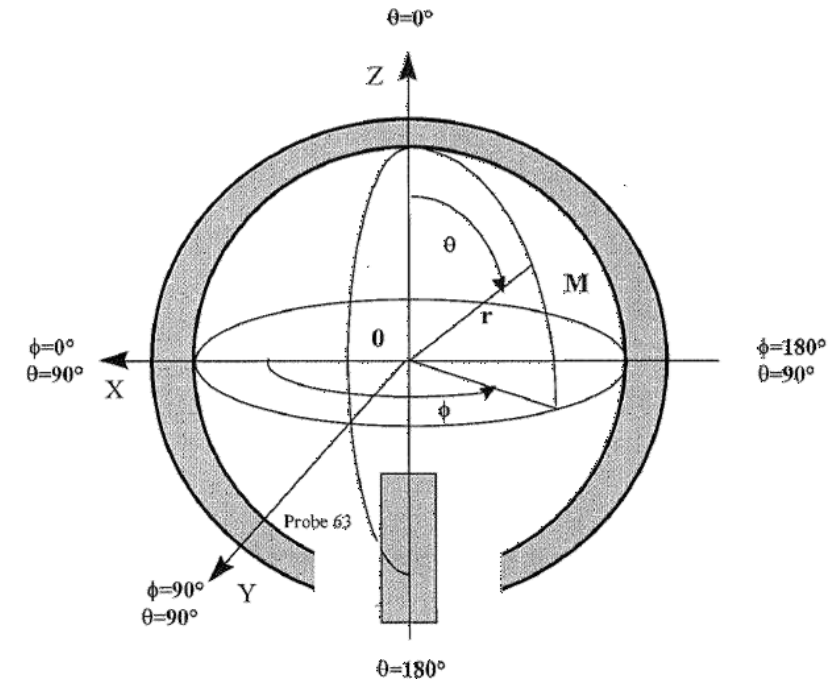
	η_a 2400MHz (%)	η_a 2484MHz (%)	Average η_a (%)
Top Ant MN	26.0	31.5	29.5
Bottom Ant MN	26.2	28.2	29.0

5.2 Performance Analysis: Setup for measurements

MVG StarLab18



Measurement coordinate system



5.3 Performance Analysis: Coordinates for the Radiation Pattern

Radiation Pattern Phi 0° (1/3)

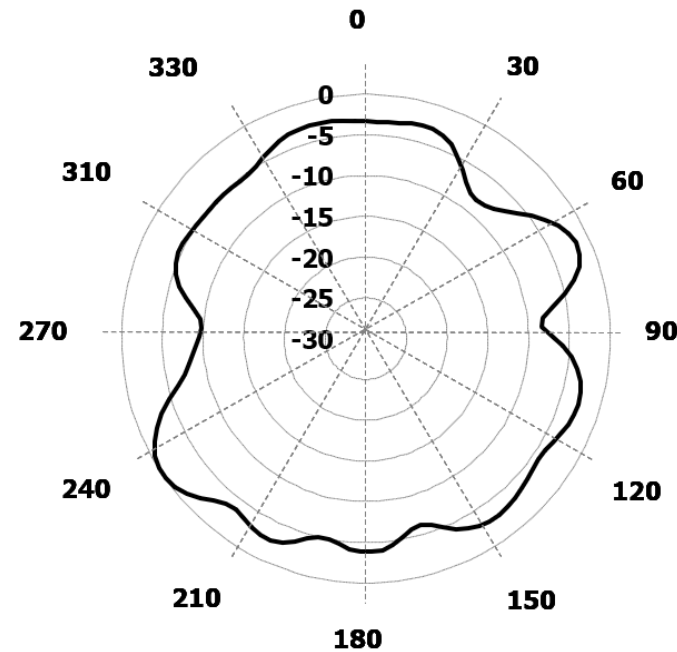
$\phi = 0^\circ$

Plane XZ

Y=0



Top Ant



2450 MHz

Bottom Ant



2450 MHz

5.3 Performance Analysis: Coordinates for the Radiation Pattern

Radiation Pattern Phi 90° (2/3)

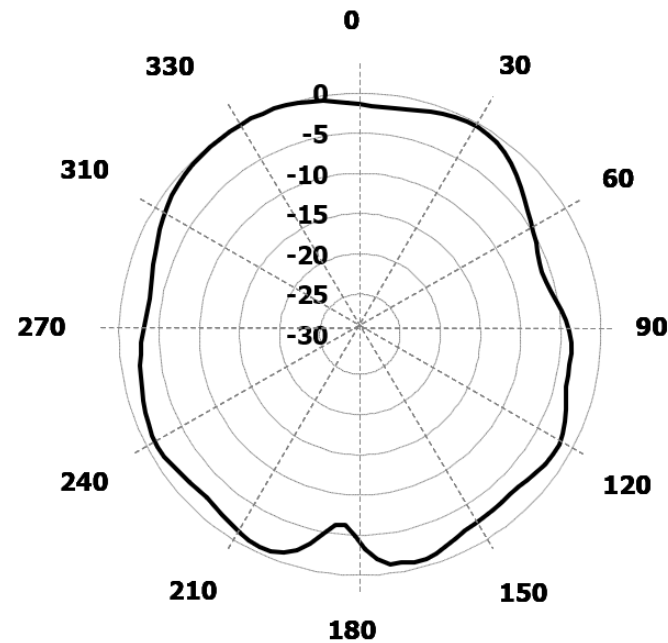
$\phi = 90^\circ$

Plane YZ

X=0

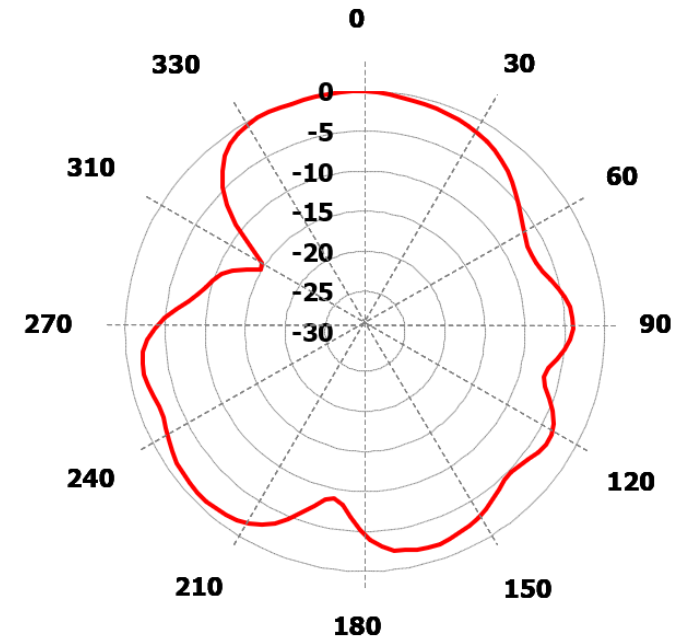


Top Ant



2450 MHz

Bottom Ant



2450 MHz

5.3 Performance Analysis: Coordinates for the Radiation Pattern

Radiation Pattern Theta 90° (3/3)

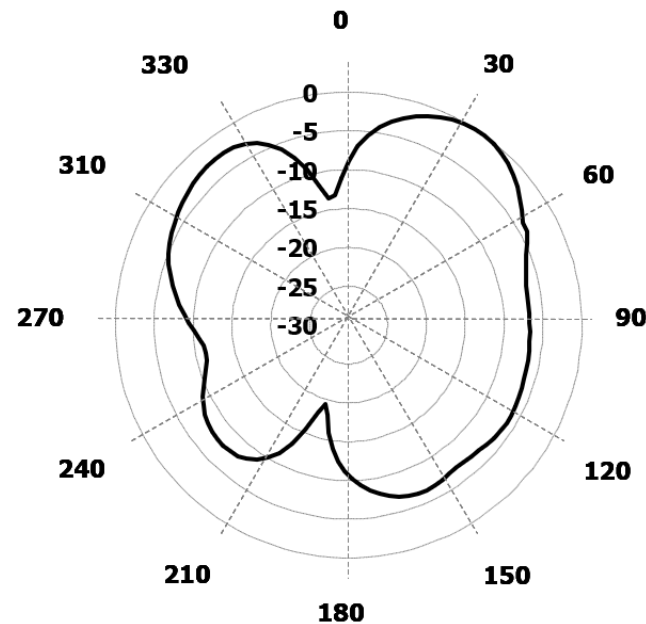
$\theta = 90^\circ$

Plane XY

Z=0



Top Ant



2450 MHz

Bottom Ant



2450 MHz

Performance Analysis

1. S-Parameters (dB)
2. Antenna Efficiency (%)
3. Radiation Patterns



6. Summary

- Results obtained for the main antenna parameters:
 - S-Parameters response centred at the frequencies of interest (2.4/2.48 GHz) with **-5.0dB** at 2.4GHz as the worst value for both antennas.
 - Isolation over **-7.6dB** for the whole frequency range.
 - Total antenna efficiency when plugged into laptop:

	η_a 2400MHz (%)	η_a 2484MHz (%)	Average η_a (%)
Top Ant MN	26.0	31.5	29.5
Bottom Ant MN	26.2	28.2	29.0

- Recommended matching network topology and component values.
- The transitions used for the measurements might introduce some slightly losses.
- .

If **any change** is applied on the PCB, the device, or its surroundings, the **matching network** may need a **readjustment**.

Get in touch.



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