1. UWC.20 Application Note

1.1. Recommended Placement and Ground Plane Size

The recommended ground plane dimensions and antenna landing pattern are shown below. The gap between the antenna and the ground plane should be fixed at 2.44 mm.

The antenna should be placed in the middle of the ground plane, although offset by 4 mm to one of the sides has shown only small influence on antenna performance.

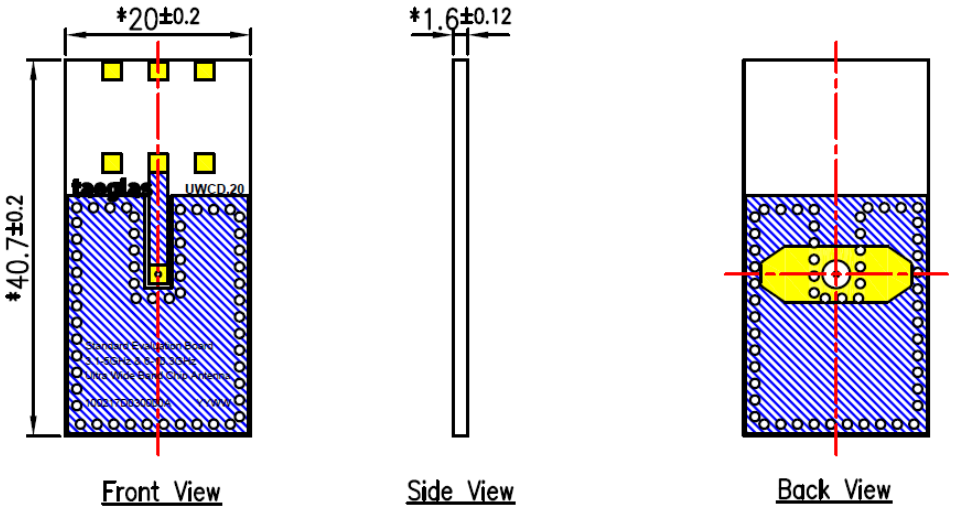

Figure 1 Evaluation Board

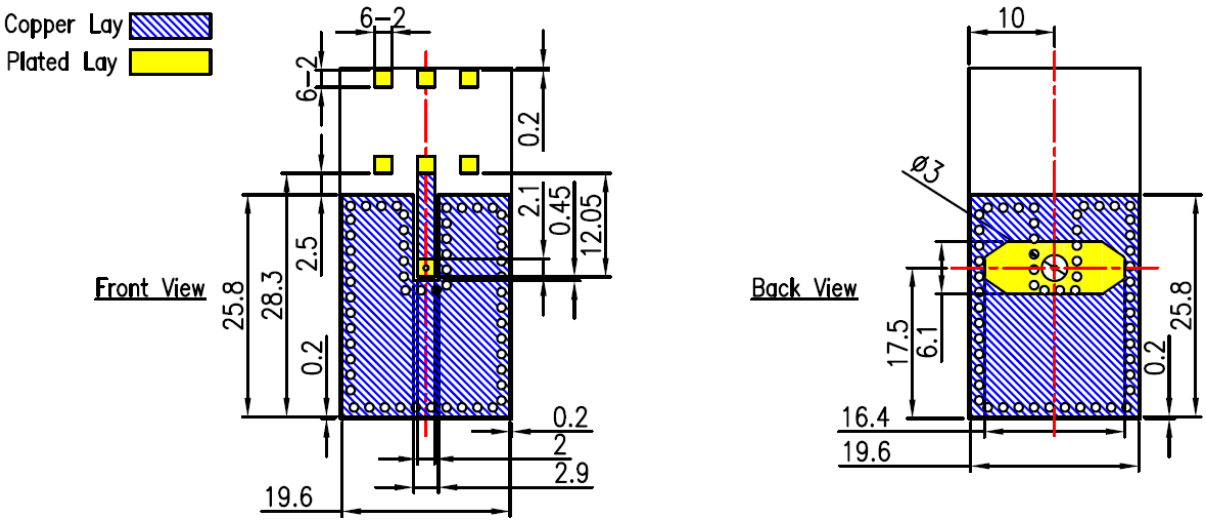

Figure 2 Detailed dimensions EVB front and back

1.2. Ground Plane Size

Influence of ground plane length and width is tested. Graphs below show that there is influence on S11 and on Efficiency when the ground plane length is increased in both lower band (3 – 5 GHz) and higher band (6 – 9 GHz). Results in Figure 4 and Figure 5 should be taken into consideration when choosing the PCB size. Length shorter than 10 mm is not recommended.

When the ground plane width is increased both S11 and efficiency are not significantly influenced, except for width 16 mm which has negative influence on performance in channel 5 (6-7 Ghz).

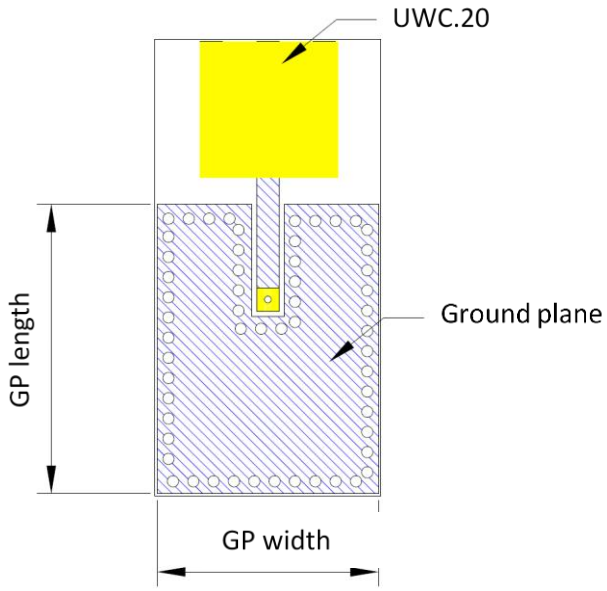

Figure 3 Evaluation Board Layout

1.2.1. Ground Plane Length

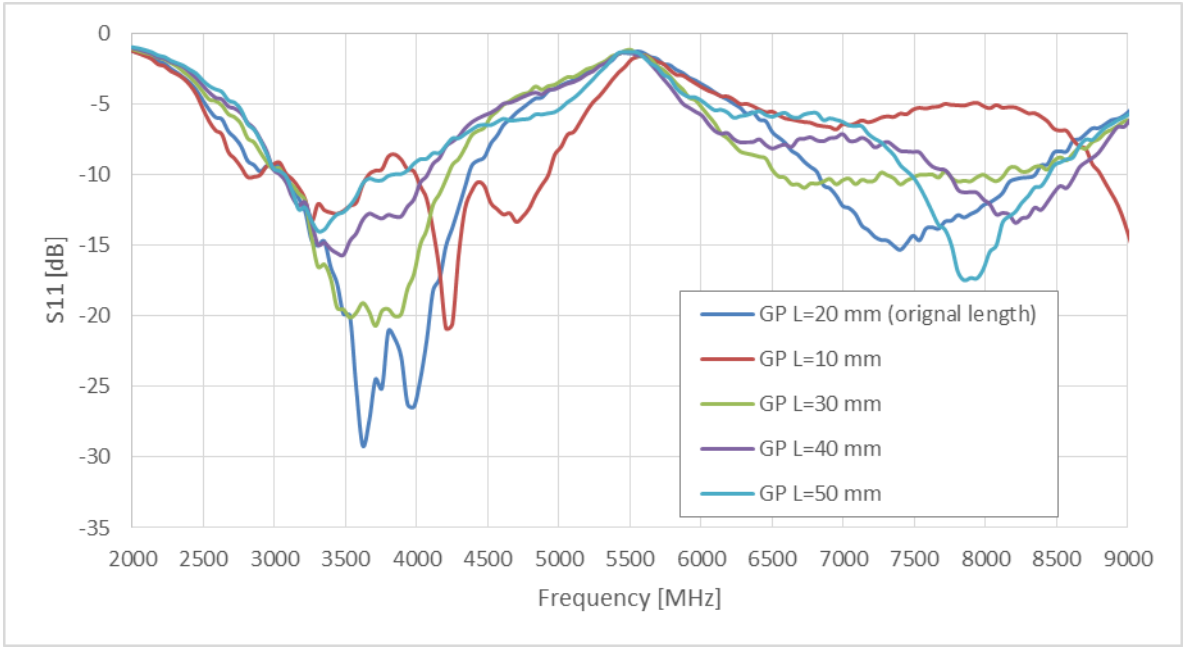

Figure 4 Return loss for ground plane length variation

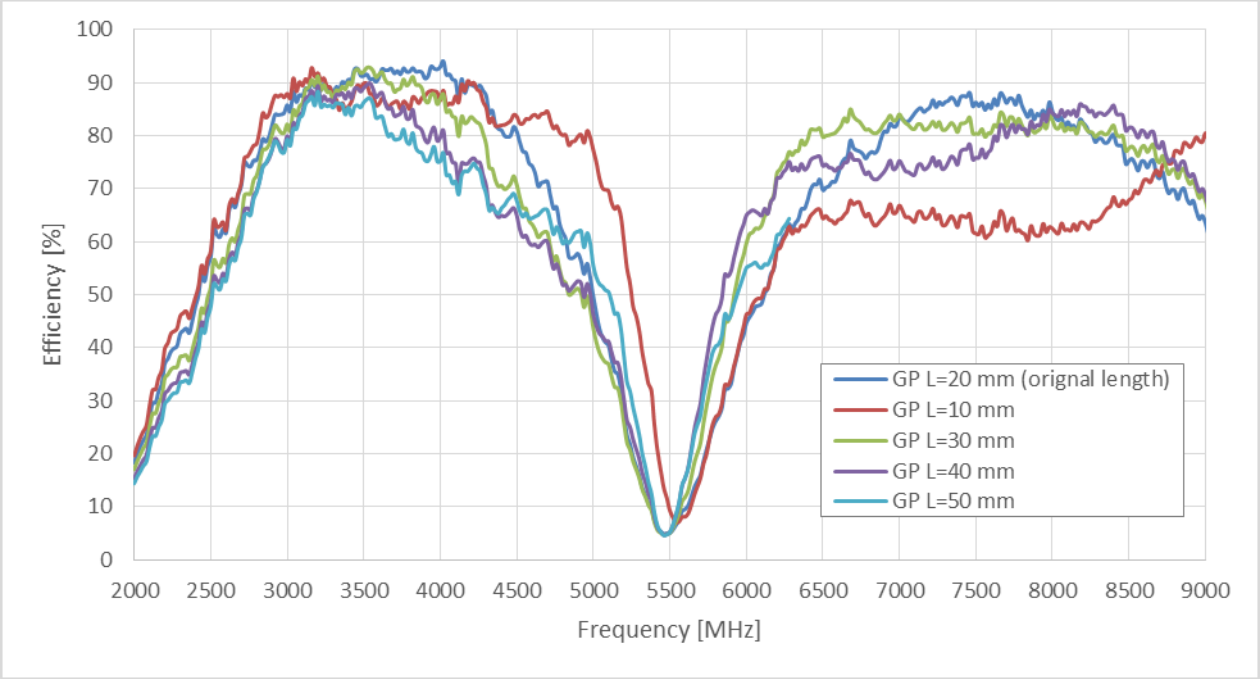

Figure 5 Efficiency for ground plane length variation

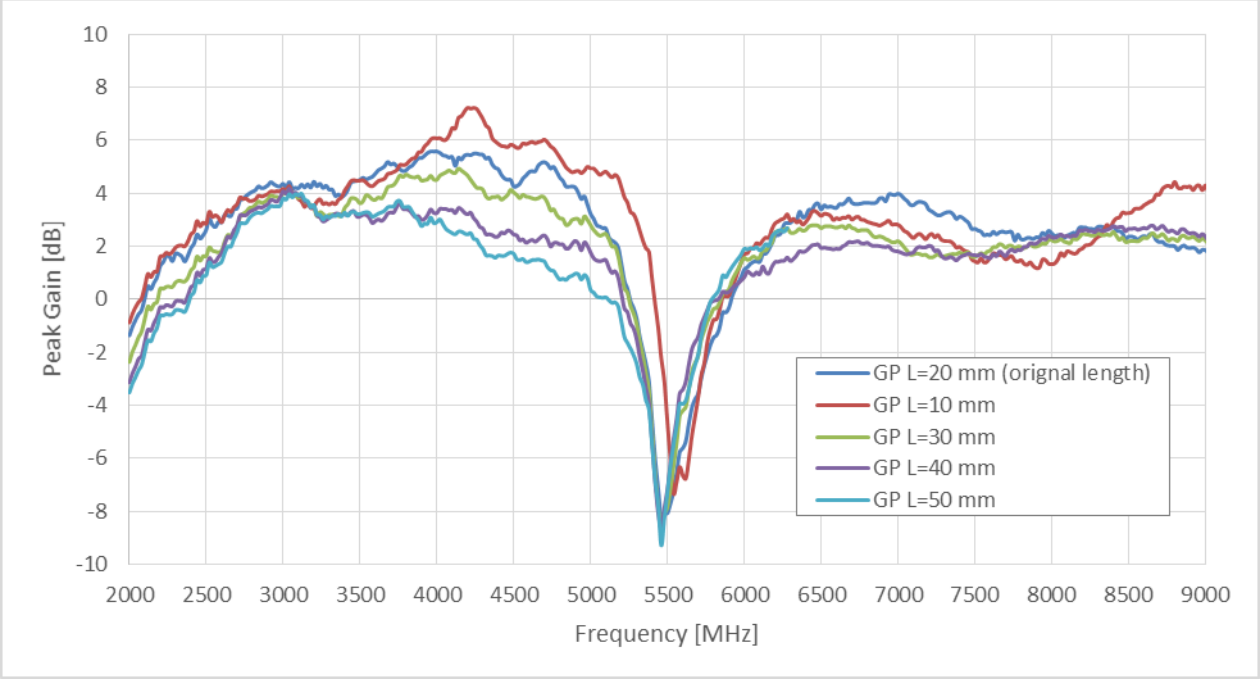

Figure 6 Peak gain for ground plane length variation

1.2.2. Ground Plane Width

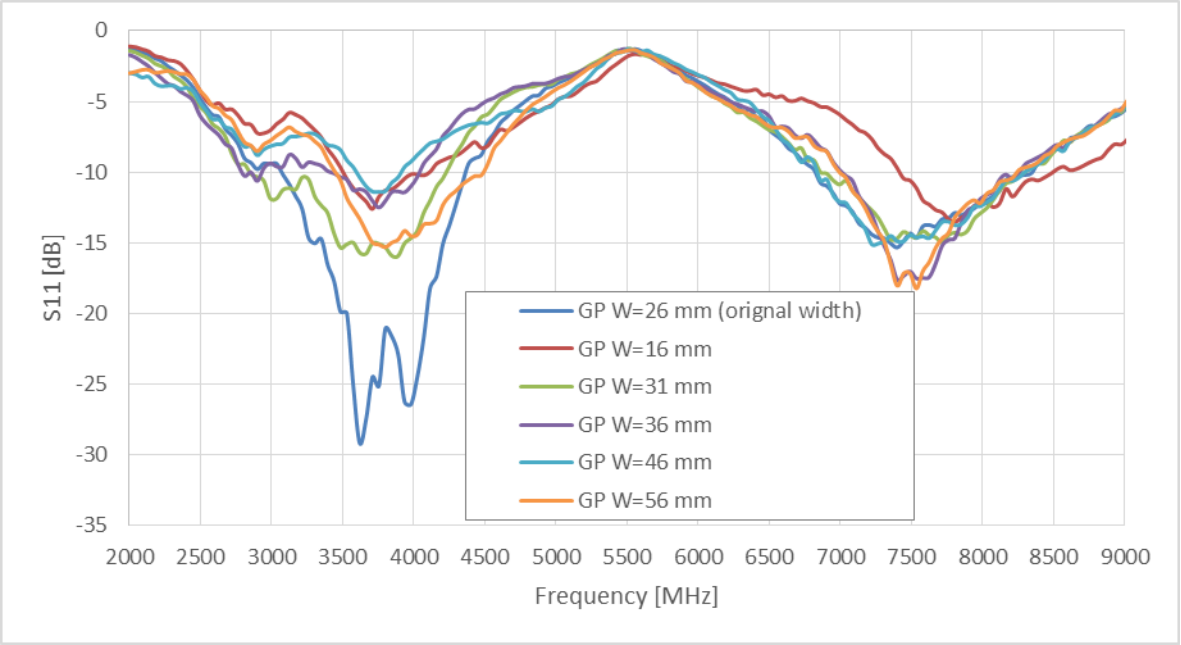

Figure 7 Return loss for ground plane width variation

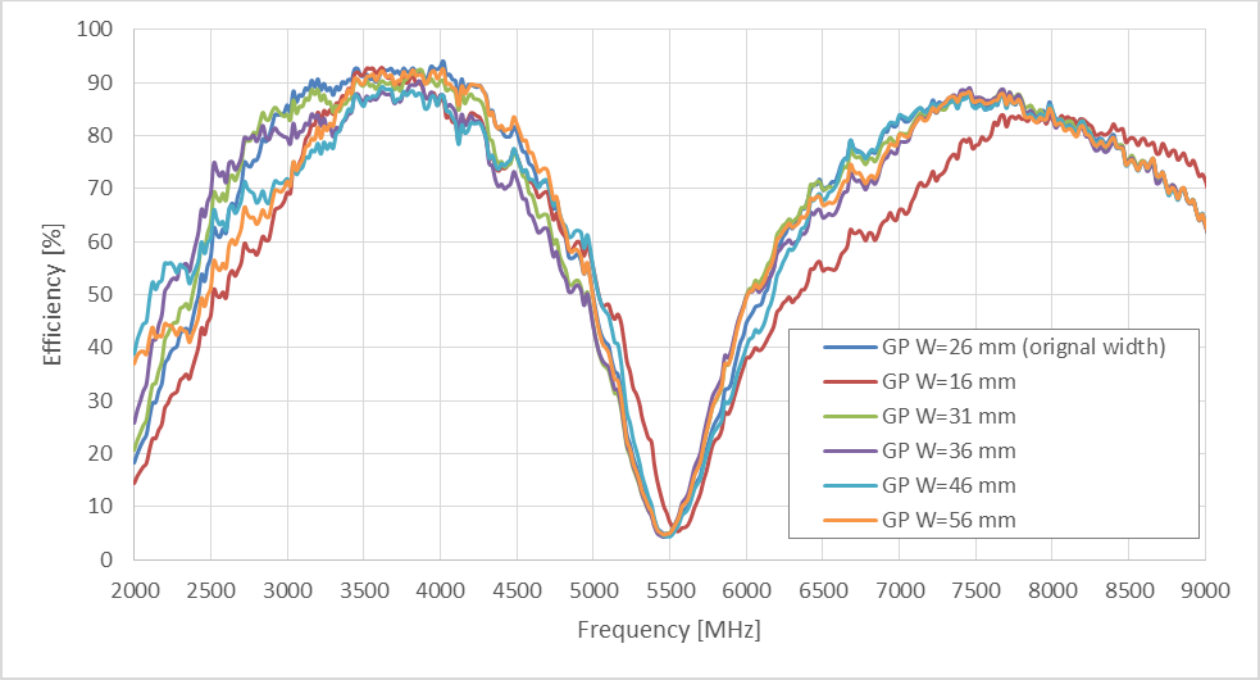

Figure 8 Efficiency for ground plane width variation

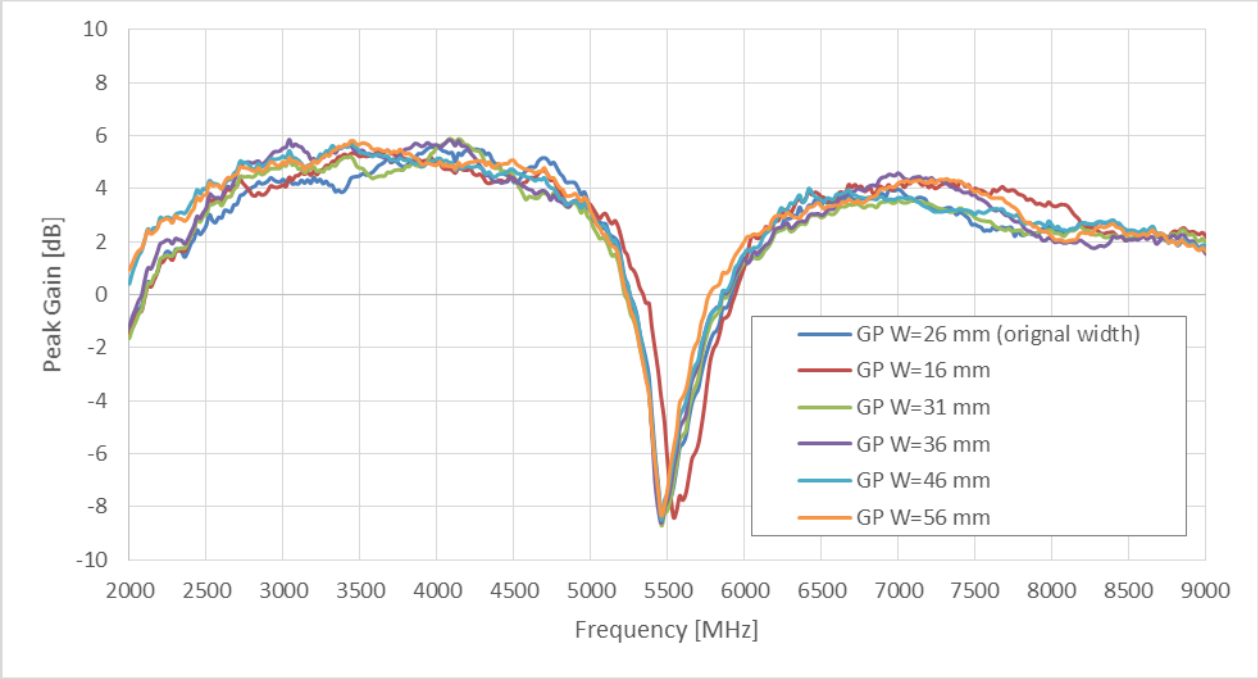

Figure 9 Peak gain for ground plane width variation

1.3. Clearance Study

A metal clearance study is also performed. A 5*5*2mm metal component is placed on different locations around the UWC.20 antenna as shown in Figure 10.

The results show that close proximity of components on the left and right of the antenna will not influence performance, nor as will a component placed on the ground plane edge below the antenna. Note that clearance between the antenna and ground plane shall be kept at 2.44 mm.

From this follows that for optimum performance it is advised to keep any component at least 1 mm from the antenna.

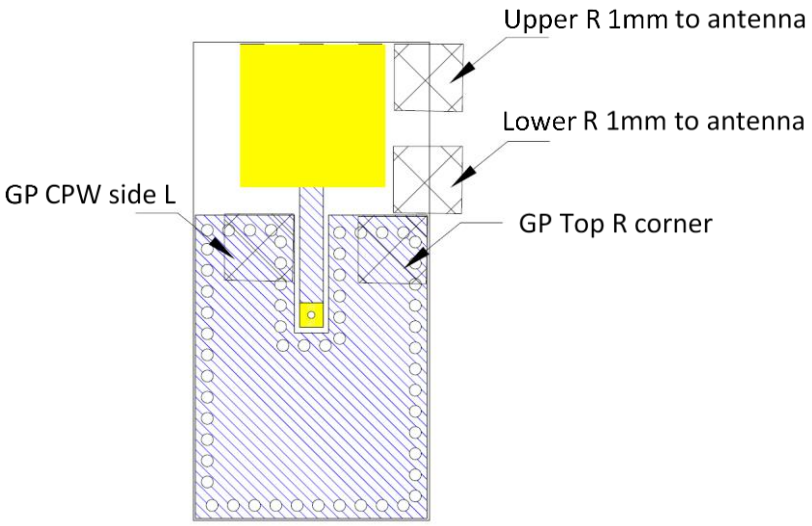

Figure 10 Clearance study - metal component locations

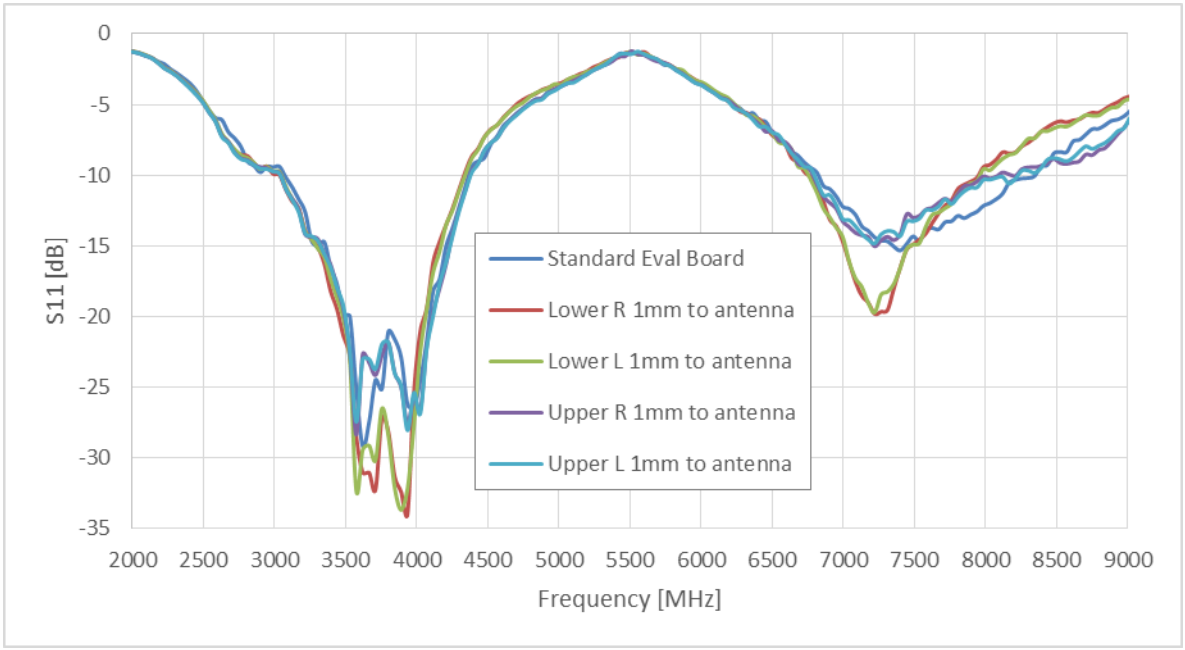

Figure 11 Return loss for clearance study (metal component next to antenna)

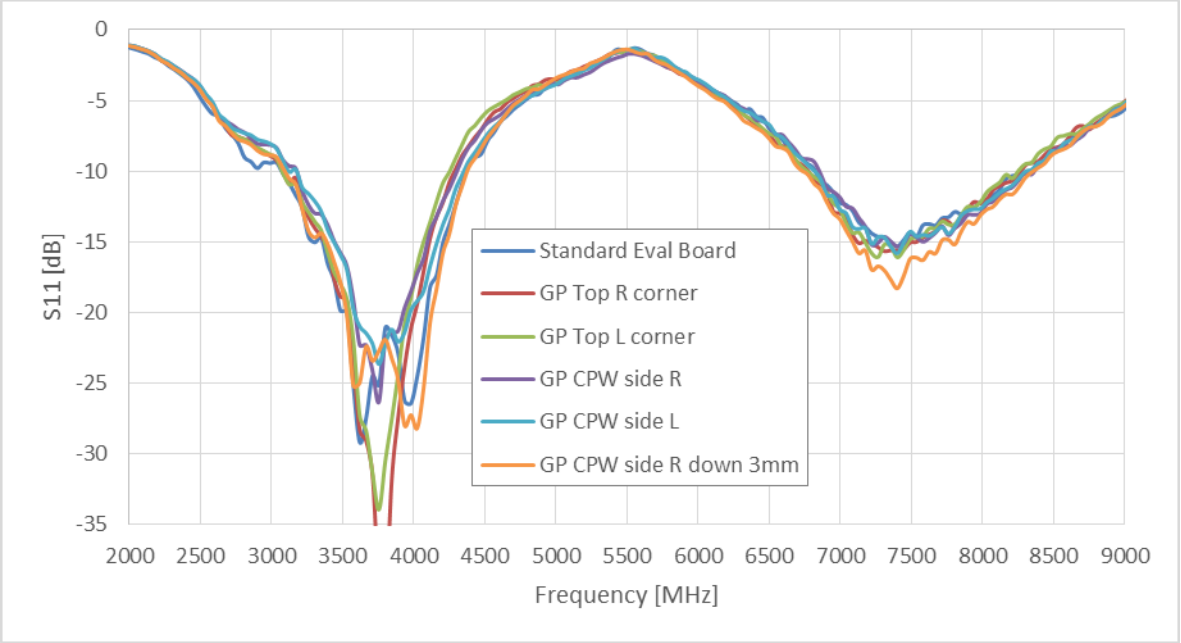

Figure 12 Return loss for clearance study (metal component on the edge of ground plane)

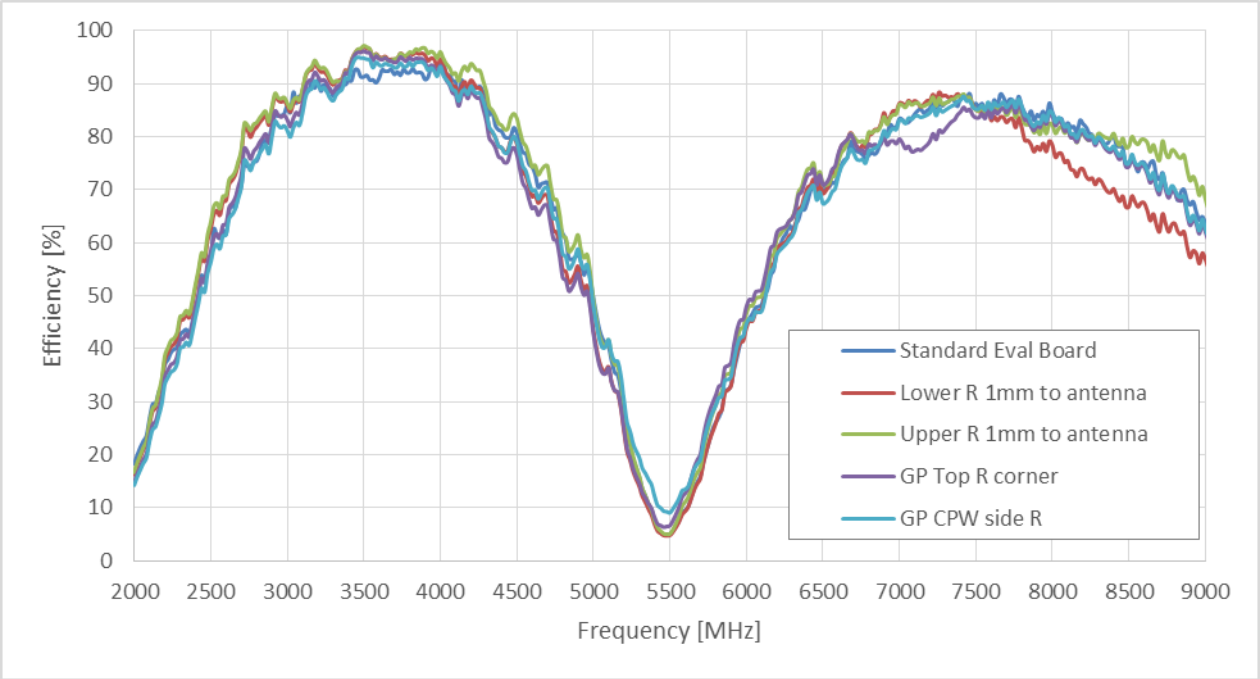

Figure 13 Efficiency for clearance study

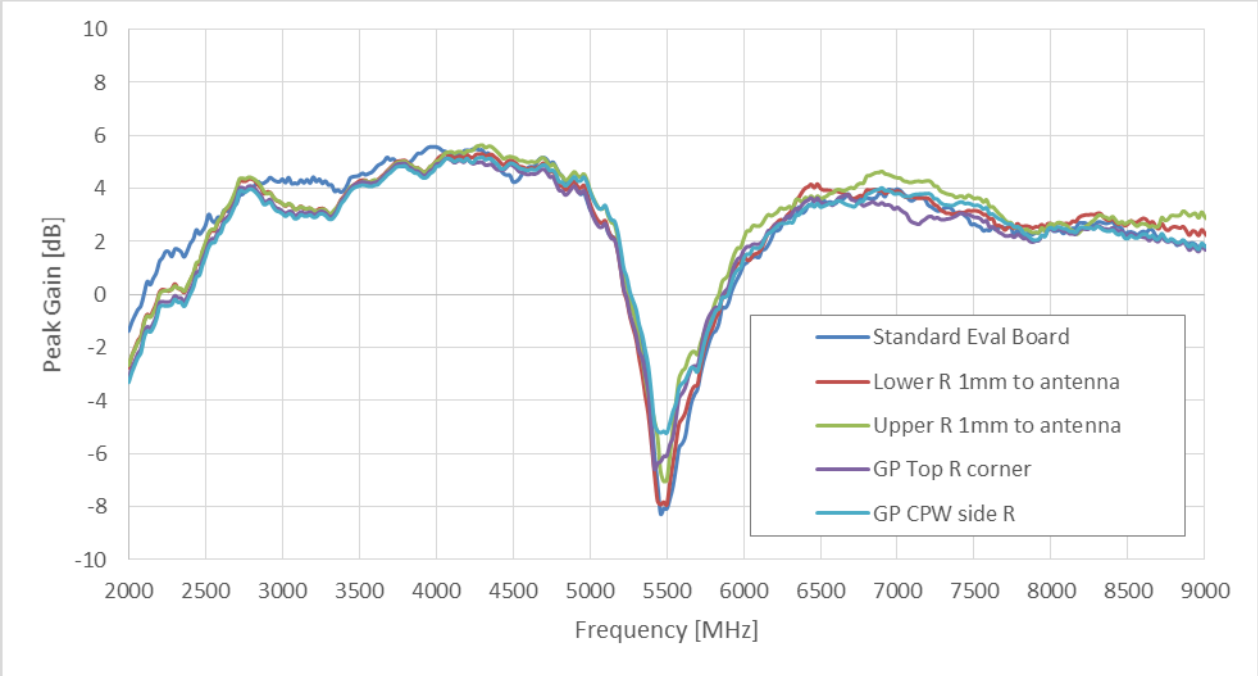

Figure 14 Peak gain for clearance study