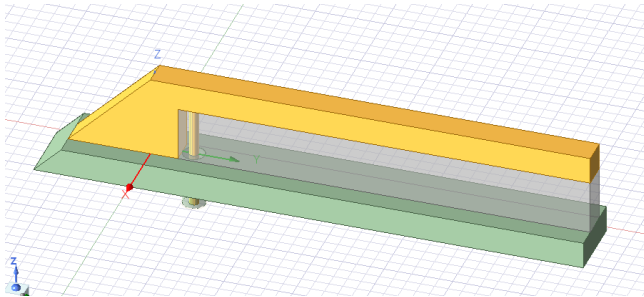


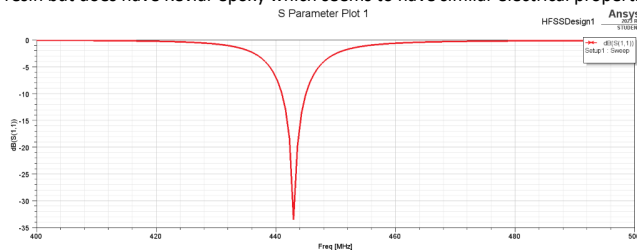
433 MHz Inverted F Blade Antenna With Larger Ground Base

Similar to this commercial one but with a larger ground plane to increase bandwidth and help with matching.



Status

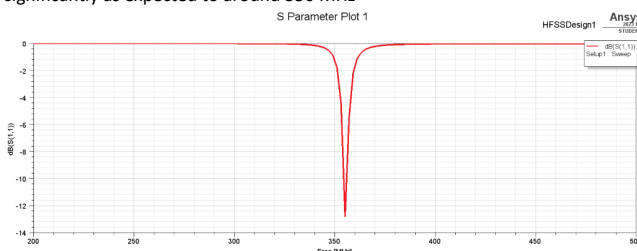
Without internal dielectric between the radiating element and ground, great match with -35 db return loss. Now working on adding an internal dielectric made out of resin. Ansys HFSS does not have epoxy resin but does have Kevlar epoxy which seems to have similar electrical properties as regular epoxy.



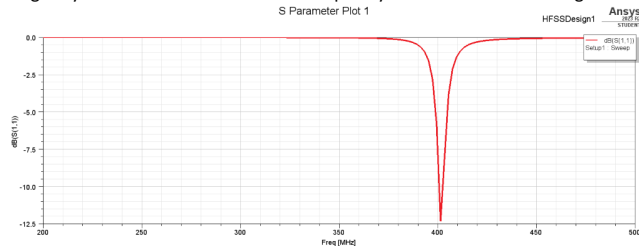
Name	Val	Unit	Evaluated
d1	0	mm	0mm
d1	300	mm	300mm
dx1	0	mm	0mm
dw1	10	mm	10mm
dx1	10	mm	10mm
dx1	30	mm	30mm
dx2	125	mm	125mm
dx2	150	mm	150mm
dx2	4.2	mm	4.2mm
dx3	157	mm	157mm
dx4	10	mm	10mm
dwg	25	mm	25mm
dxg	190	mm	190mm

Variables [HFSS]

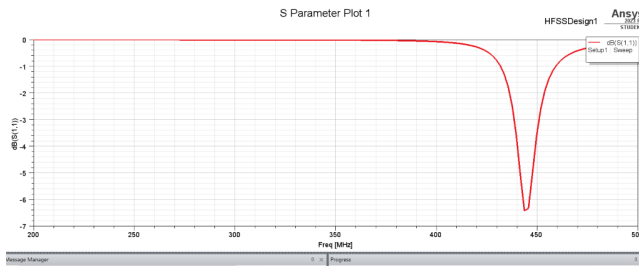
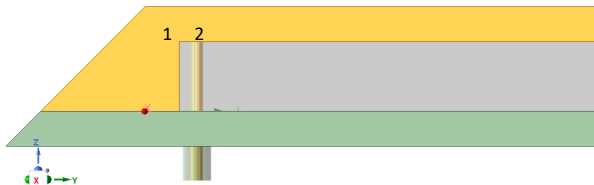
Adding the dielectric without changing any of the dimensions results in the resonant frequency to drop significantly as expected to around 350 MHz



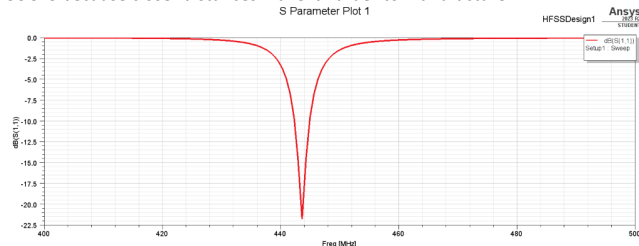
Let's decrease the length of the radiating element and ground plane (same length). Decreasing the length by 20mm results in a resonant frequency around 400mhz. Getting closer



Decreasing the length by another 10mm results in a resonant frequency of exactly 433 MHz which is perfect, but not as good of a match. Let's change the size between the feed pin (2) and antenna-ground bridge (1). Increasing the length from 4.2mm to 5mm results in a WORSE MATCH (NARRRR)



Time to decrease the distance once again! Decreasing it to 3mm results in a much better match which SUCKS because closer distances make it harder to manufacture.



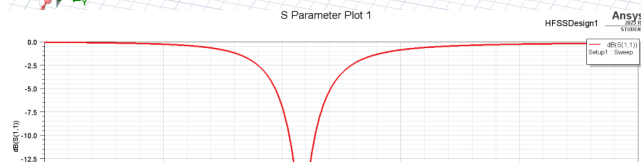
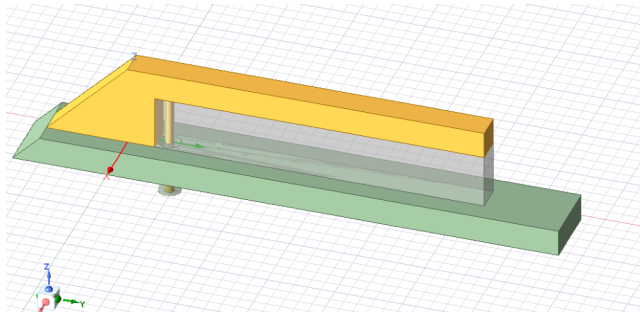
Switching the material to Polycarbonate.

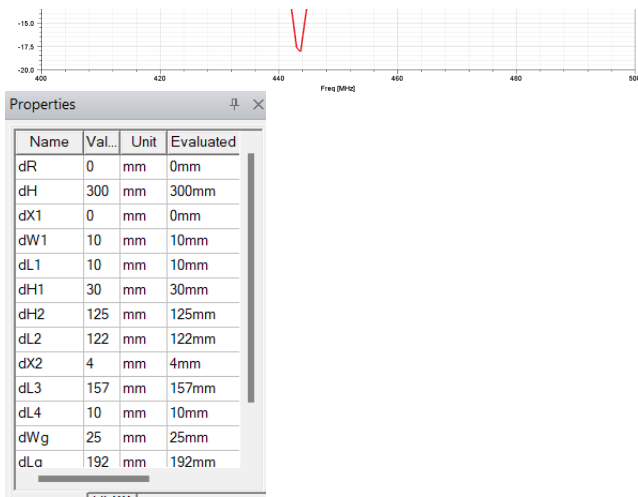
<https://members.tm.net/lapointe/plastics.htm>

<https://www.chemeurope.com/en/encyclopedia/Polycarbonate.html>

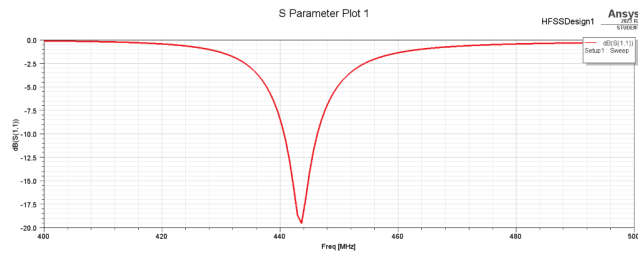
(Material Information added to HFSS)

Already much better using PC

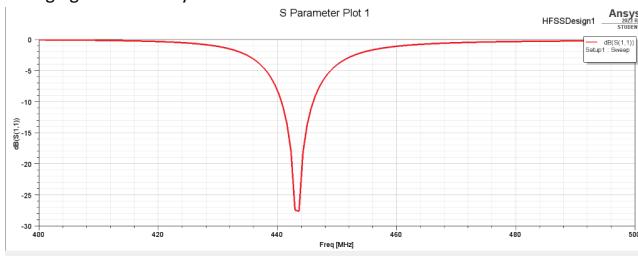




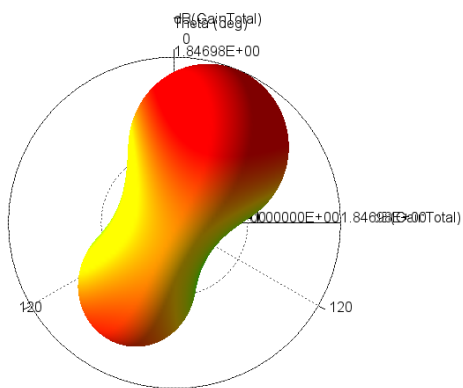
Increasing length from short to feed to 5mm from 4mm makes it better!



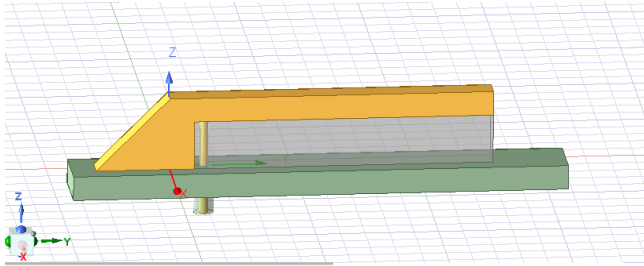
Changing it to 4.5mm yields this incredible result. There is the radiation field with a max gain of 1.8. Not bad!



Gain Plot 1



Increasing the length in the front by 10mm also helps improve the match which is great because we can have an easier aerodynamic taper.



Name	Val...	Unit	Evaluated
dX1	0	mm	0mm
dW1	10	mm	10mm
dL1	10	mm	10mm
dH1	30	mm	30mm
dH2	125	mm	125mm
dL2	122	mm	122mm
dX2	4.5	mm	4.5mm
dL3	157	mm	157mm
dL4	10	mm	10mm
dWg	25	mm	25mm
dLg	202	mm	202mm
dHg	-10	mm	-10mm

