Skärmande Aperturer?

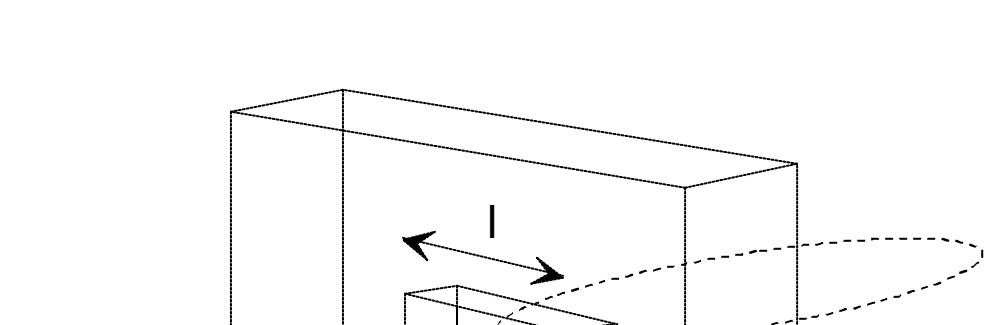
Jan Carlsson, SP

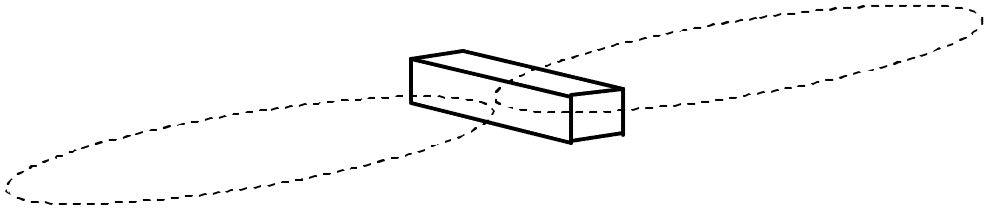
Disposition

- Lite teori – Hur fungerar aperturer?
- Specialfallet slits
- Transmissionskoefficient
- Metoder att minska transmissionen
  - Packningar
  - Korrugeringar
- Slutsatser

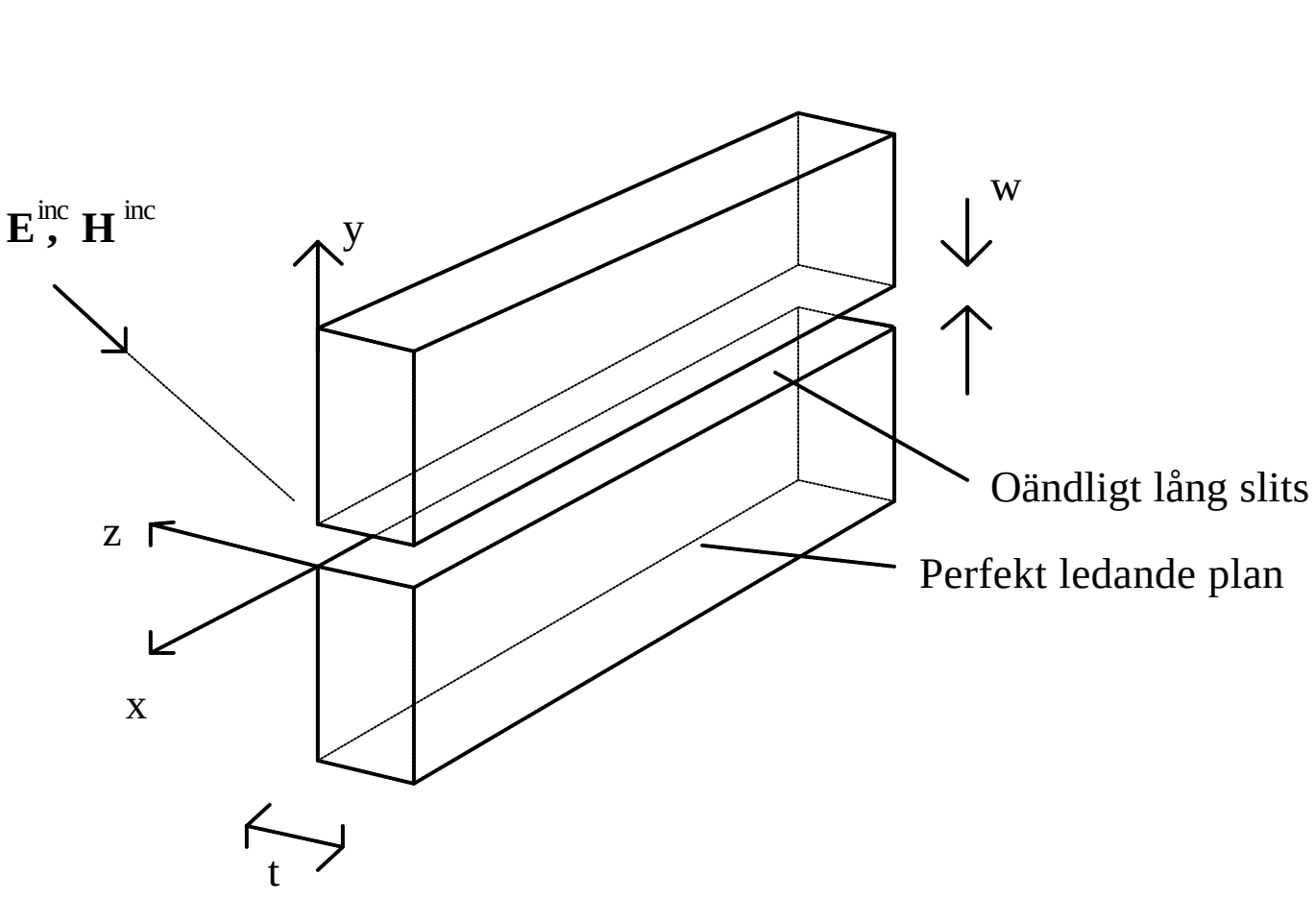
Teori

Babinets princip

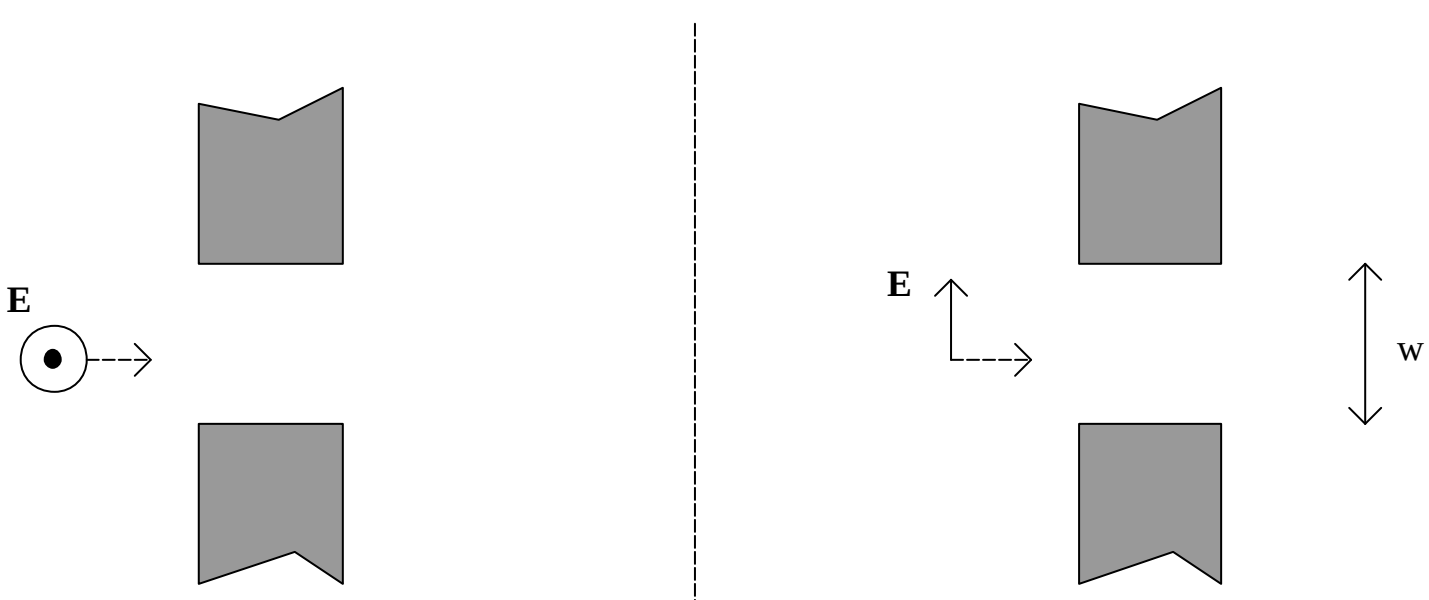




Specialfallet slits

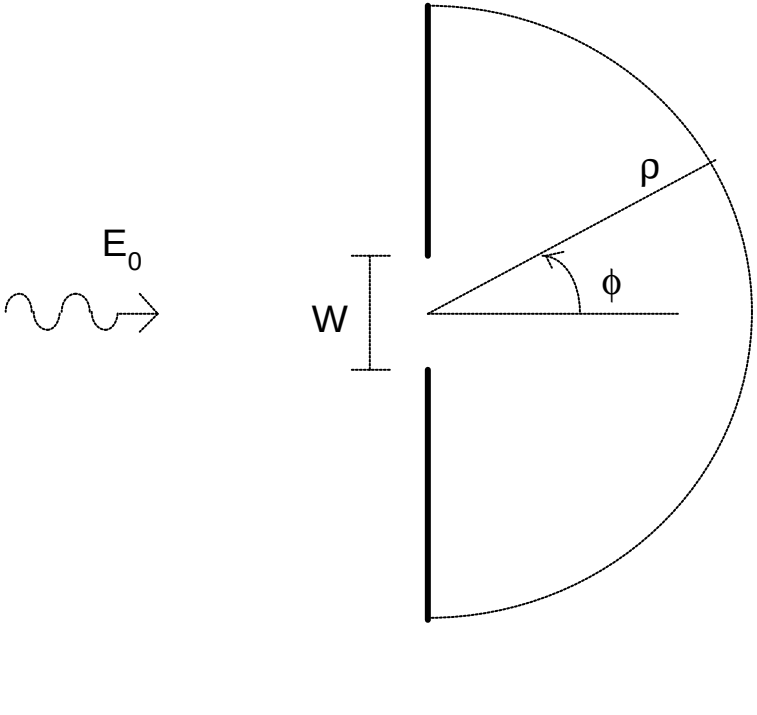


TE & TM polarisation



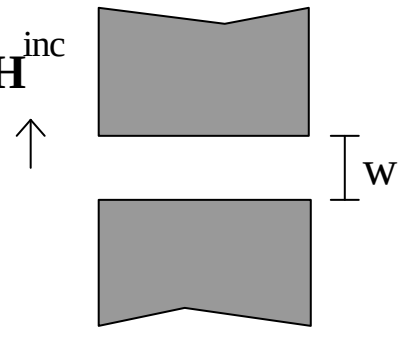
TM-polarisation **TE-polarisation**

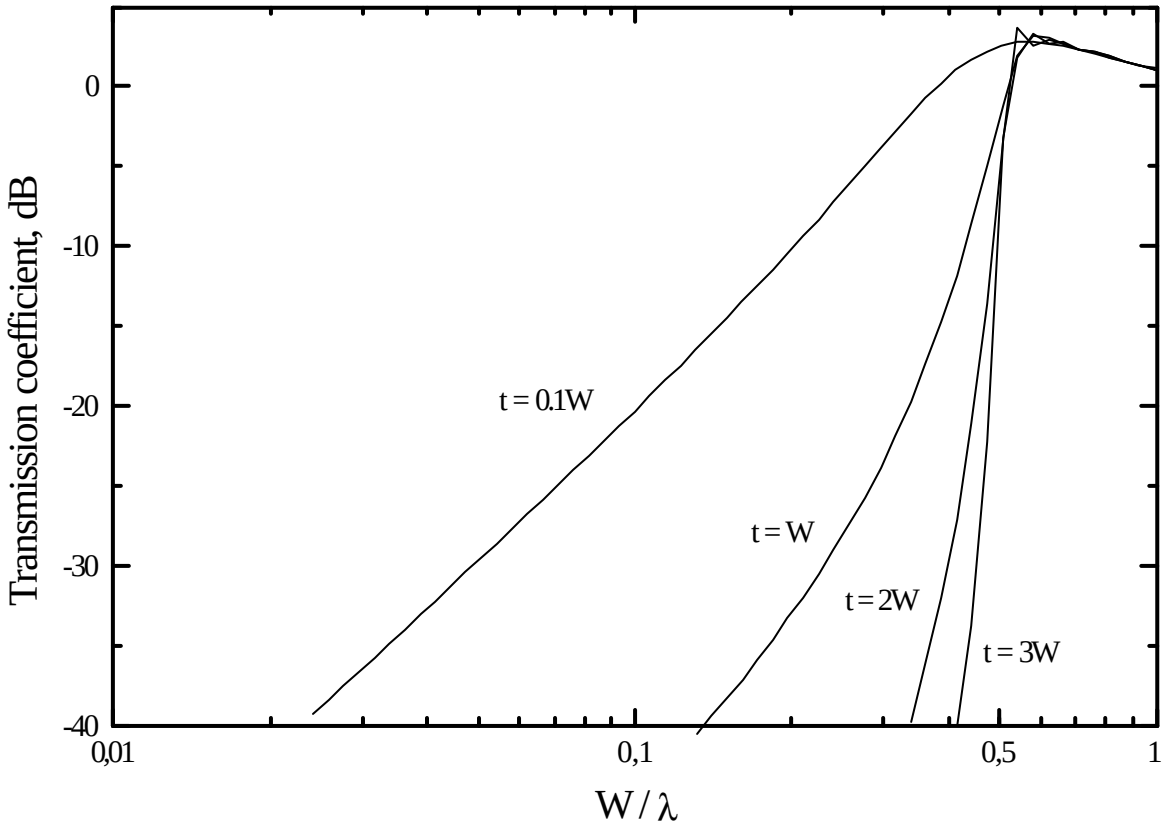
Transmissionskoefficient



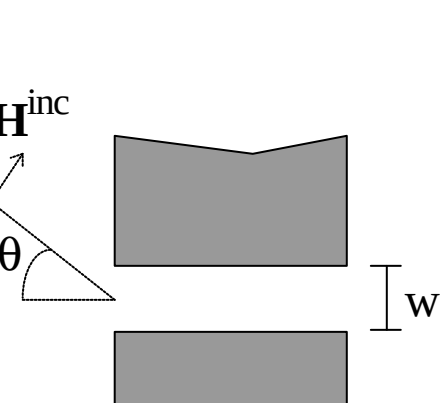
$$T = \frac{P_{rad}}{P_{inc}} = \frac{r}{WE_0^2} \int_{-p/2}^{p/2} \left| E(f) \right|^2 df$$

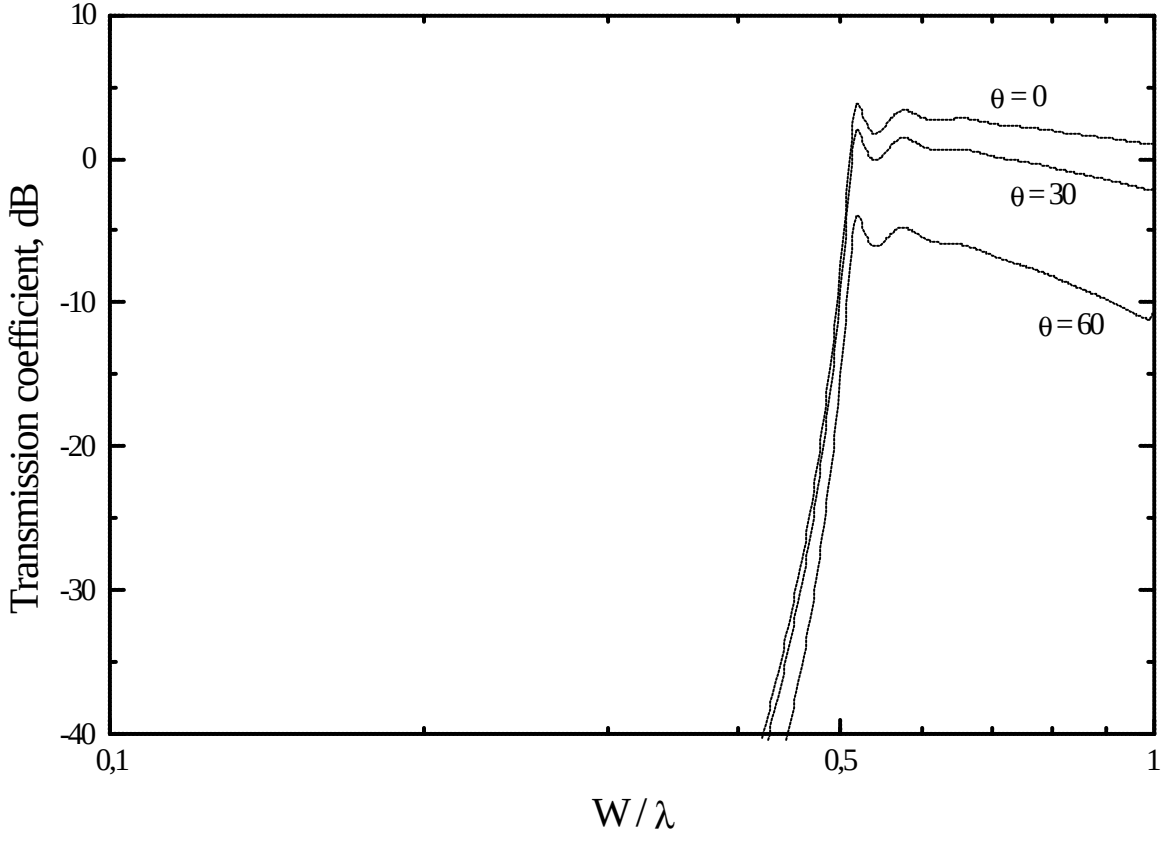
Transmissionskoefficient för TM-polarisation



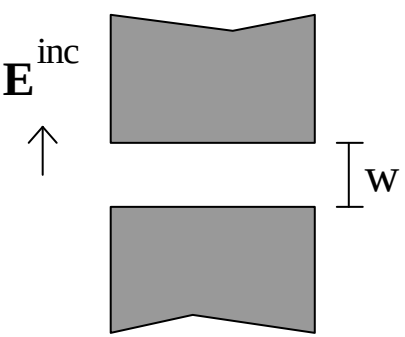


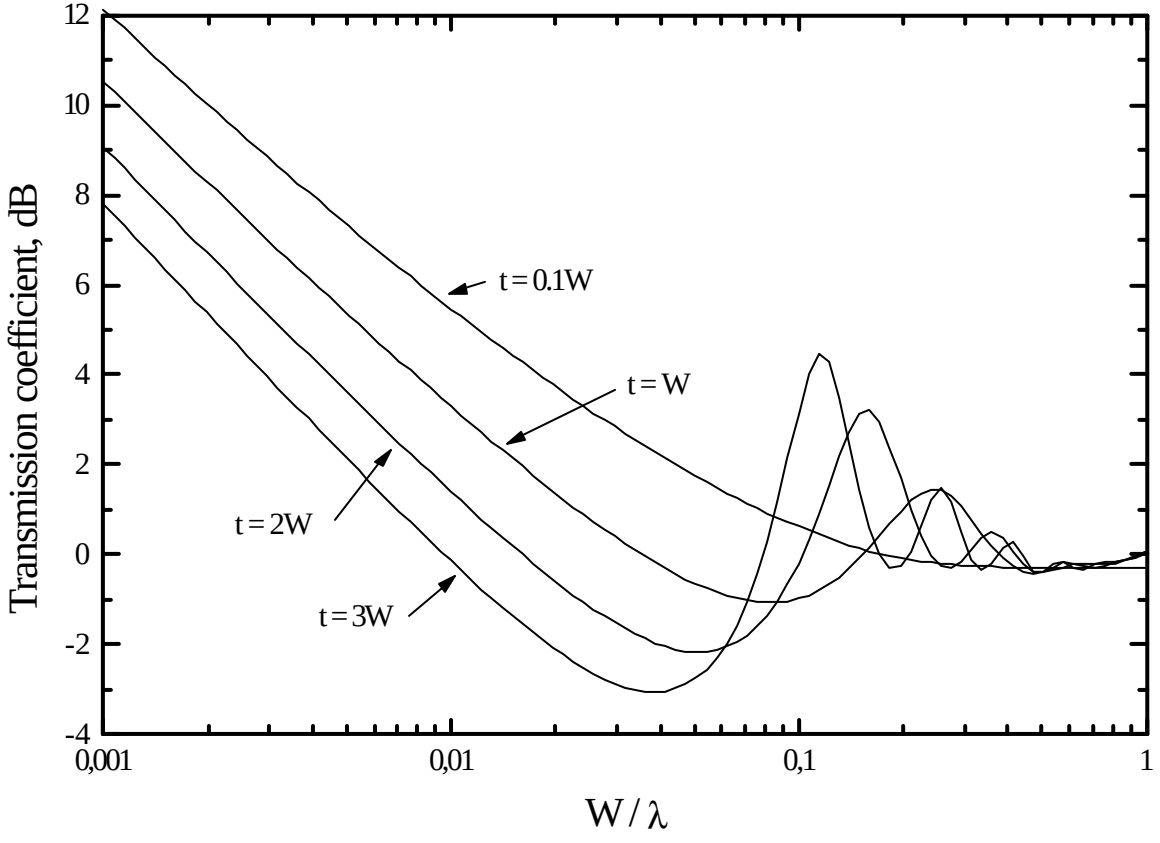
Transmissionskoefficient för TM-polarisation



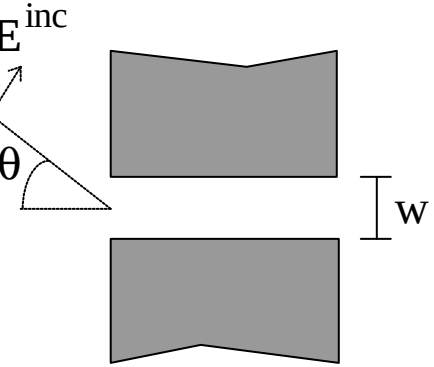


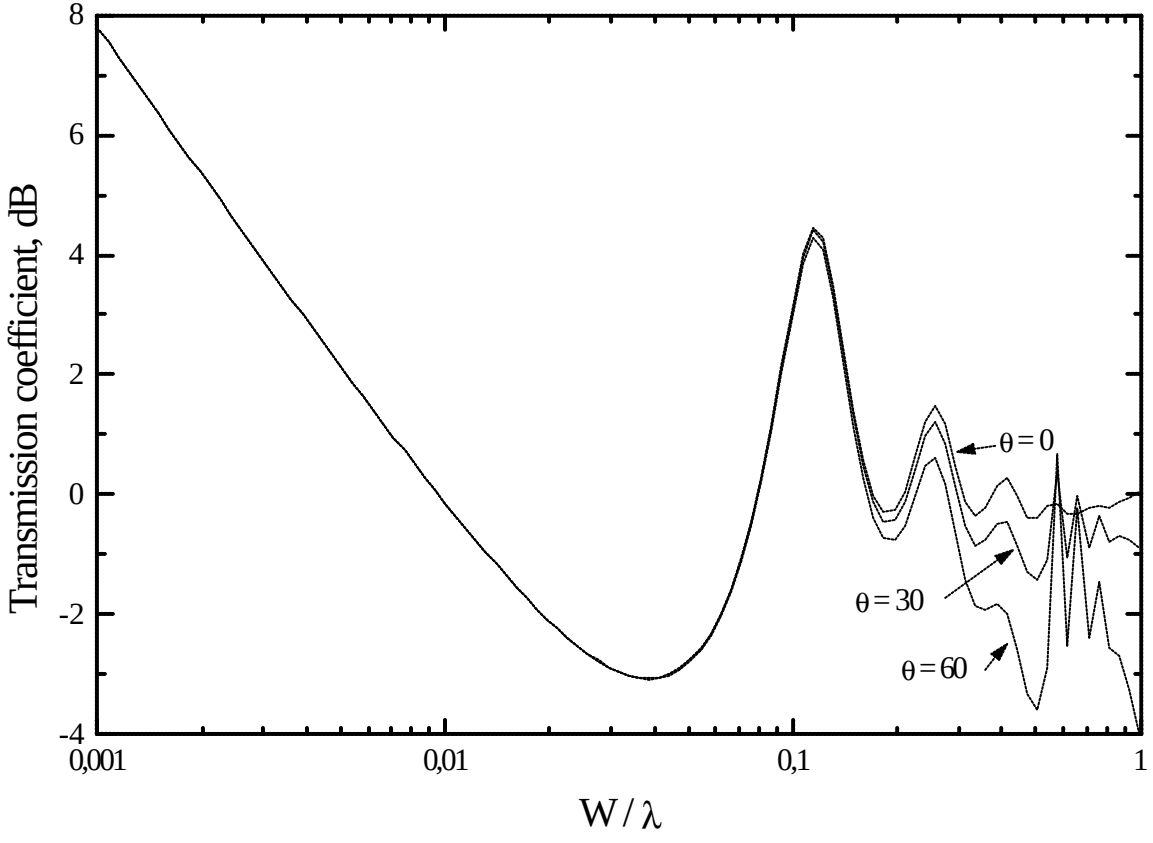
Transmissionskoefficient för TE-polarisation



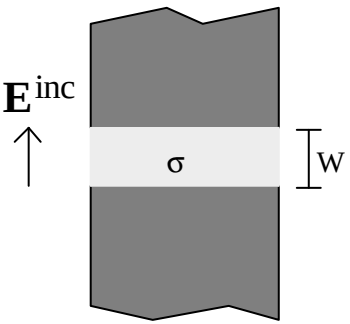


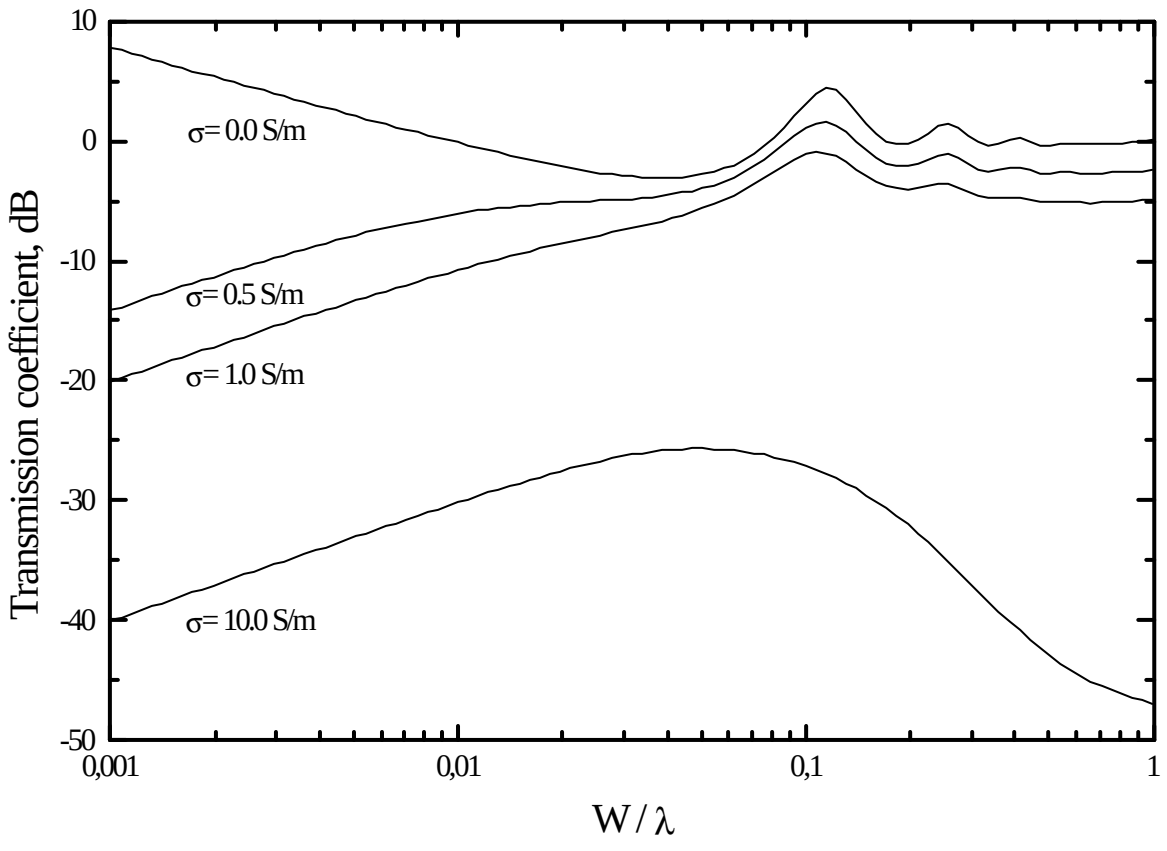
Transmissionskoefficient för TE-polarisation



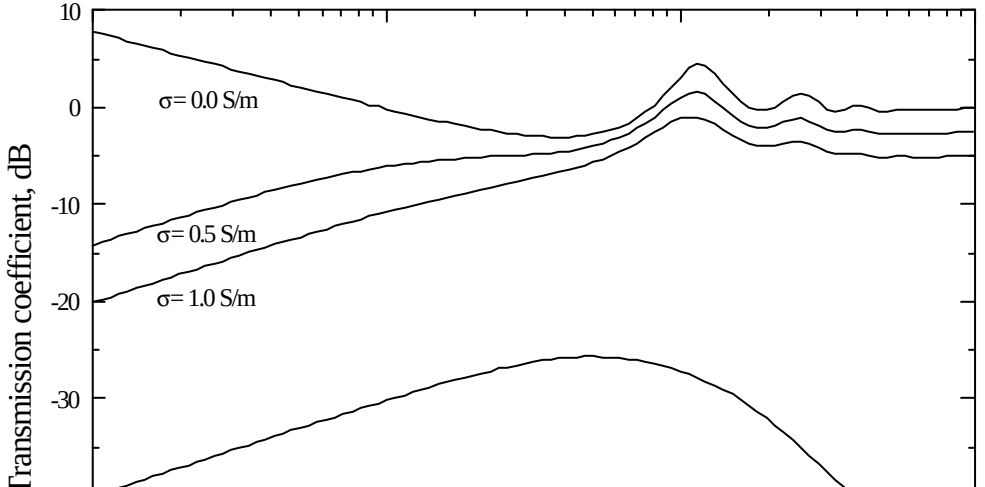


Ledande packningar – TE-polarisation





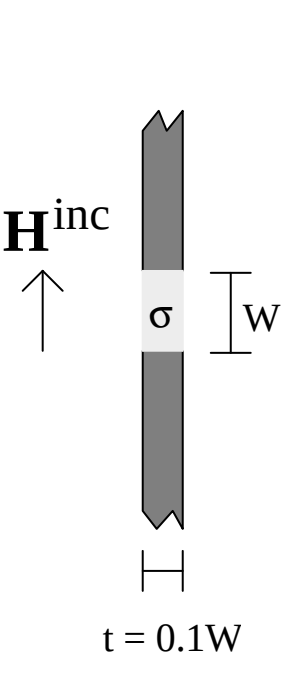
Ledande packningar – TE-polarisation

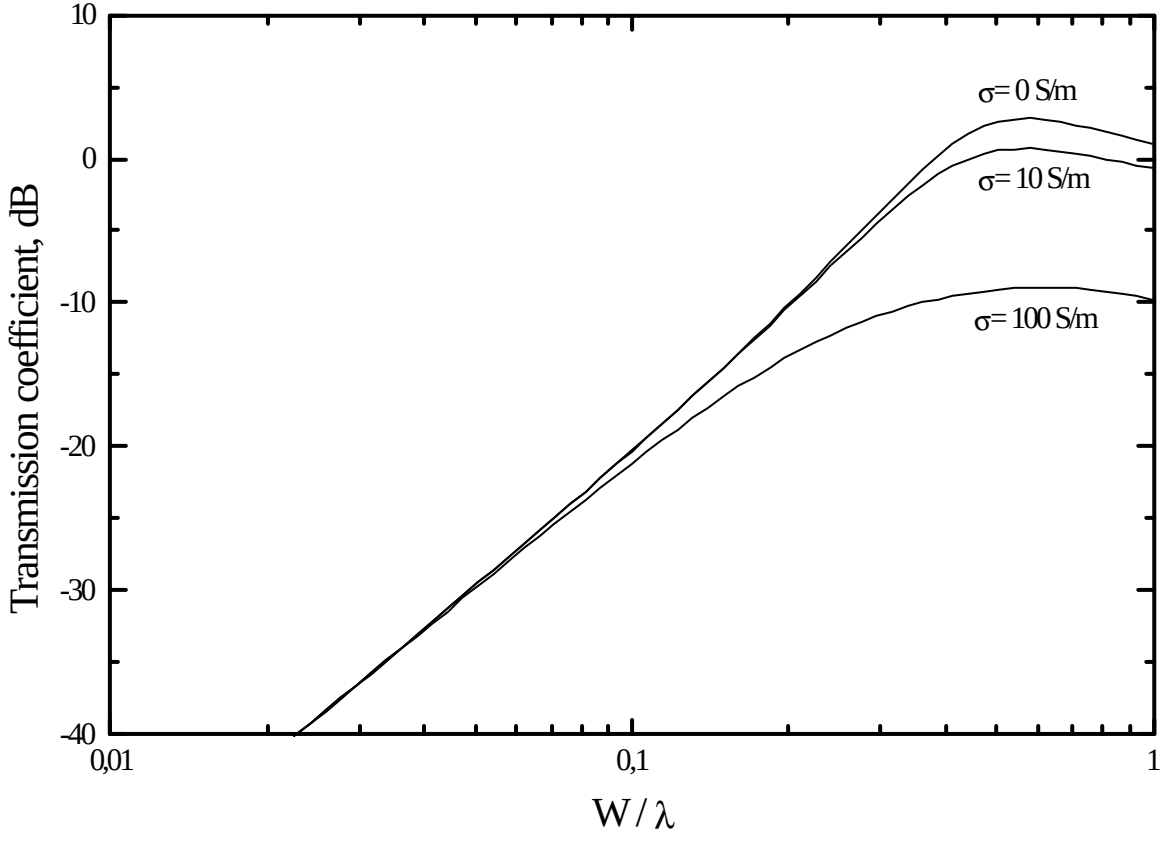


För låga frekvenser: $$T \propto \frac{\sqrt{W}}{s} \propto \sqrt{W}R$$

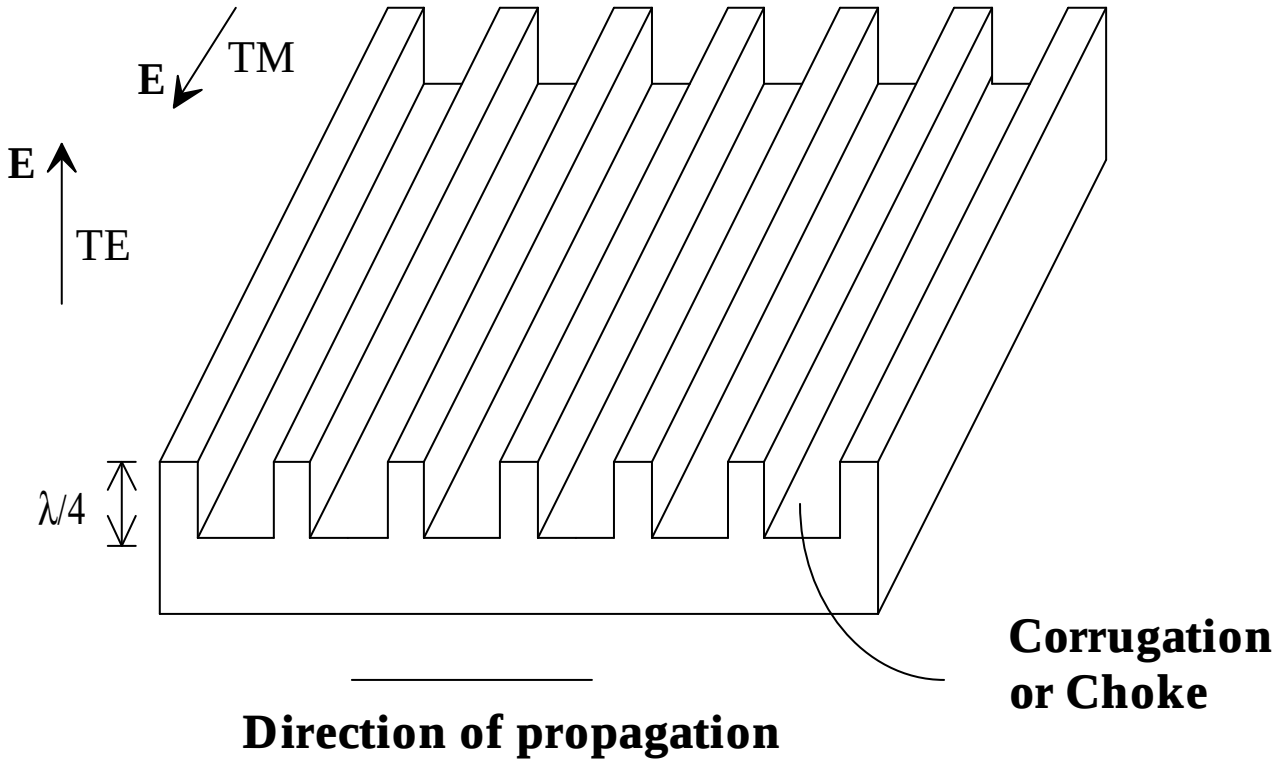
R = Resistansen i packningen

Ledande packningar – TM-polarisation

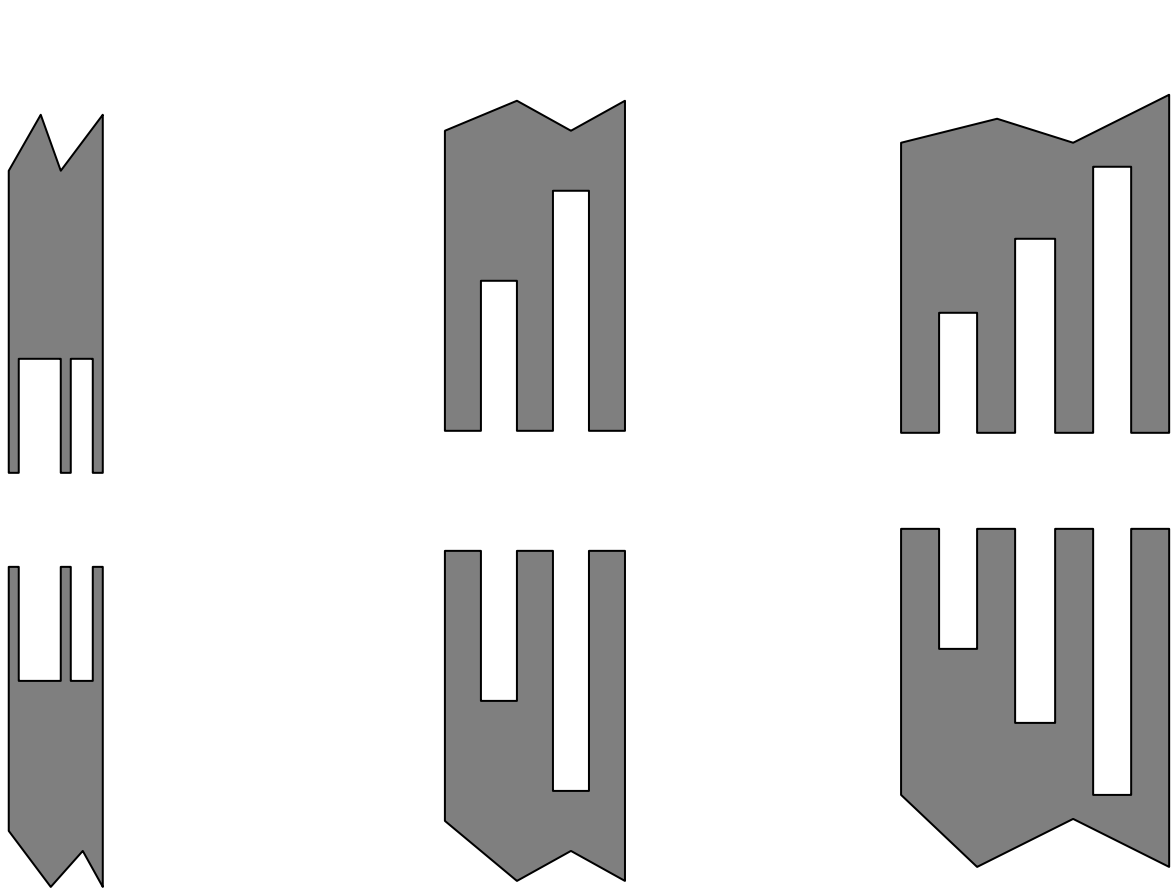




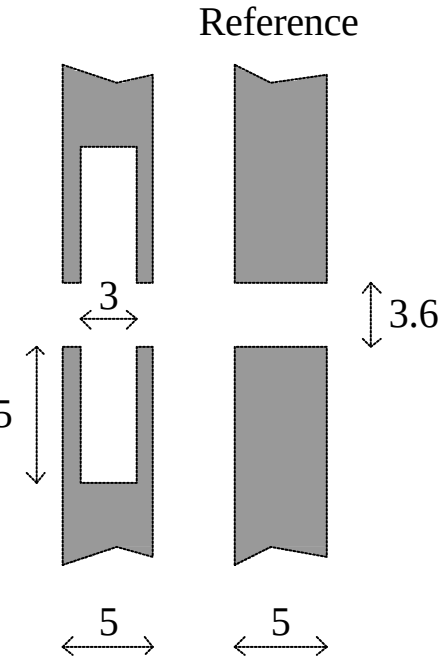
Mjuka ytor - Korrugeringar

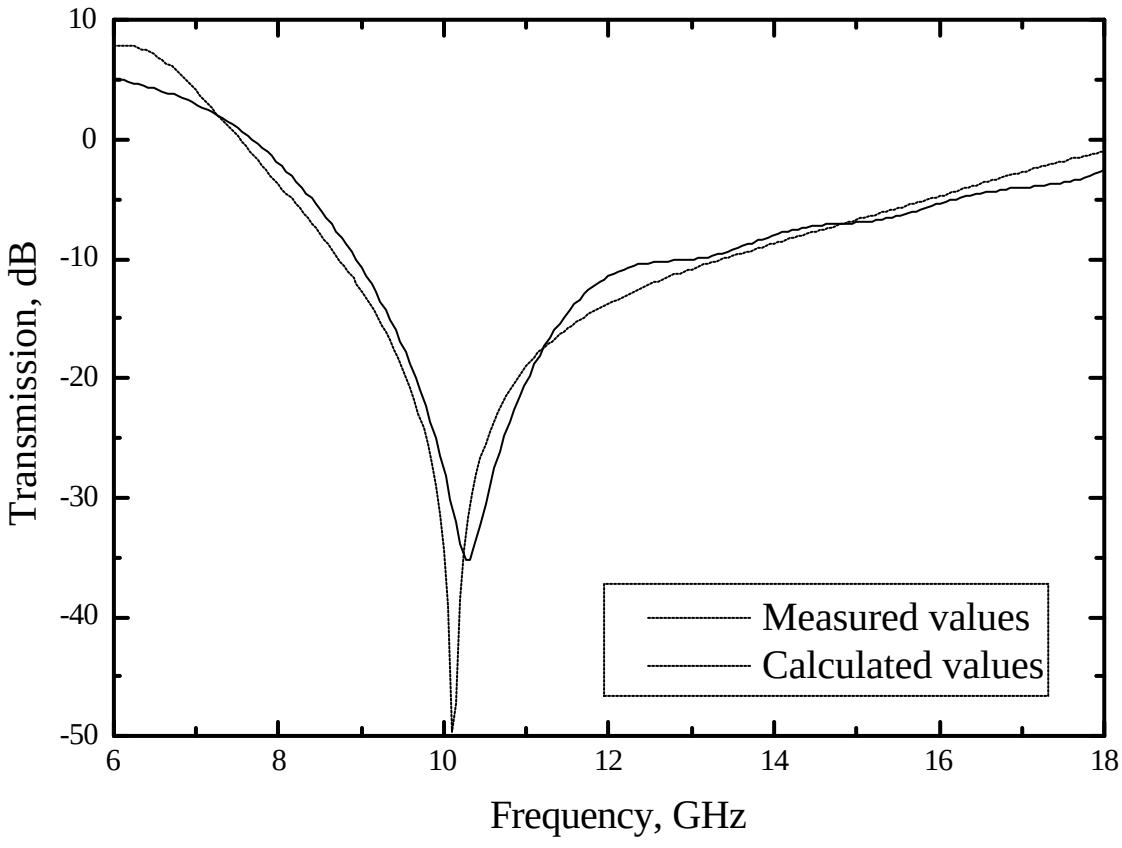


Korrugeringar applicerade på slits

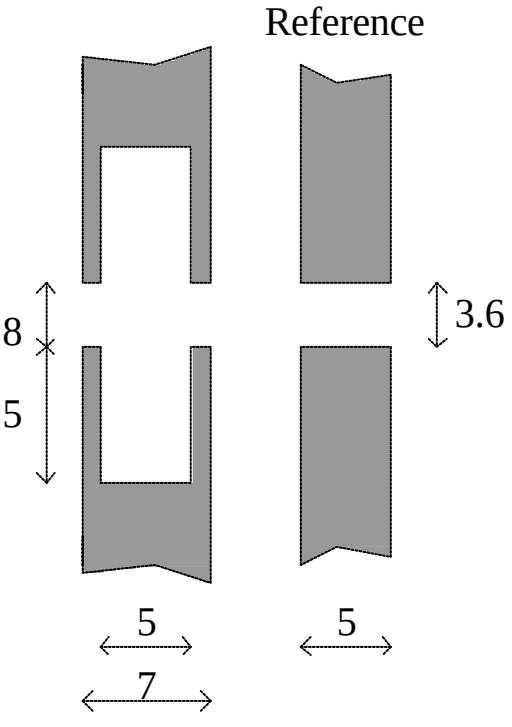


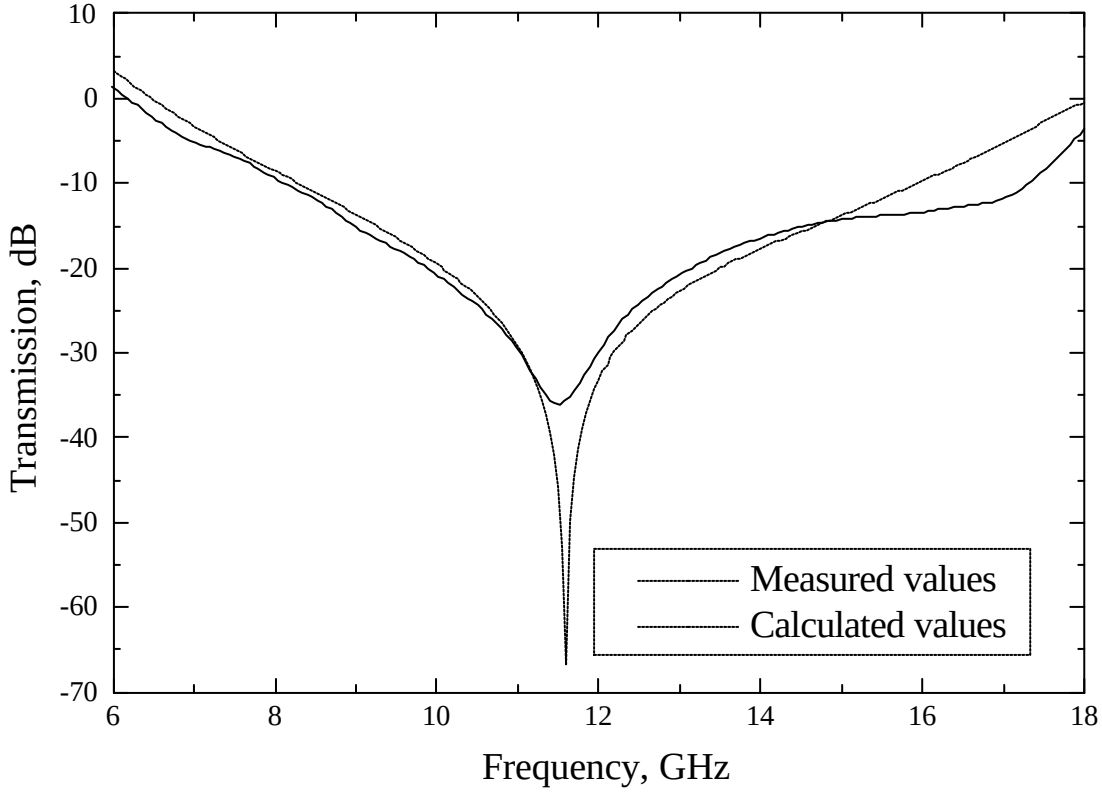
Korrugering i praktiken 1



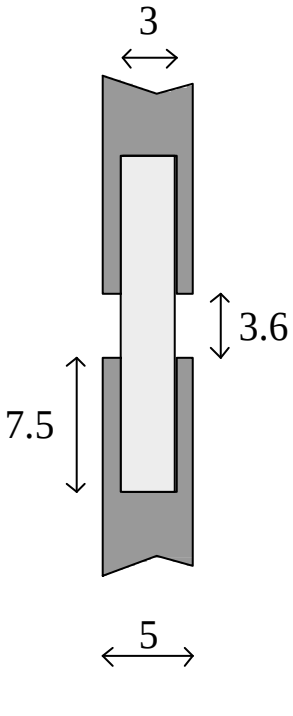


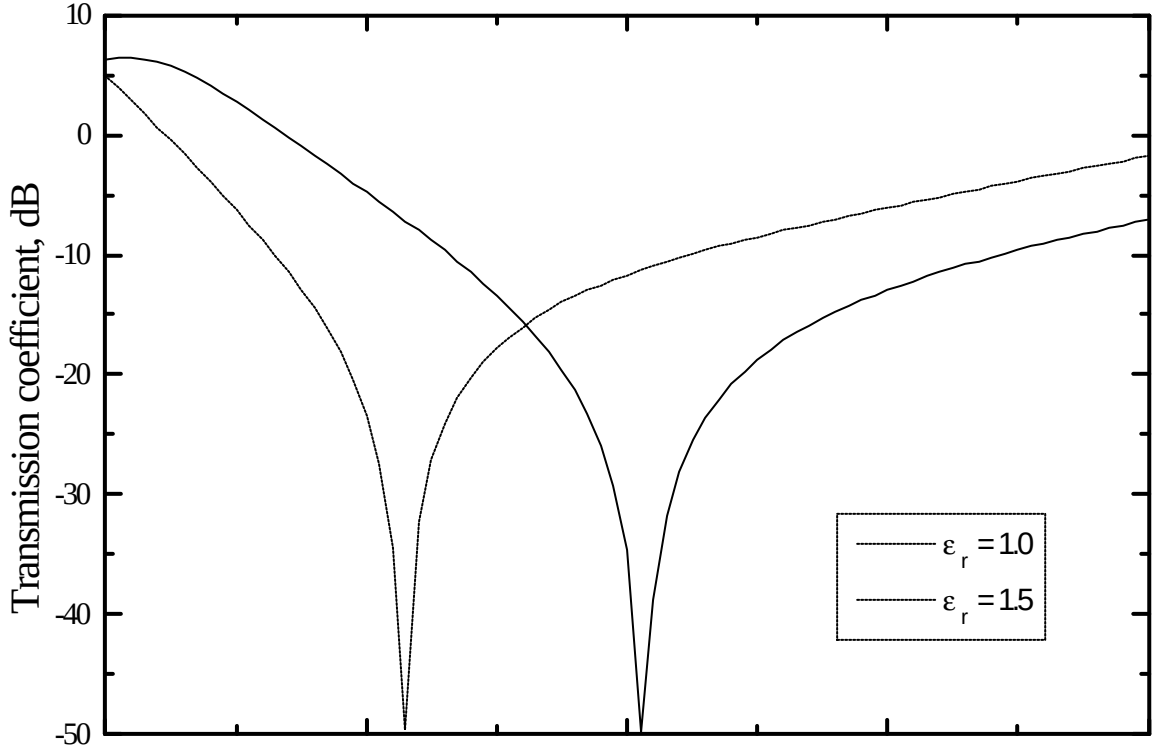
Korrugering i praktiken 2





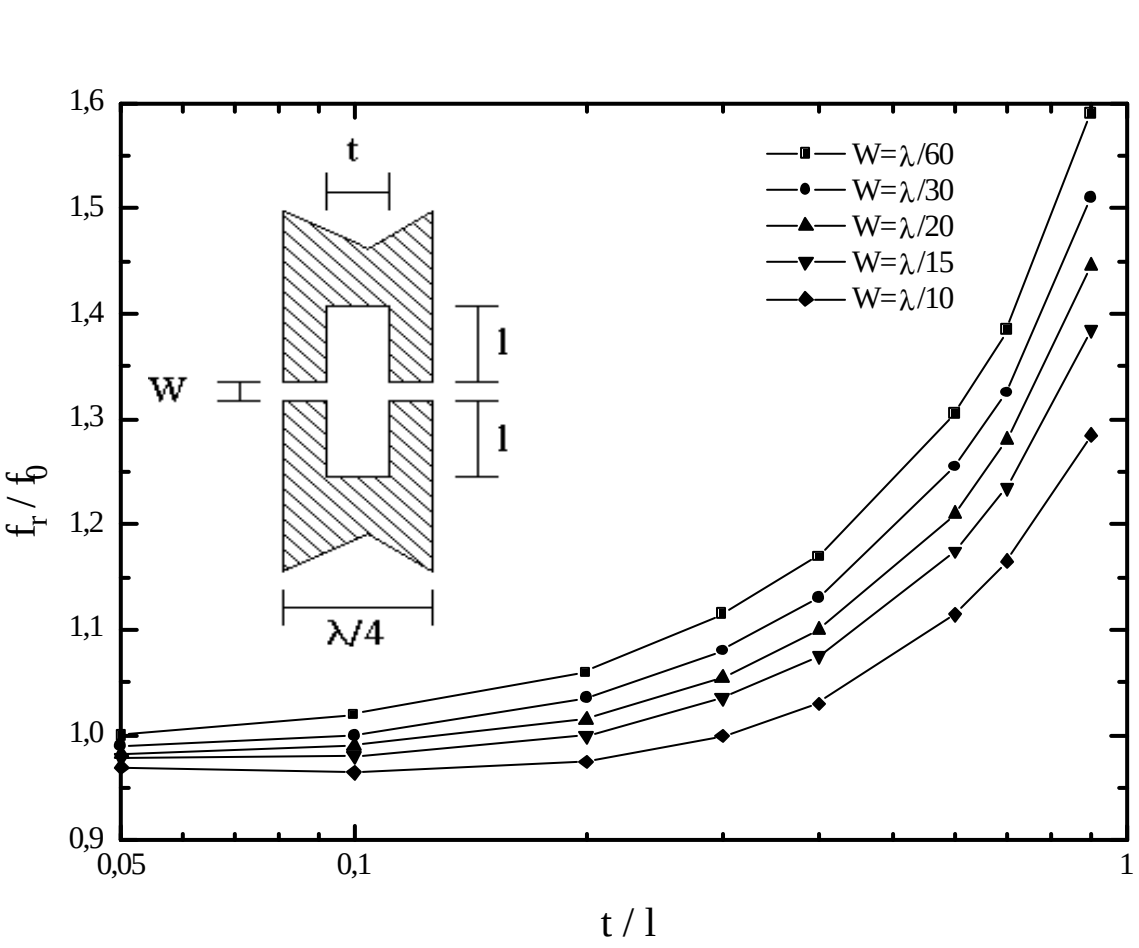
Korrugering - Resonansfrekvens



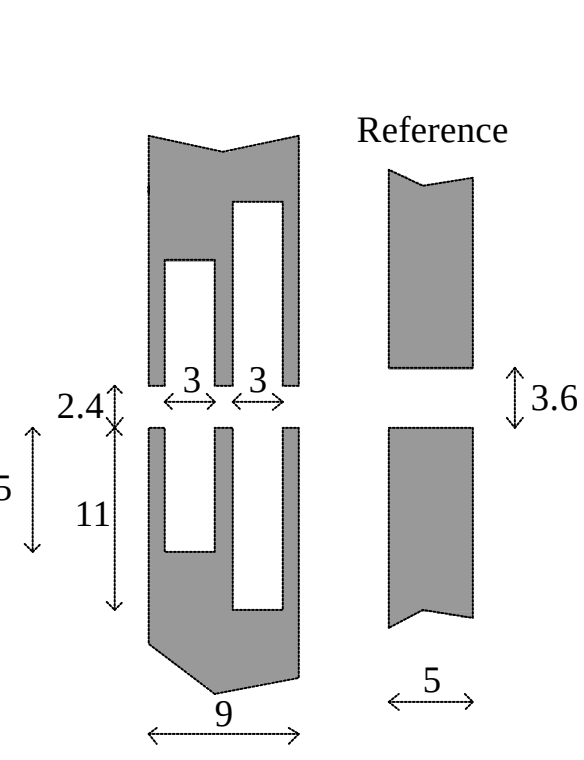


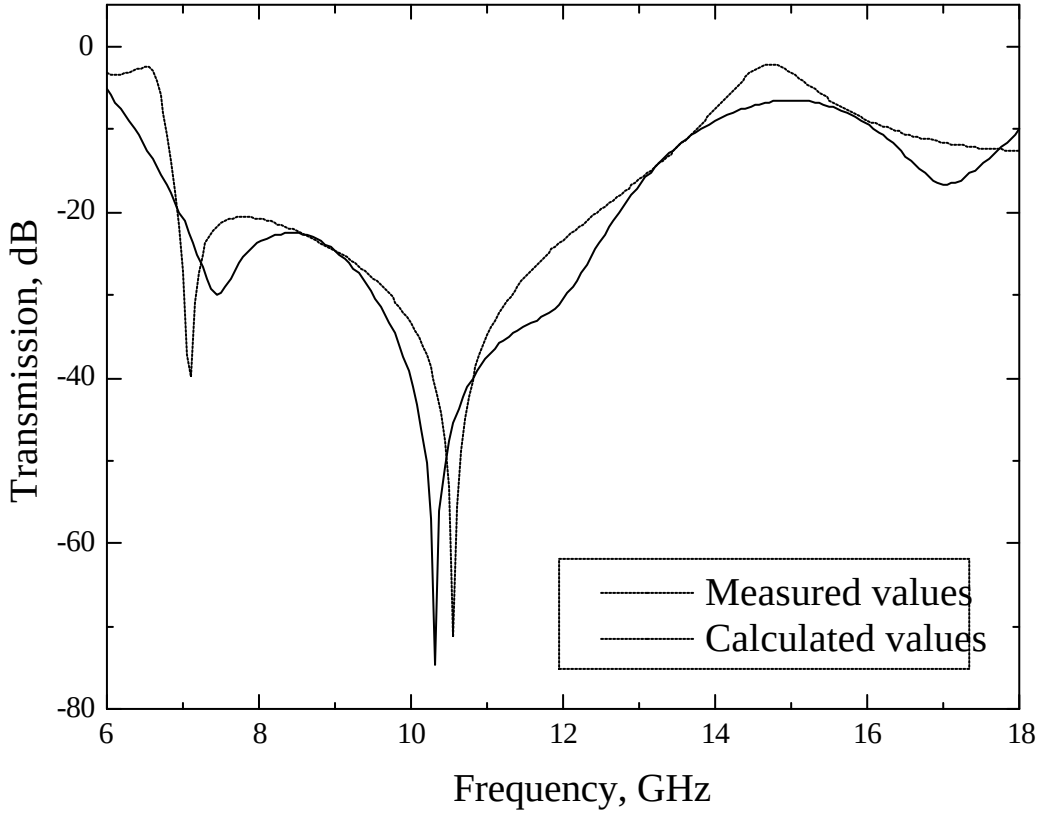
$$\frac{f_1}{f_2} \approx \sqrt{\frac{e_{r2}}{e_{r1}}} = \sqrt{1.5}$$

Designkurvor - Resonansfrekvens

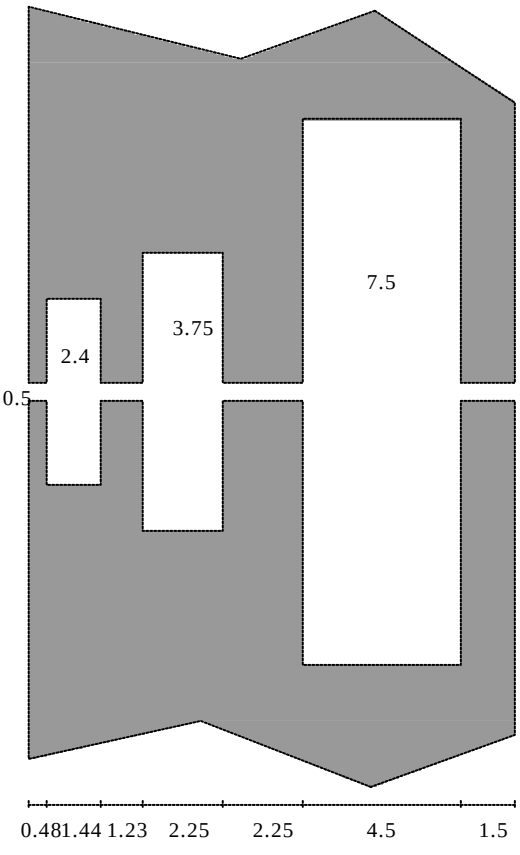


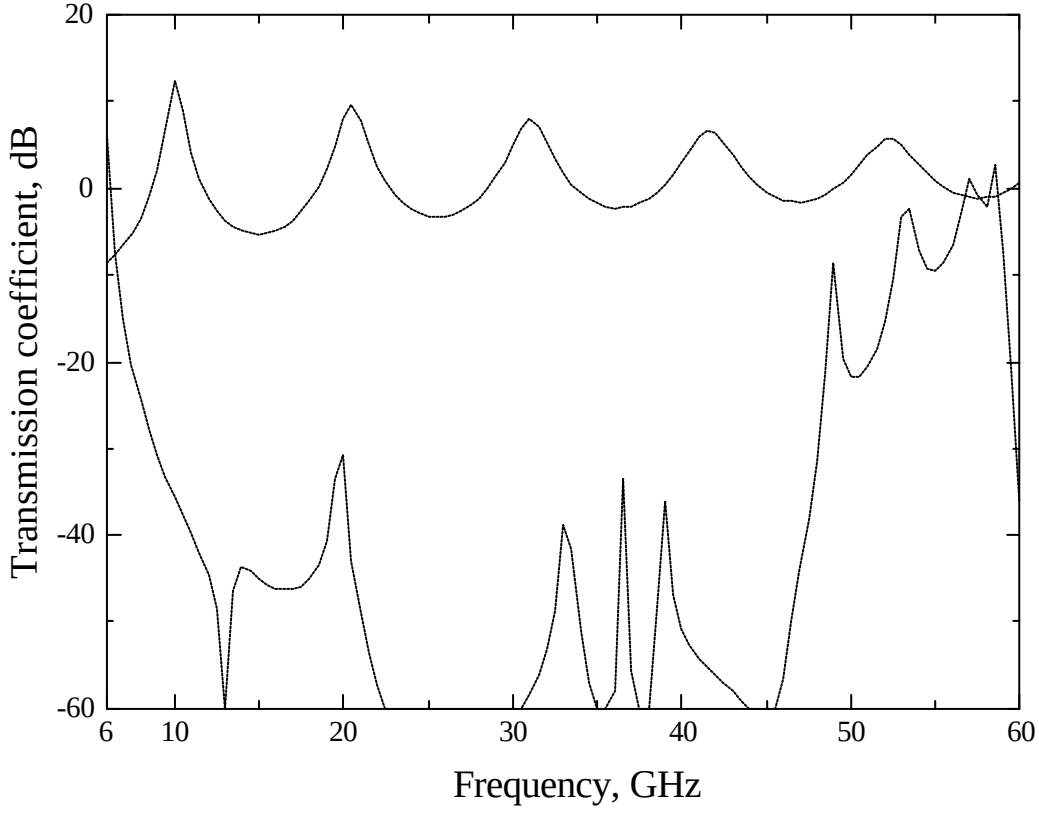
Korrugering i praktiken 3





Korrugering - Bredbandig





Slutsatser

- Packningar fungerar bra för att minska transmissionen genom slitsar
- Korrugeringar kan användas för speciella fall
- Går att åstadkomma bredbandig lösning med flera korrugeringar
- Går att beräkna numeriskt med god noggrannhet