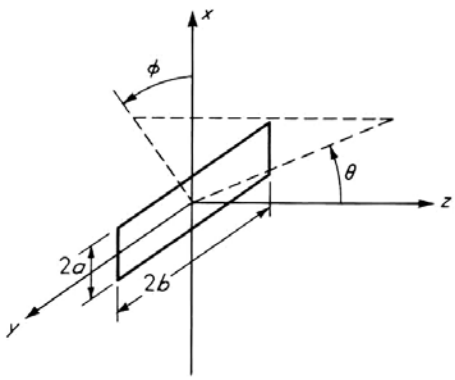
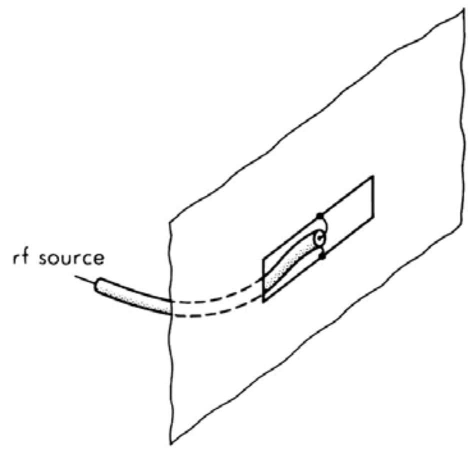
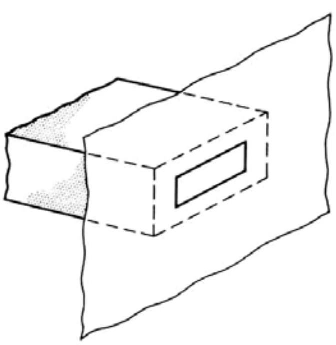
antenne a fessura



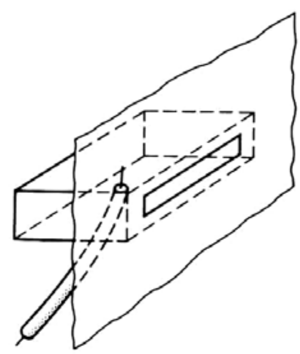
Slot in a ground plane.



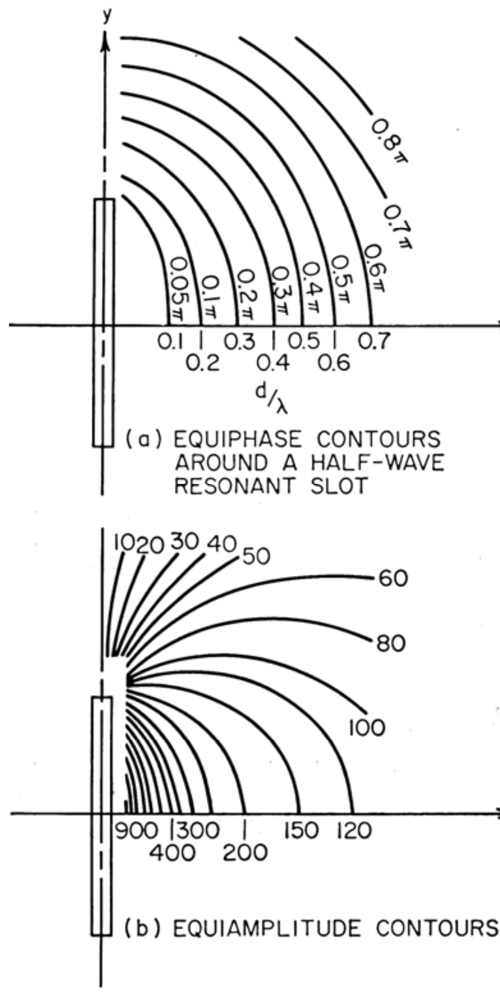
Coax-fed slot.



Endwall slot.

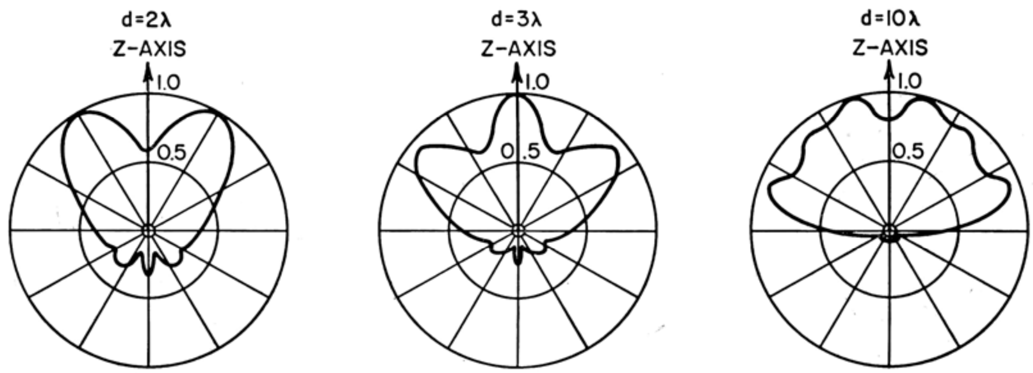


Cavity-fed slot.



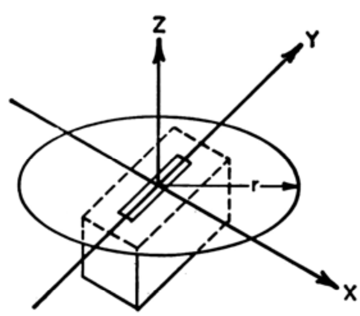
linee equilivello ed equifase della corrente superficiale
indotta in prossimità di una fenditura risonante in $\lambda/2$

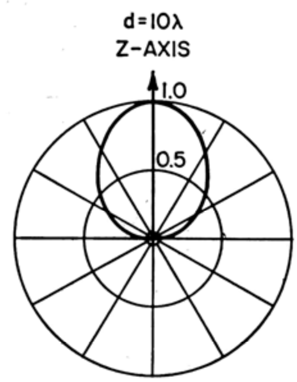
antenne a fessura risonante su piano di massa finito



(a) (b) (c)

POLAR DIAGRAM IN X, Z PLANE

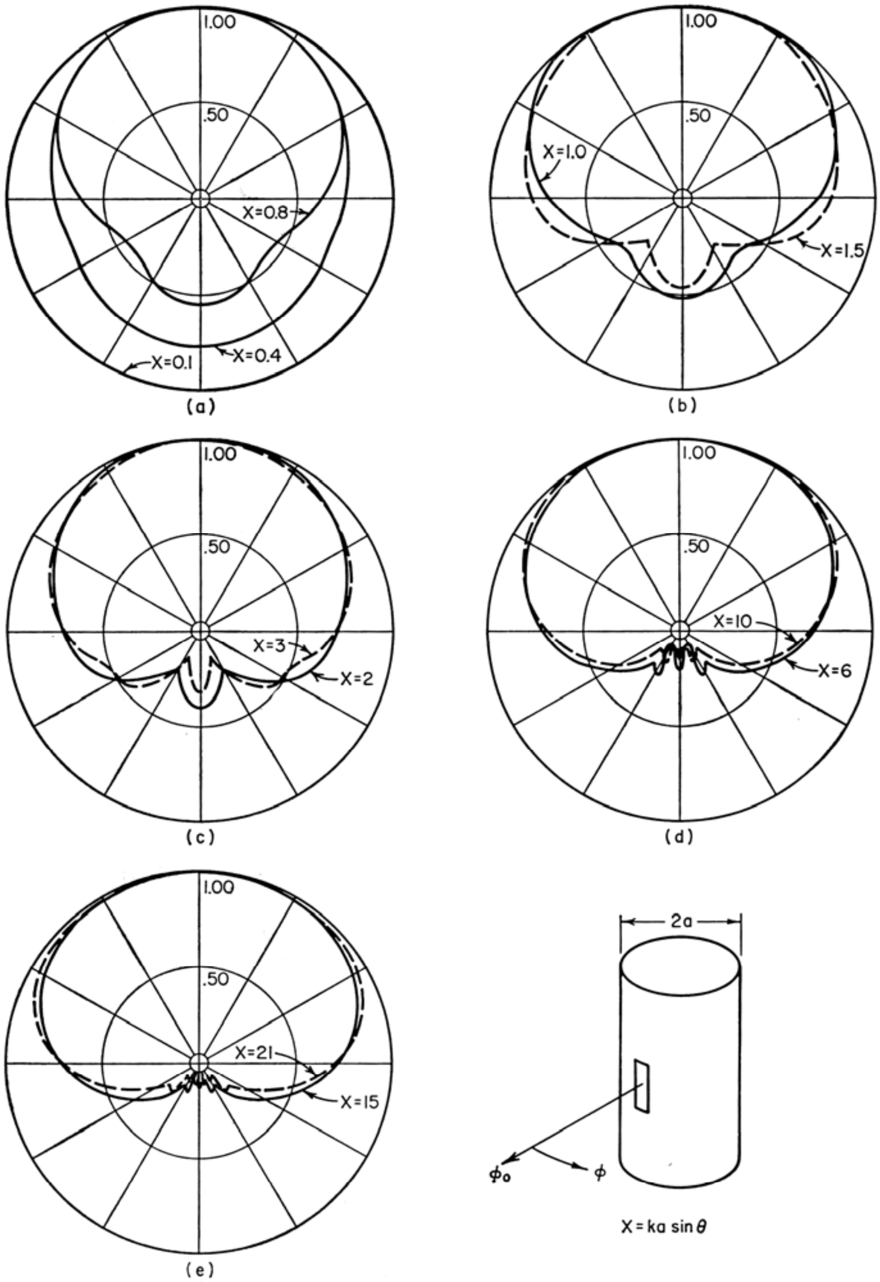




(d)

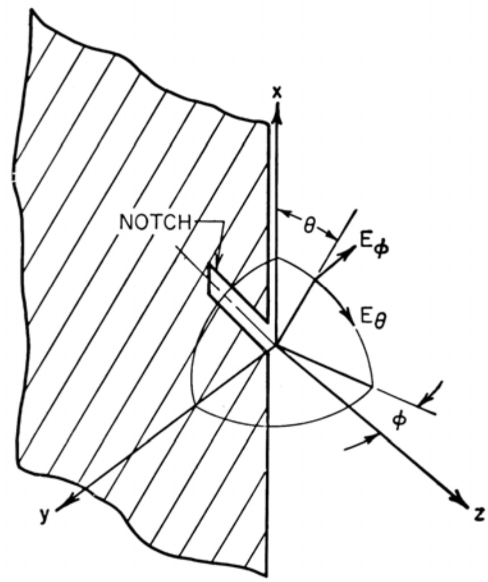
POLAR DIAGRAM IN Y, Z PLANE

antenne a fessura assiale in guida circolare



diagrammi di radiazione azimutali di una fenditura assiale:
$x = ka \sin\theta$

antenna notch
(antenna a fenditura aperta)



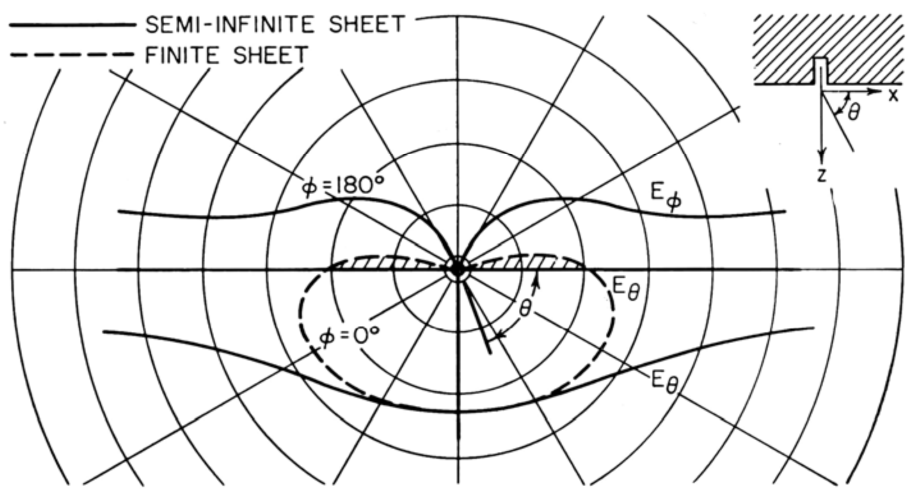
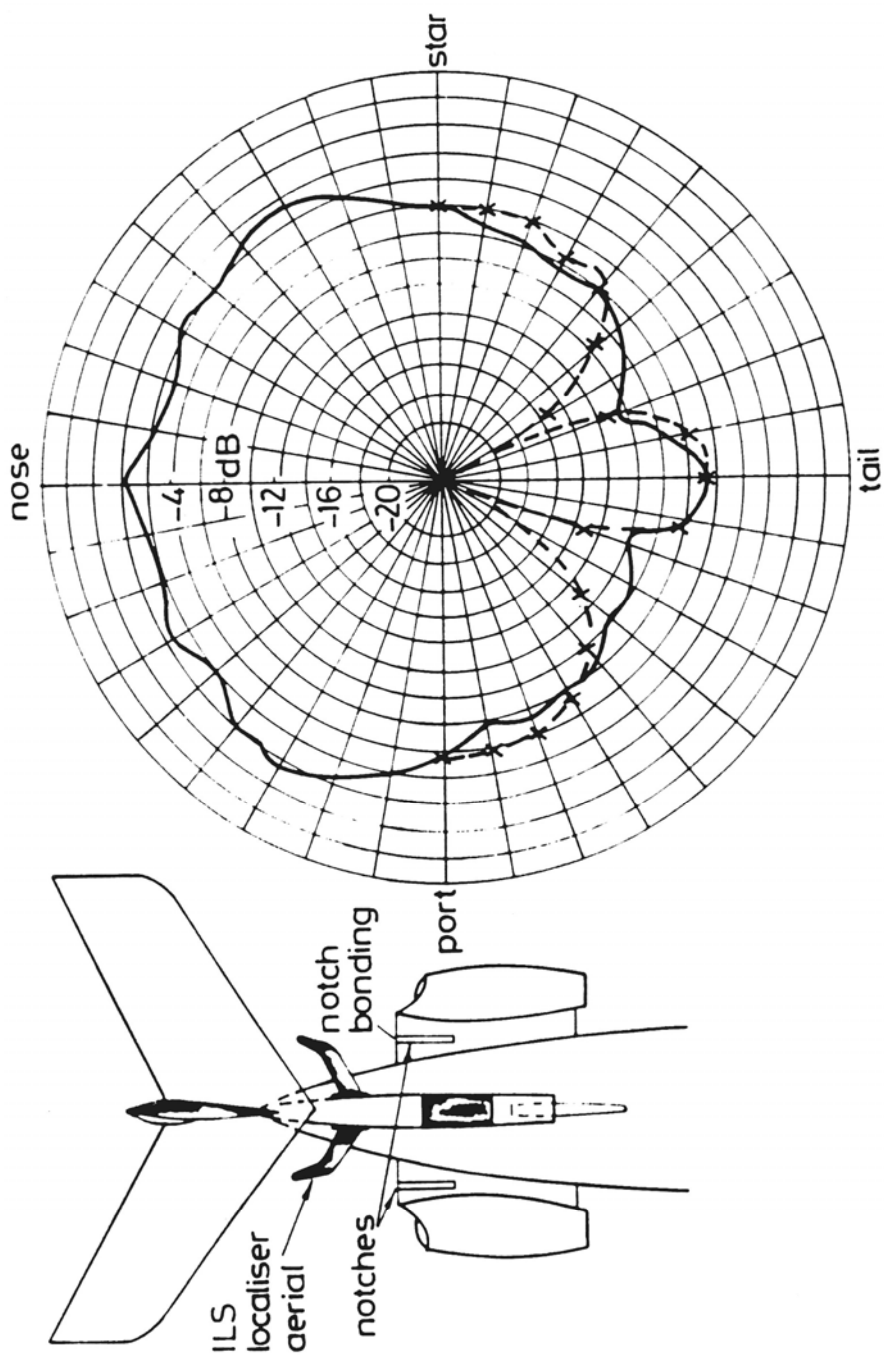


diagramma di radiazione sul piano x-z

antenna notch parassita

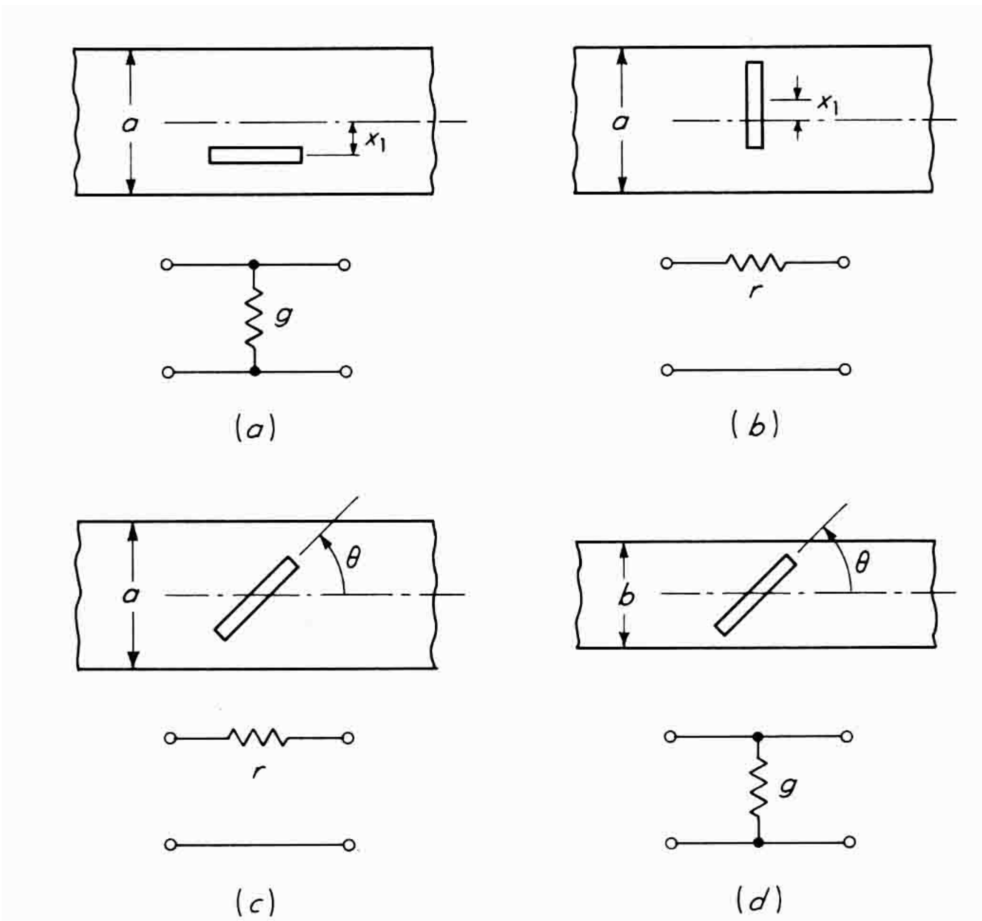


Effect of parasitic notches on ILS localiser antenna patterns

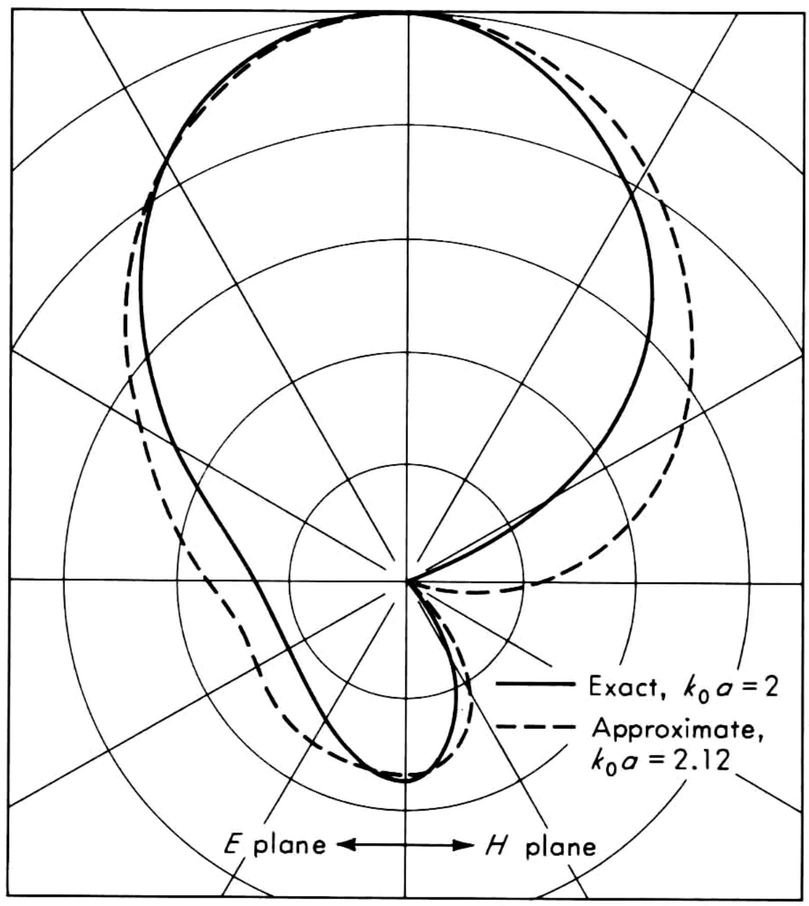
—— Notches bonded

— — — Notches unbonded

circuiti equivalenti di fenditure risonanti in guida rettangolare



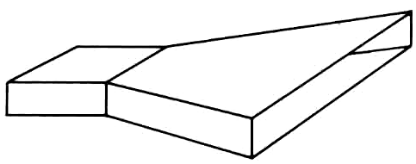
Radiazione da guida circolare troncata
(modo TE_{11})



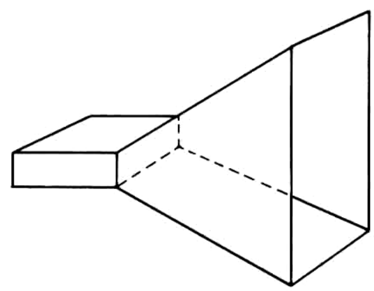
apertura del fascio a –3 dB	14.7 λ/a [gradi]	sul piano E
	18.6 λ/a [gradi]	sul piano H
direttività	$10.5\ \pi\ a^2 / \lambda^2$	

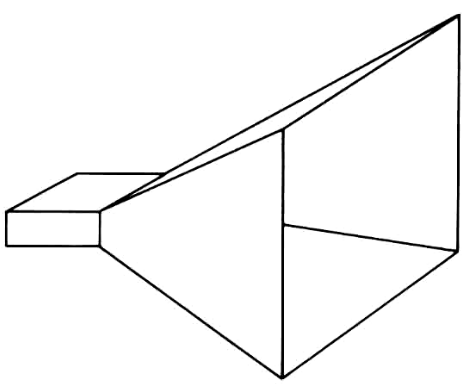
antenne a tromba

tromba settoriale sul piano H

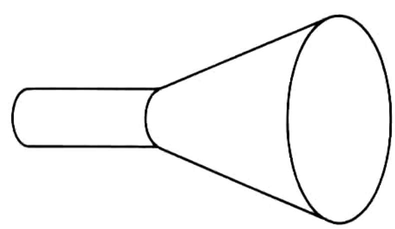


tromba settoriale sul piano E



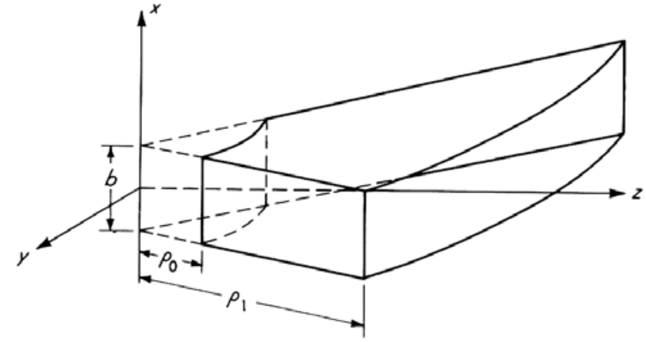


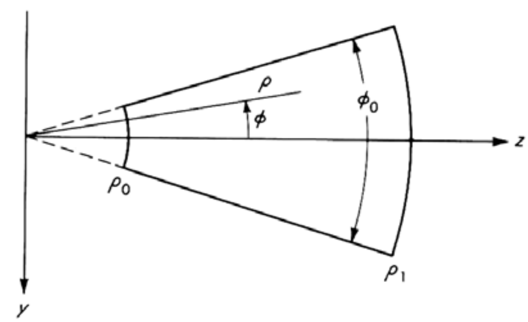
tromba piramidale



tromba conica

tromba sul piano H
modo dominante in guida radiale



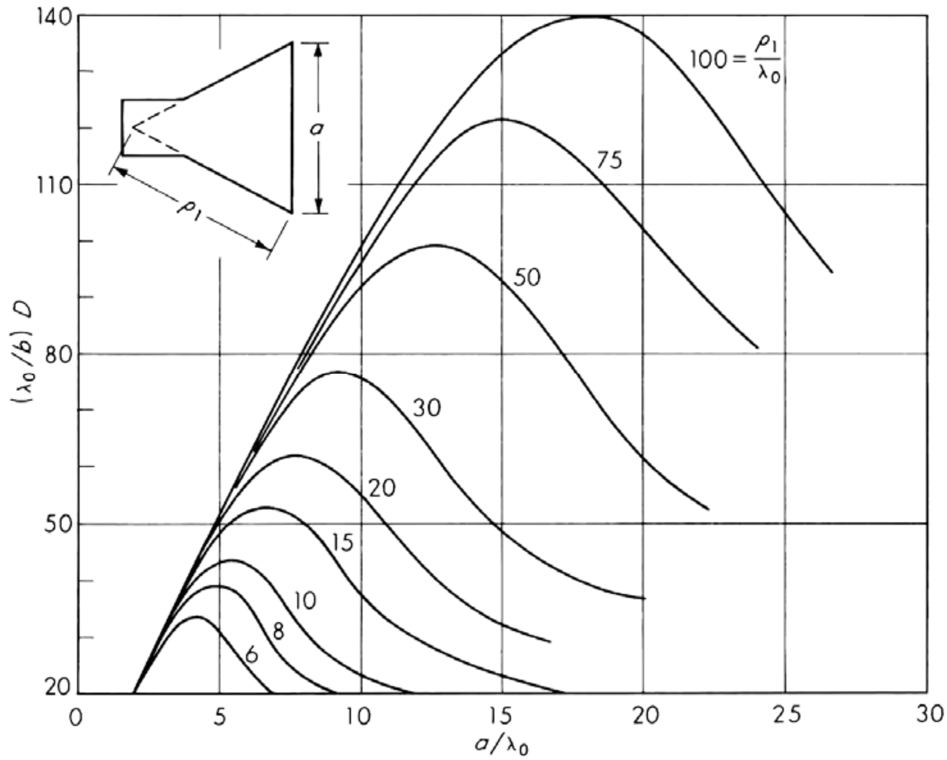


$$\begin{cases} E_x = A\cos\nu\varphi \, H_\nu(k_o\rho) \\ H_\varphi = -j\,\dfrac{A}{\eta}\cos\nu\varphi\,\dfrac{\partial H_\nu(k_o\rho)}{\partial(k_o\rho)} \\ H_\rho = -j\,\dfrac{A}{\eta}\,\nu\sin\nu\varphi\,\dfrac{H_\nu(k_o\rho)}{k_o\rho} \end{cases} \qquad \nu = \frac{m\pi}{\varphi_o} \qquad \text{(m dispari)}$$

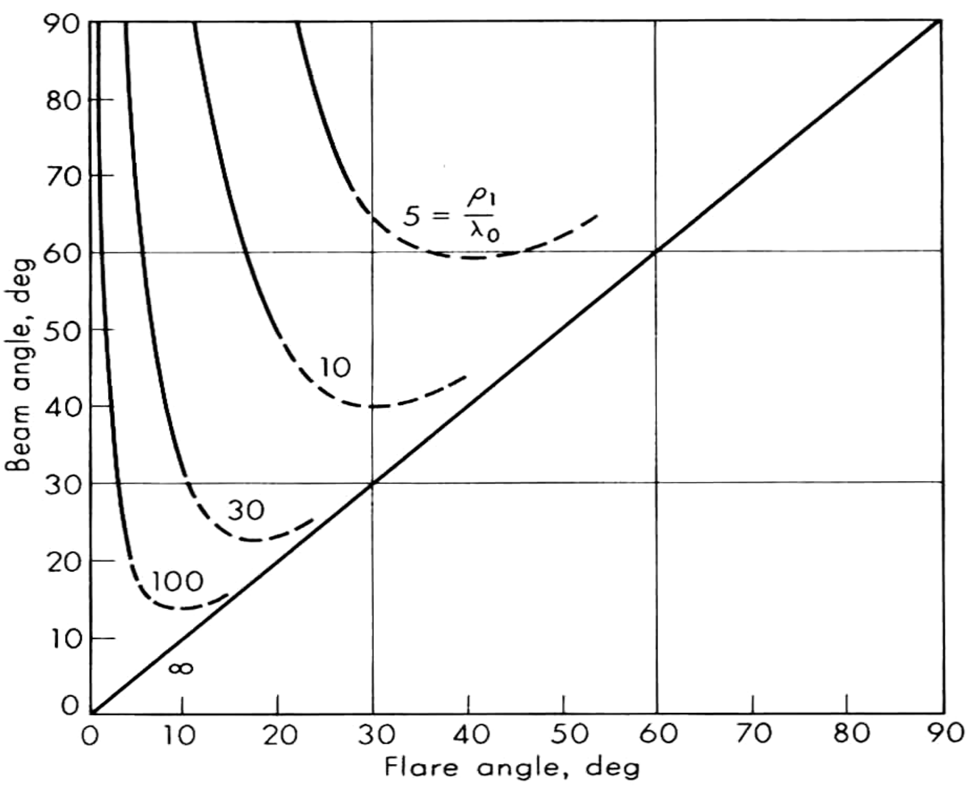
$$H_\nu(k_o\rho) \to \sqrt{\frac{2}{\pi\,k_o\rho}}\; e^{-j\left(k_o\rho-\pi\frac{2\nu+1}{4}\right)}$$

$$\frac{\partial H_\nu(k_o\rho)}{\partial(k_o\rho)} \to -j\sqrt{\frac{2}{\pi\,k_o\rho}}\; e^{-j\left(k_o\rho-\pi\frac{2\nu+1}{4}\right)}$$

antenna a tromba settoriale piano H

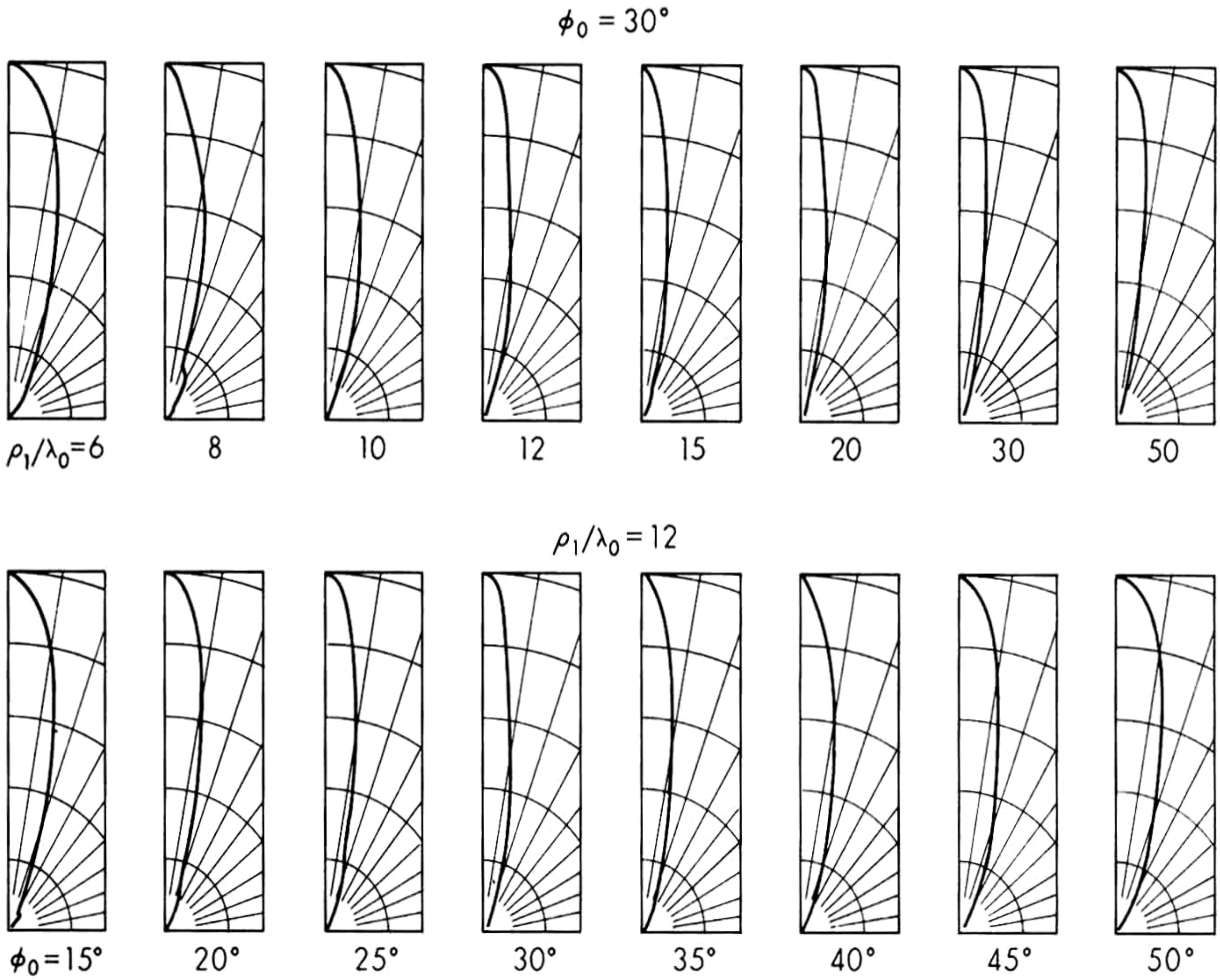


direttività



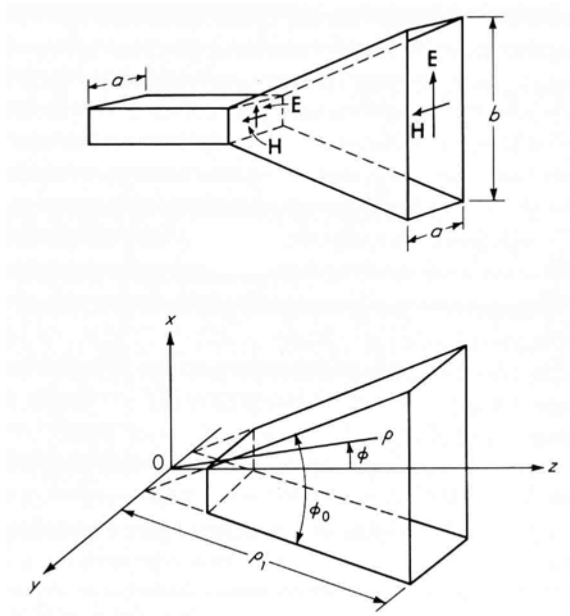
apertura
del fascio

antenna a tromba settoriale piano H



diagrammi di radiazione sul piano H

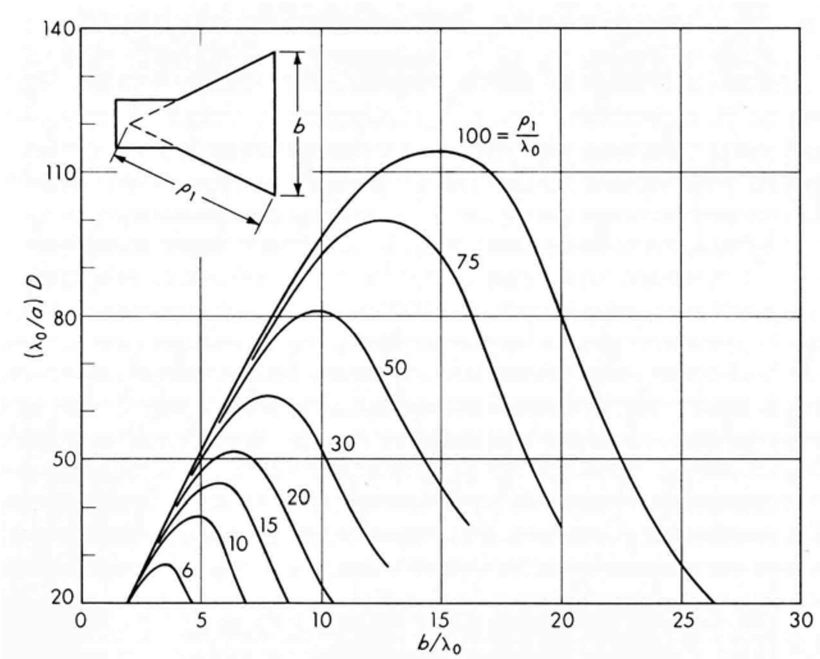
tromba sul piano E
modo dominante in guida radiale



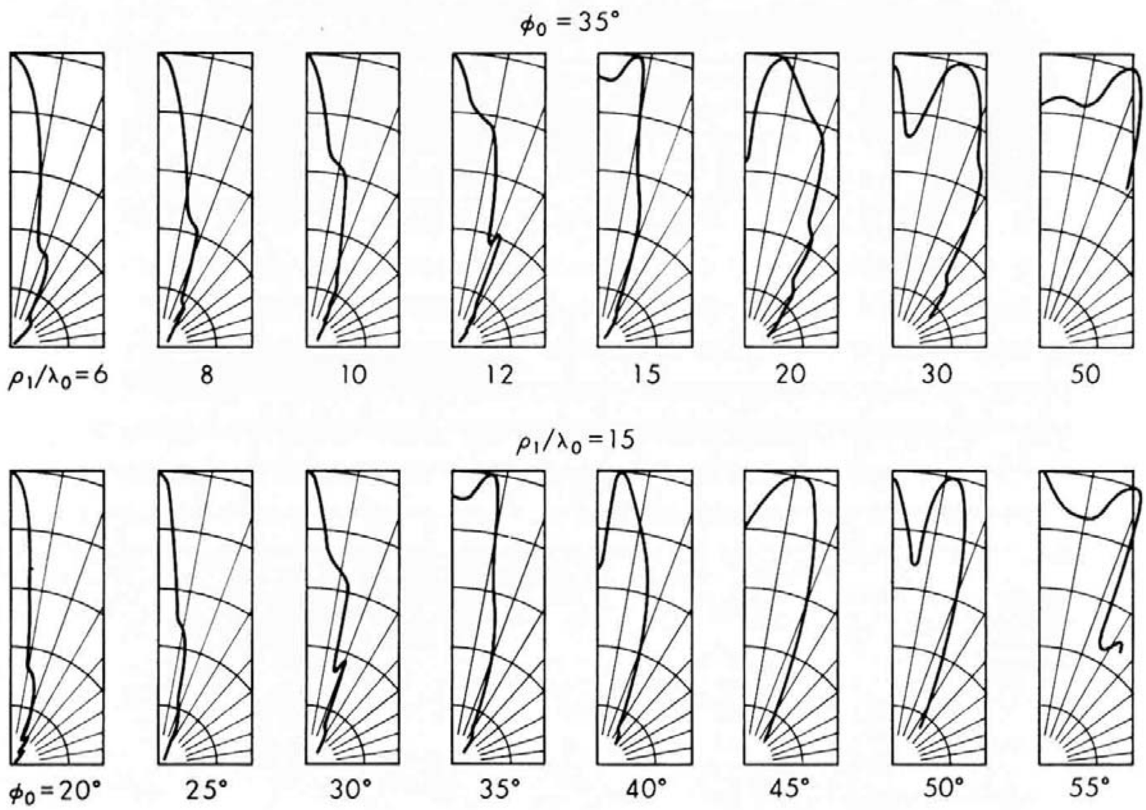
$$\begin{cases} E_\varphi = B\cos\frac{n\pi y}{a} H_1(\gamma\rho) \\ H_y = j\,\frac{B}{\eta}\cos\frac{n\pi y}{a}\,\frac{\partial H_1(\gamma\rho)}{\partial(\gamma\rho)} \\ H_\rho = -j\,B\frac{n\pi}{\eta k_o a}\sin\frac{n\pi y}{a} H_1(\gamma\rho) \end{cases}$$

$$\gamma = \sqrt{k_o^2 - \left(\frac{n\pi}{a}\right)^2}$$

antenna a tromba settoriale piano E

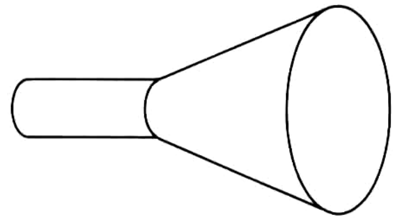


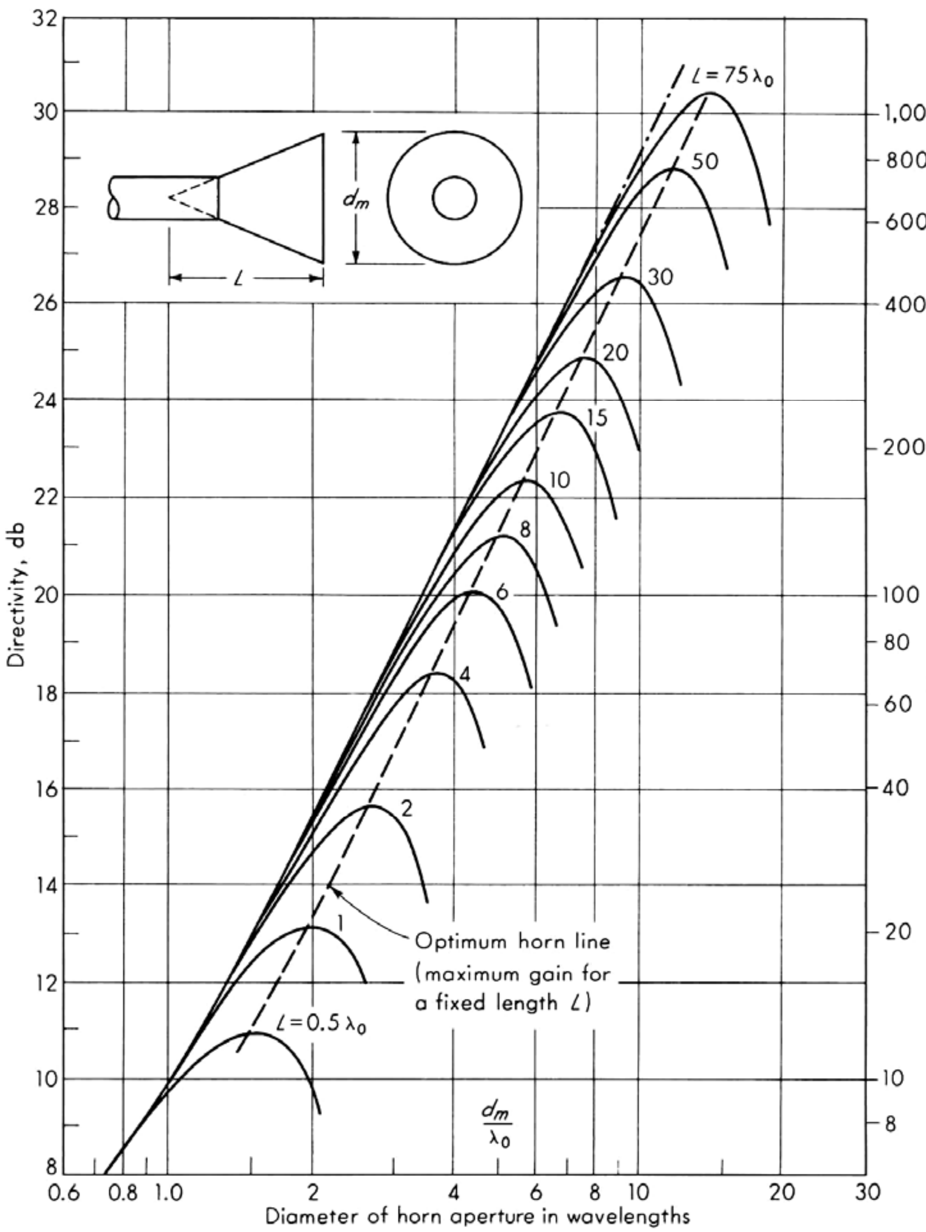
direttività



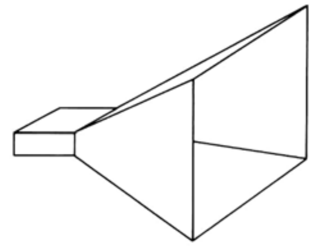
diagrammi di radiazione sul piano E

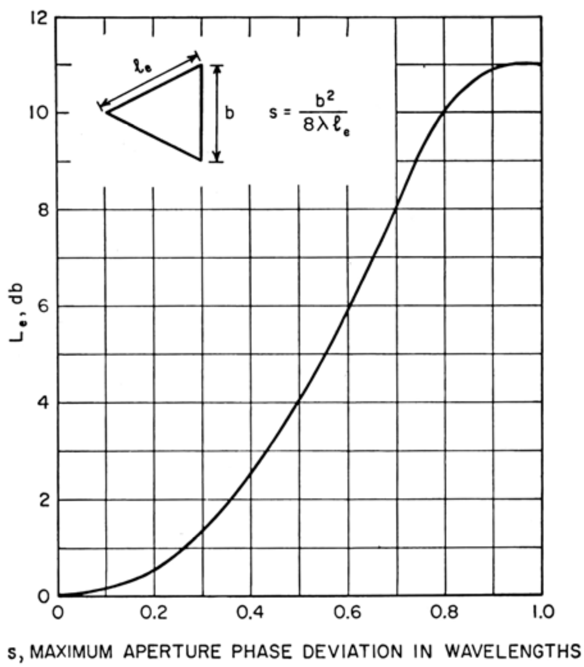
antenna a tromba conica

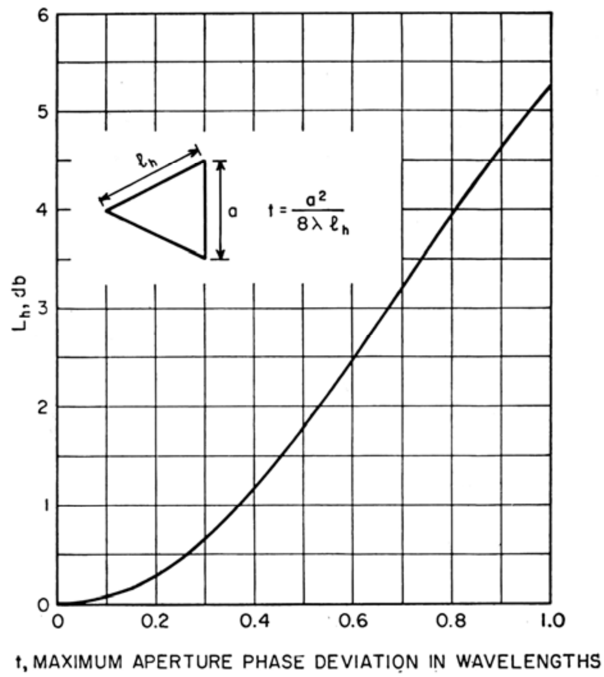




antenna a tromba piramidale







s, *t* = massima differenza di fase in lunghezze d’onda sul piano E e sul piano H

L_e , L_h = corrispondenti fattori correttivi del guadagno [dB]

$$g = 10\left(1.008 + Log\,\frac{a\,b}{\lambda^2}\right) - (L_e + L_h) \qquad [\mathrm{dB}]$$

antenna a tromba piramidale ottimizzata

la tromba ottimizzata è quella che ha il massimo guadagno a parità di lunghezza. Questa situazione si trova se tra le dimensioni dell'apertura e le lunghezze l_e e l_h sono rispettate le seguenti relazioni:

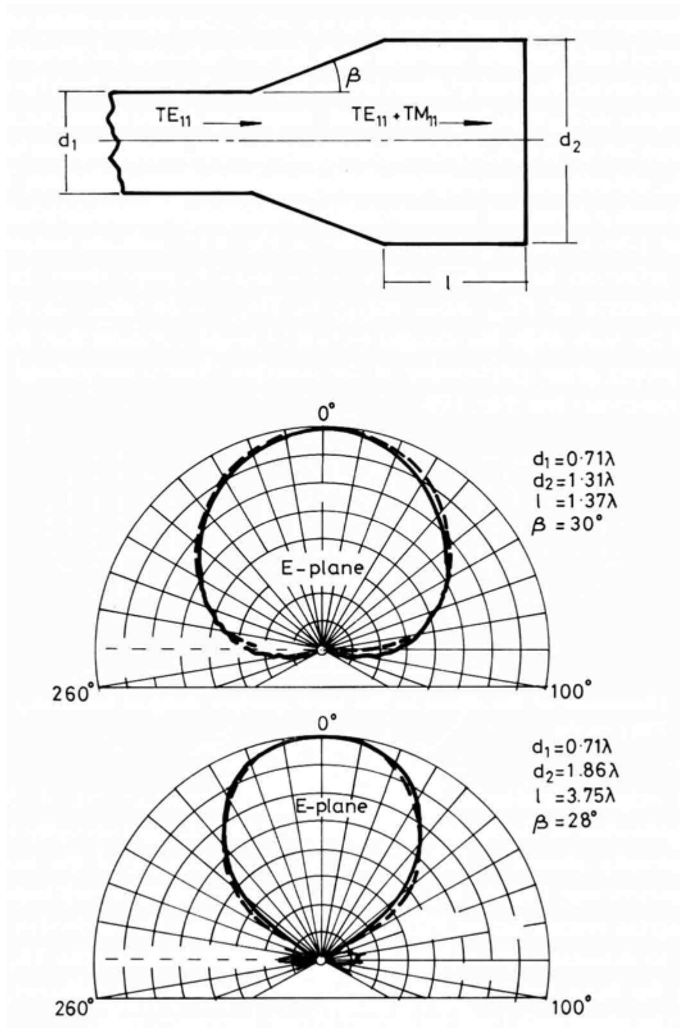
$$a = \sqrt{3\lambda \, \ell_h} \qquad\qquad b = \sqrt{3\lambda \, \ell_e}$$

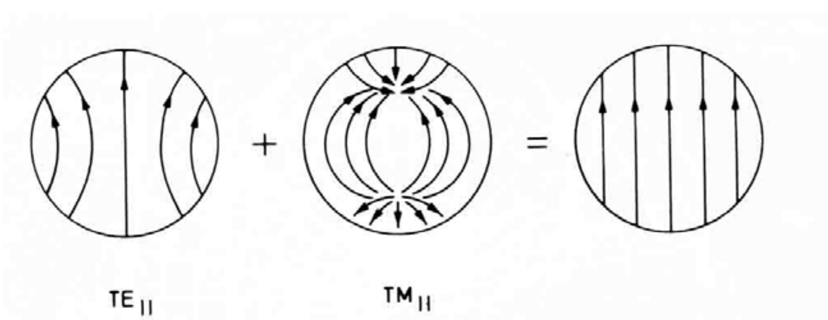
in queste condizioni risulta:

$$A_{eff} \approx \frac{A}{2}$$

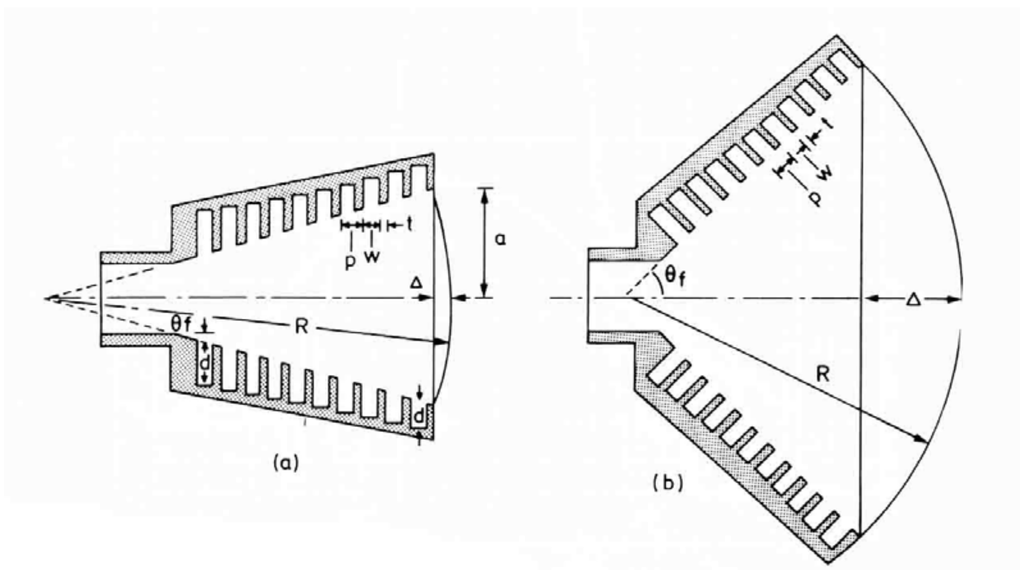
$$g = 10\left(0.808 + Log\,\frac{a\,b}{\lambda^2}\right) \qquad \text{[dB]}$$

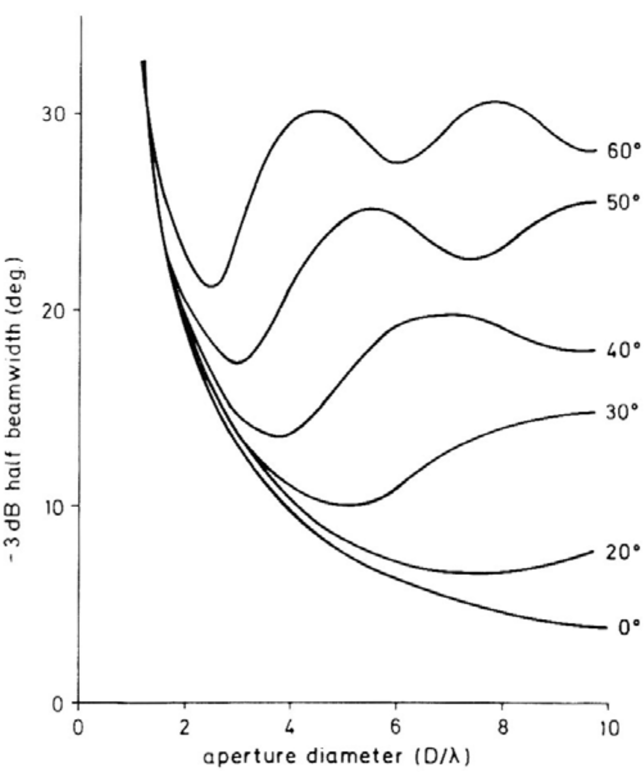
antenna a tromba bimodale



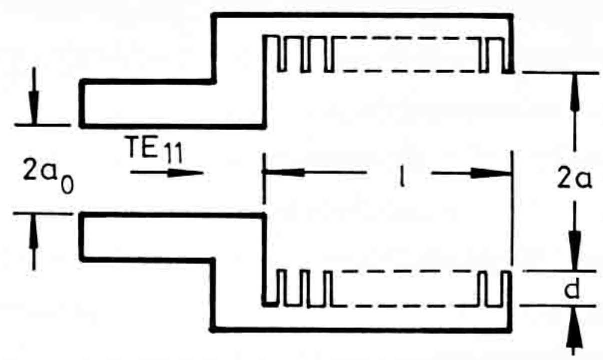


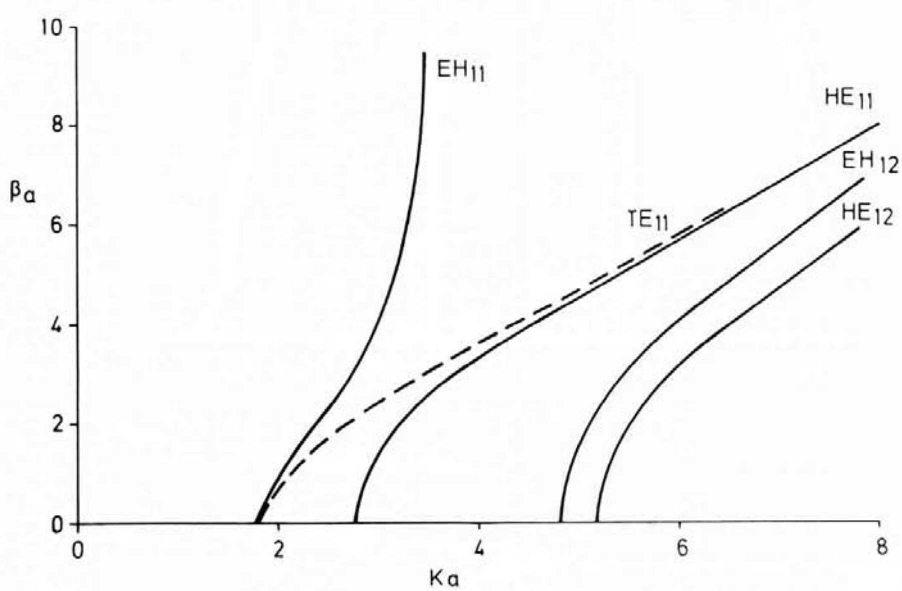
antenna a tromba corrugata
(modi ibridi)





antenna a tromba corrugata multimodale





dispersione dei primi modi sopportati dalla guida corrugata