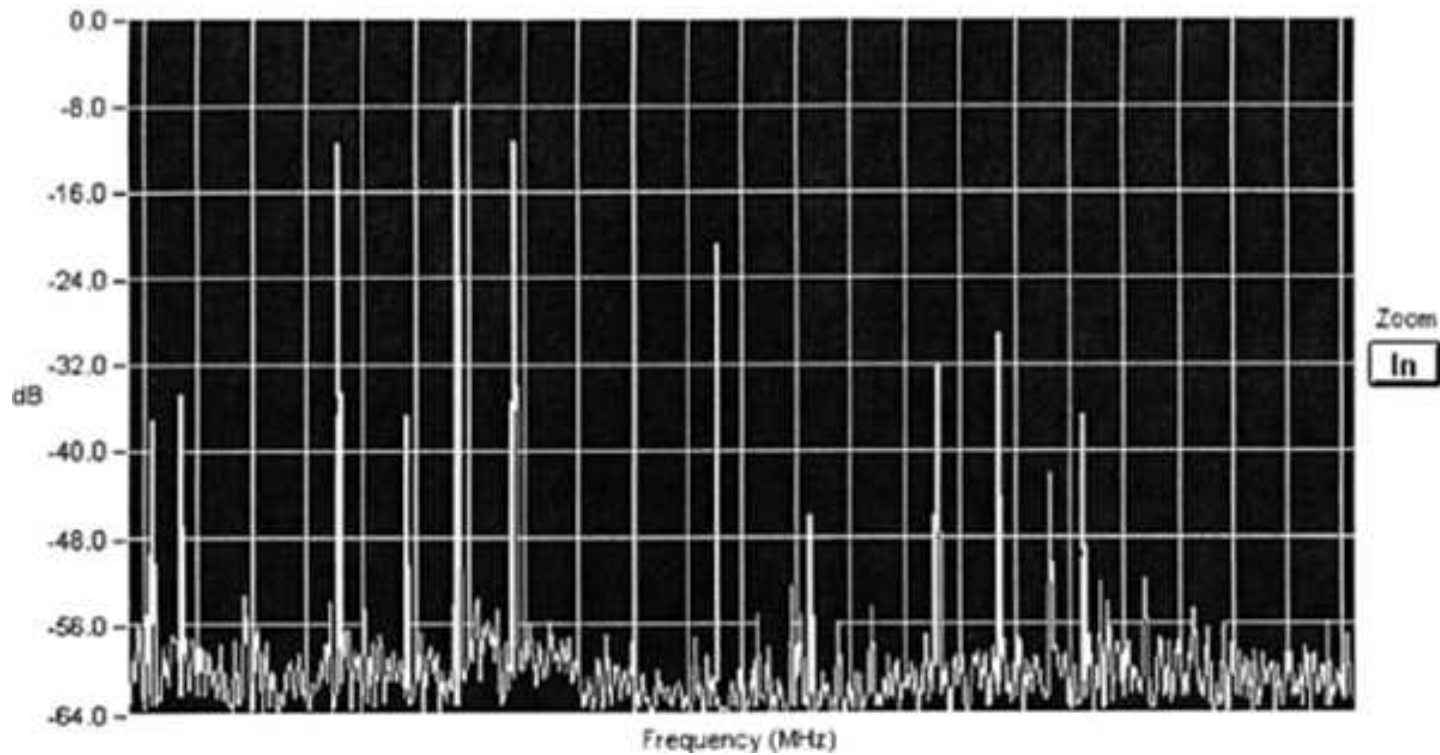


Radiocommunications

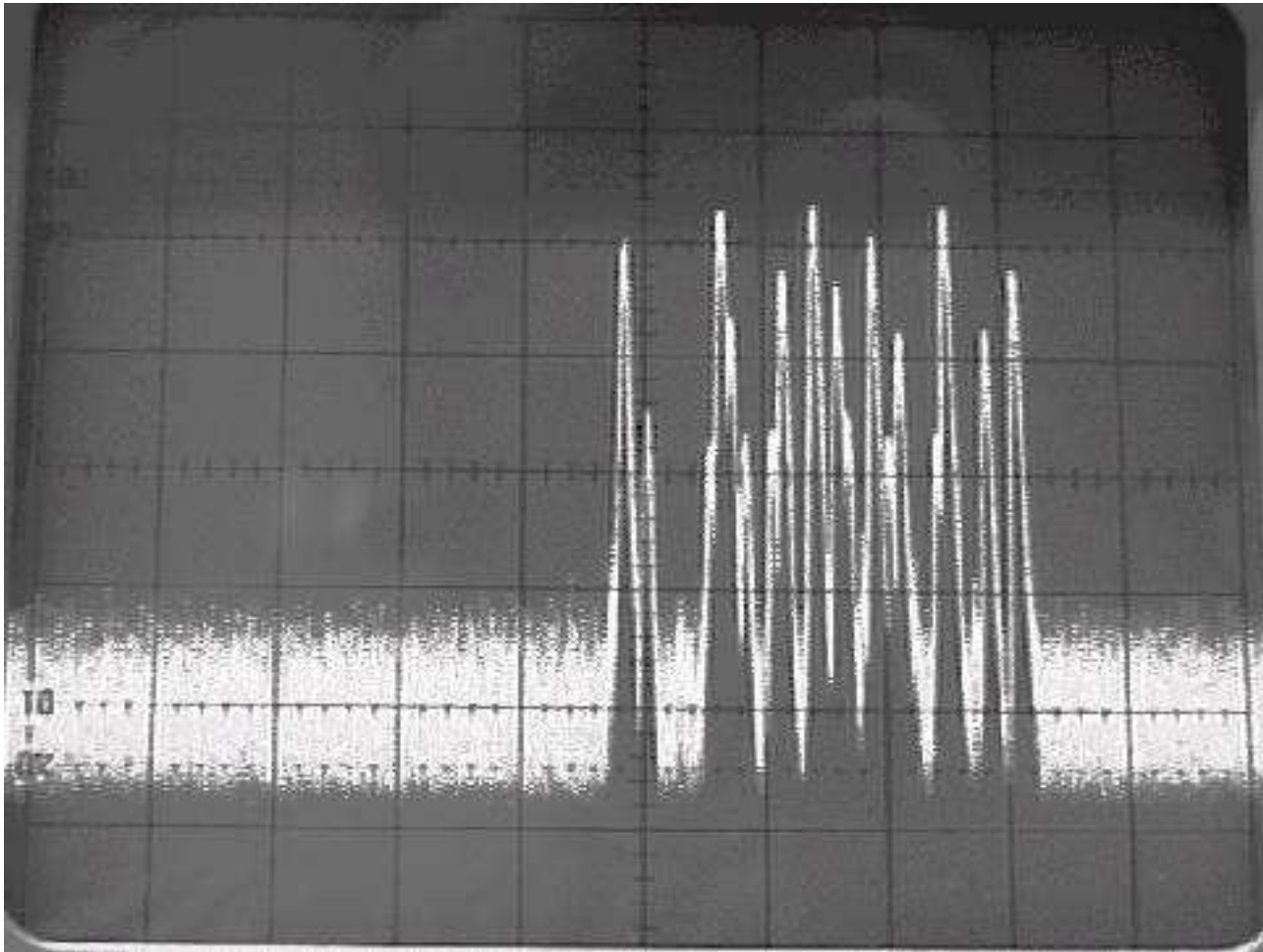
Filtrage passe bande

Joël Redoutey - 2009

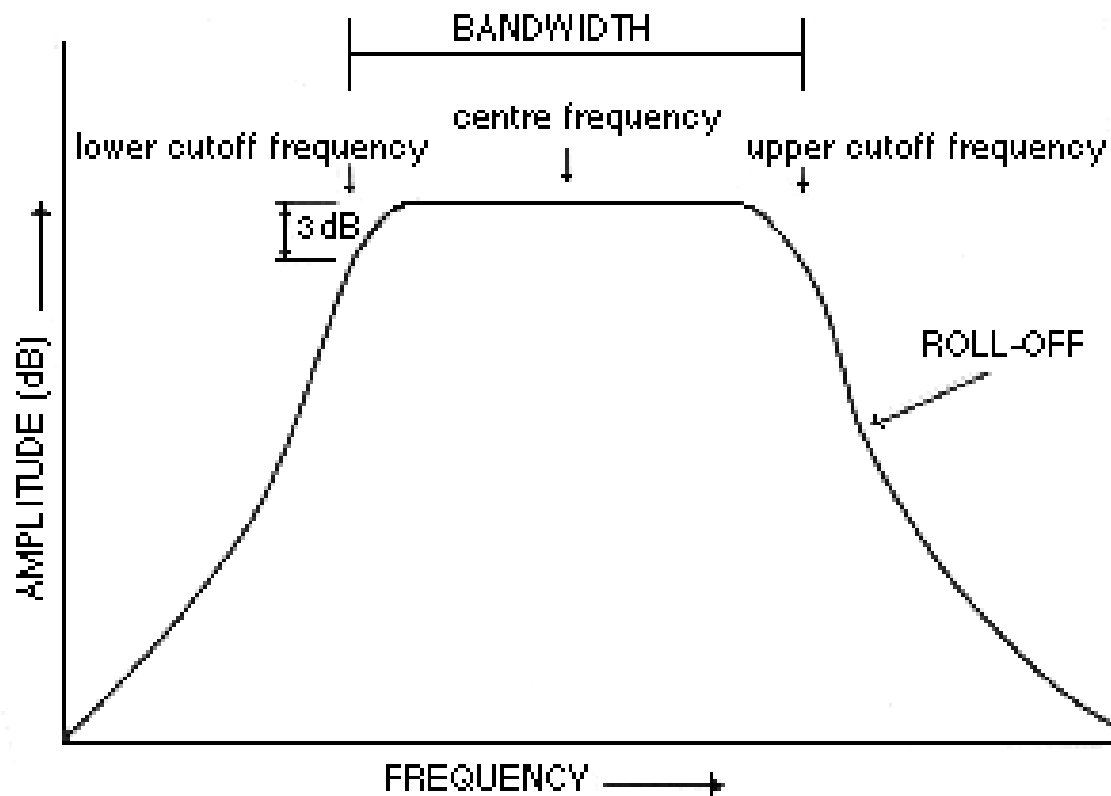
Nécessité du filtrage



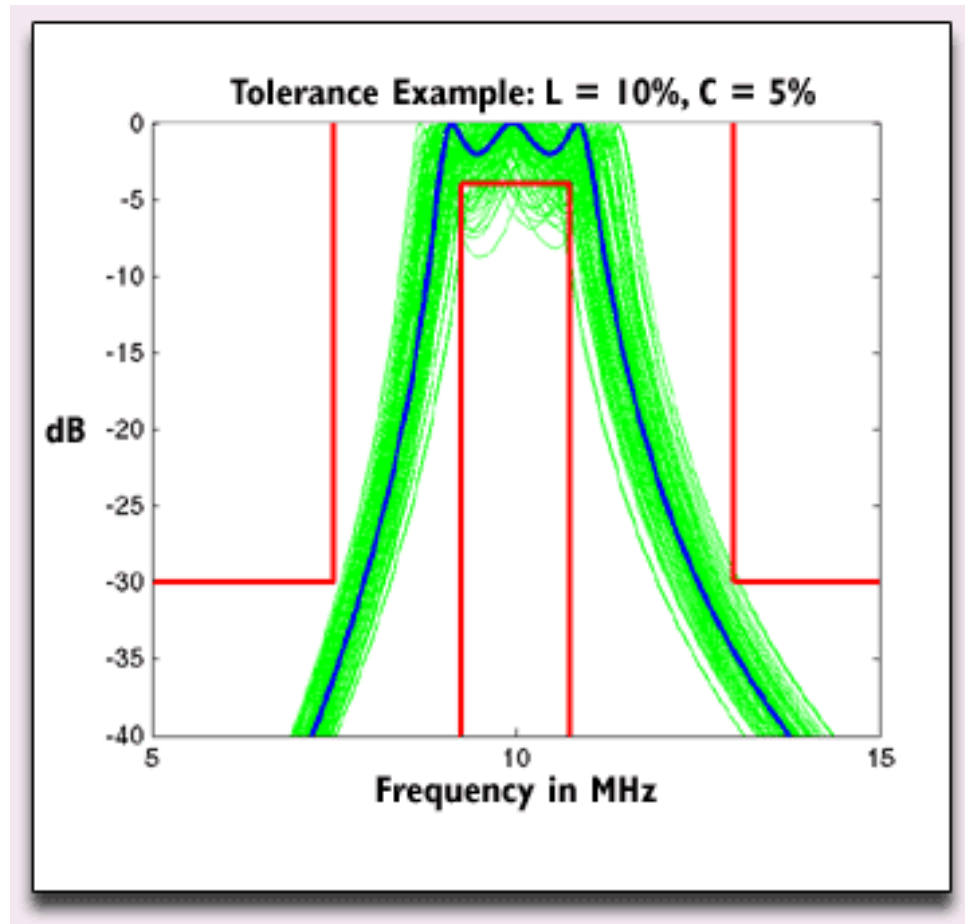
Filtrage passe bande



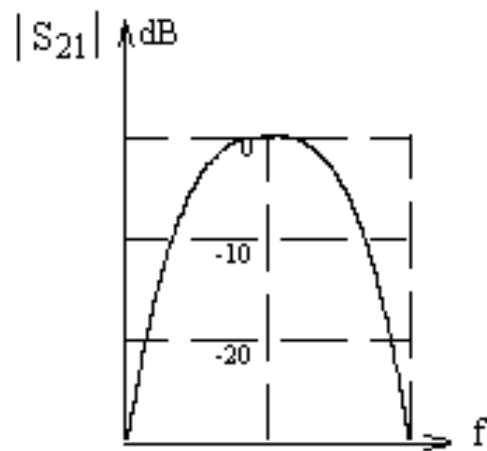
Définitions



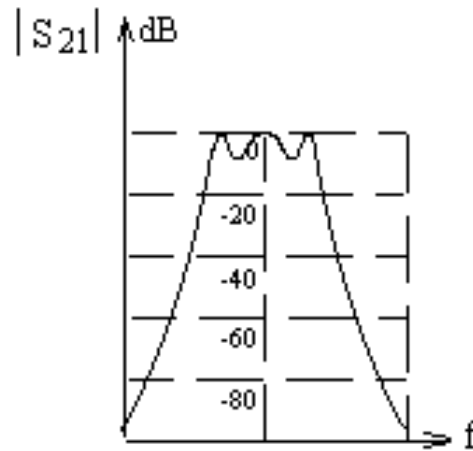
Gabarit d'un filtre passe bande



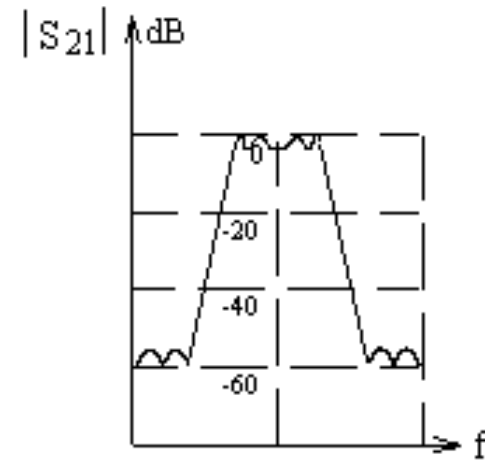
Réponse d'un filtre passe bande



Butterworth



Tchebychev



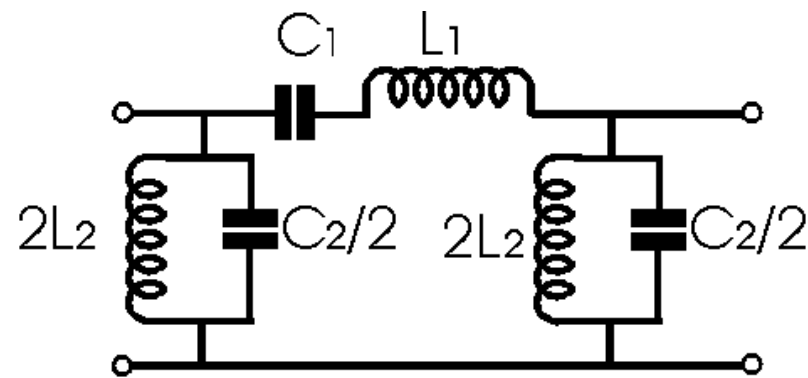
elliptique

Butterworth : pas d'ondulation dans la BP, mauvaise réjection hors bande

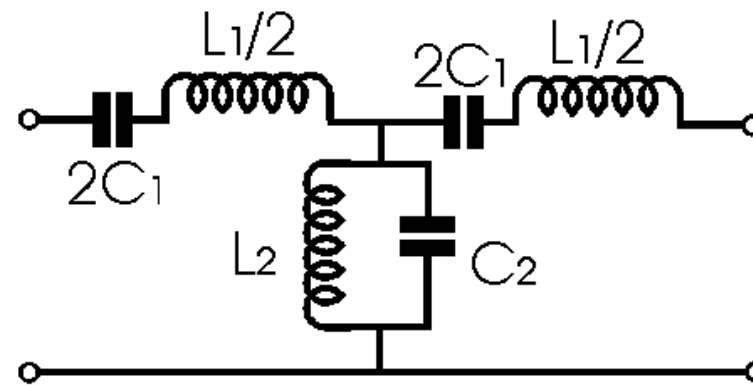
Tchebychev : légère ondulation dans la BP, meilleure réjection que Butterworth

Elliptique : meilleure réjection en limite de bande passante

Filtre passe bande LC

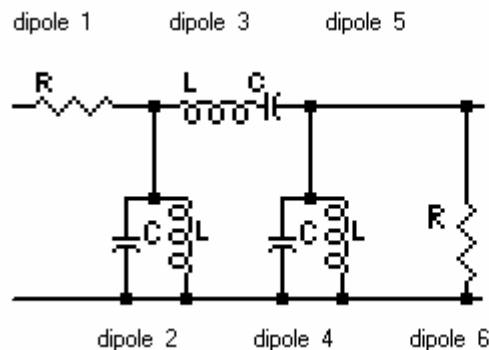
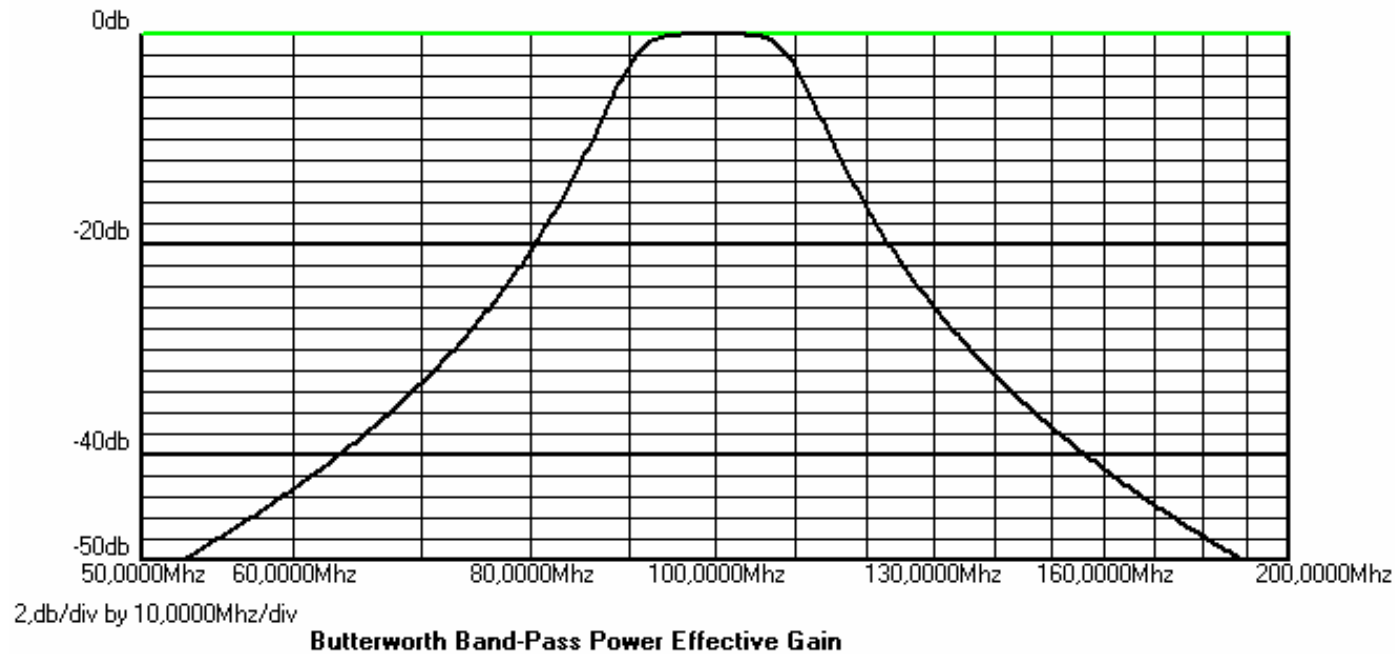


Pi section filter



T section filter

Filtre passe bande de Butterwoth



DIPOLE 1
R 1=50,

DIPOLE 2
C 2=159,02902pF
L 2=16,089nHy

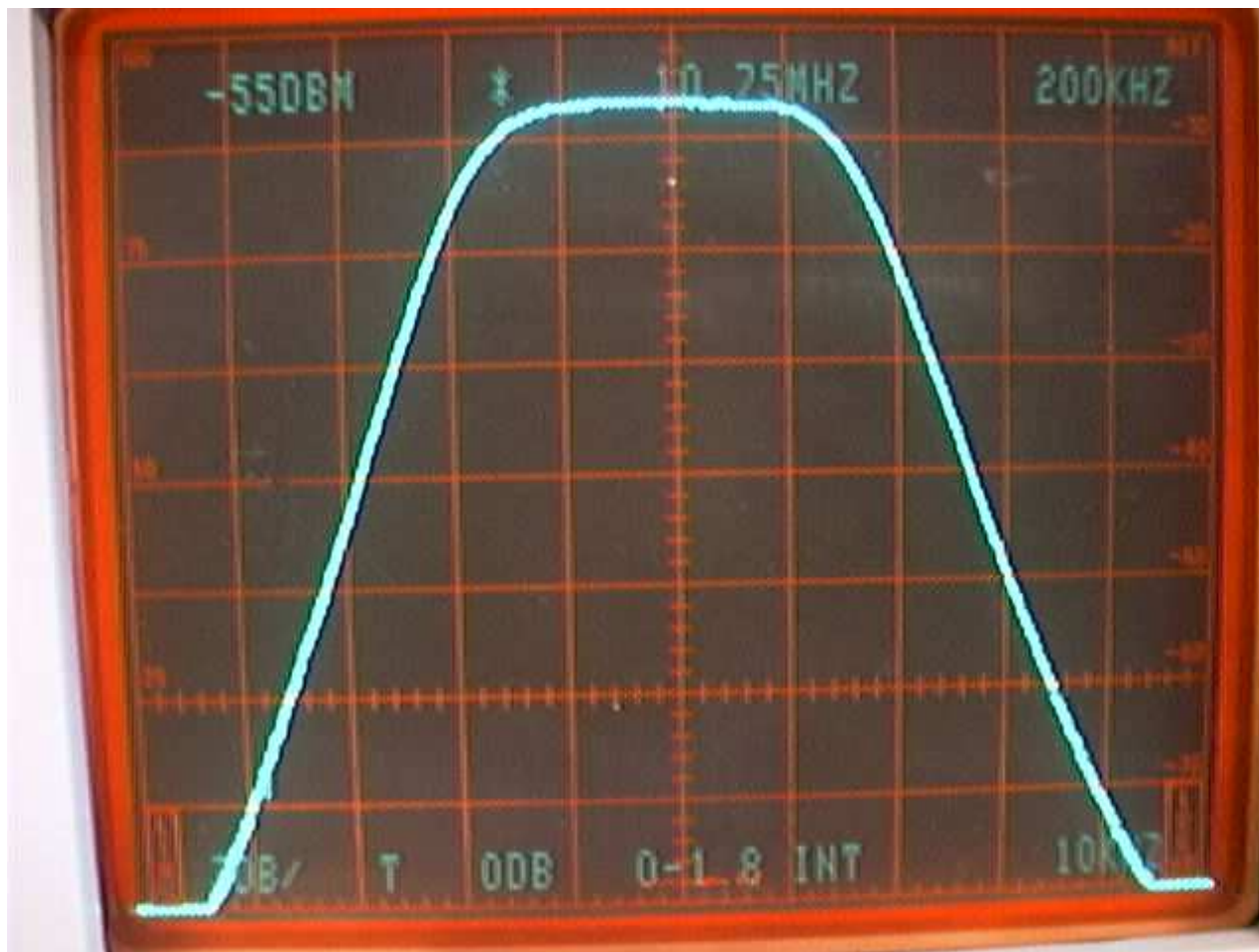
DIPOLE 3
C 3=3,2178pF
L 3=795,145nHy

DIPOLE 4
C 4=159,02902pF
L 4=16,089nHy

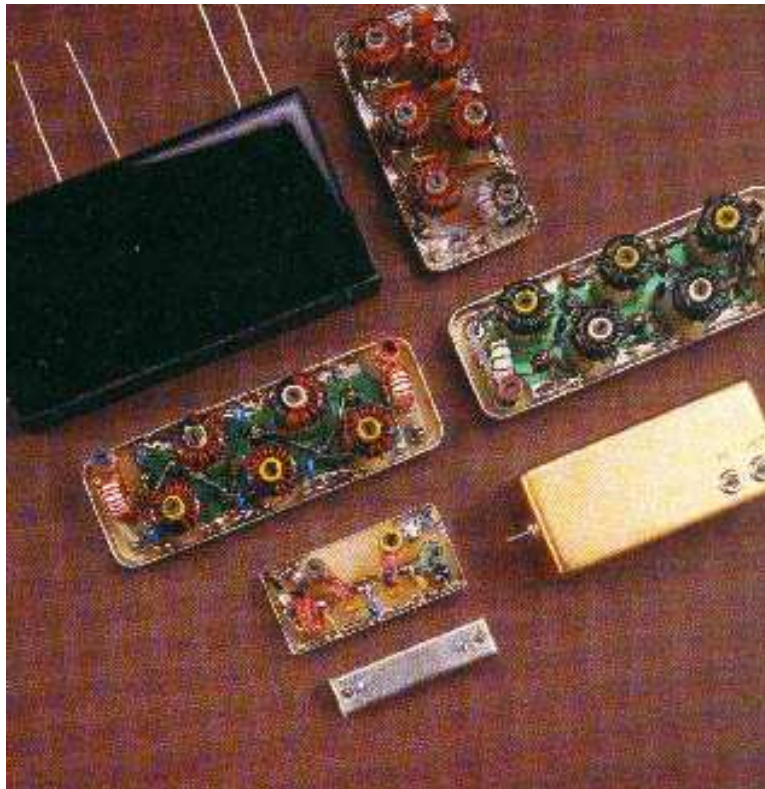
DIPOLE 6
R 6=50,

3rd order (12/12/2006) Butterworth Band-Pass
Center Frequency = 99,498744Mhz
Bandwidth = 20,Mhz @ 3, db
Stopband = 56,5 db minimum @ 45,Mhz and 220,Mhz
Design Impedance=50, ohms
Input Impedance = 50, ohms
Output Impedance = 50, ohms

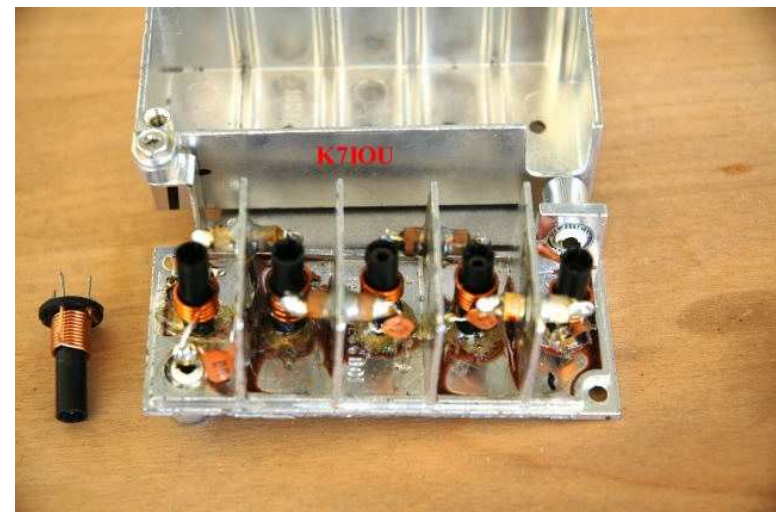
Exemple de réponse d'un filtre LC



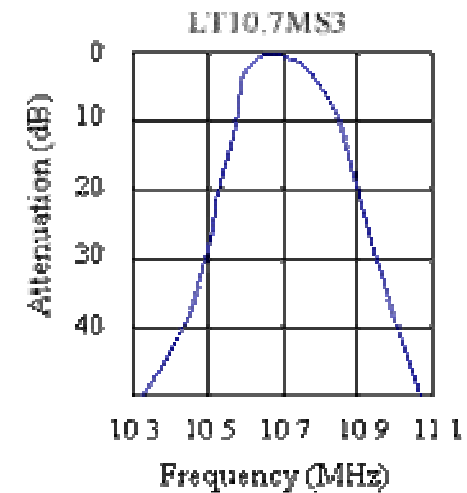
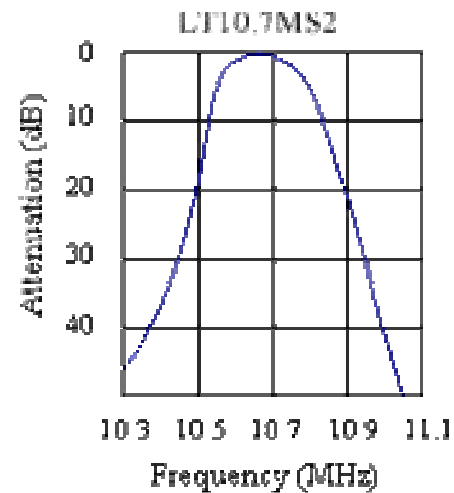
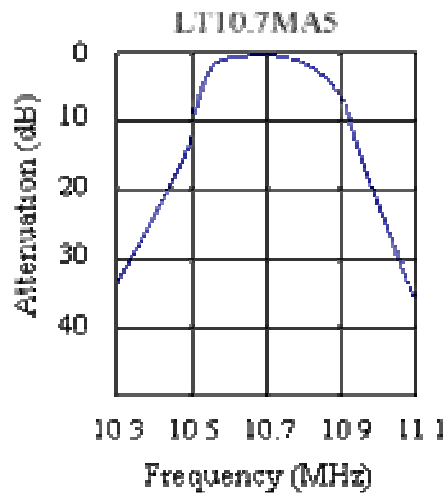
Filtre passe bande LC



Difficulté de réglage
Fréquence fixe
Limité en fréquence
Coût



Filtres céramique

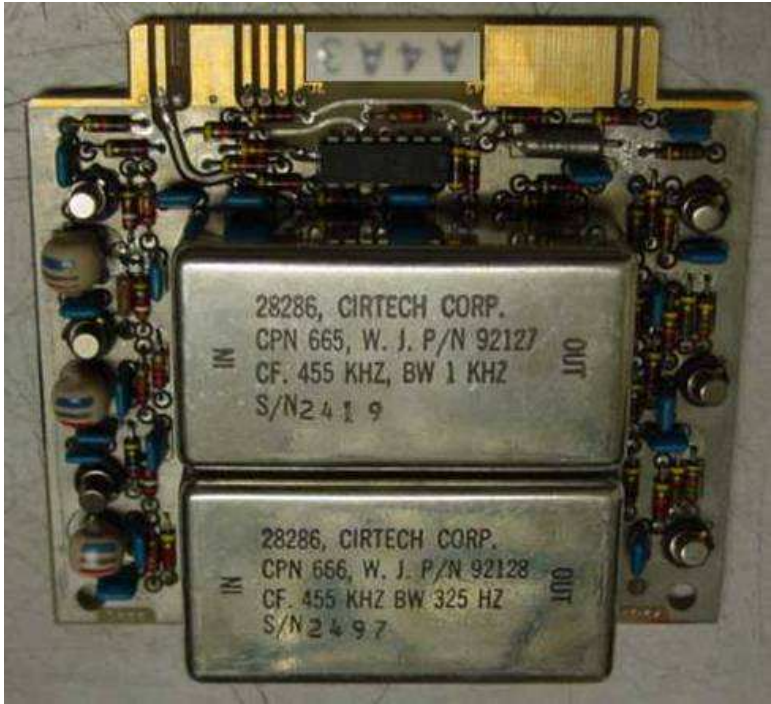
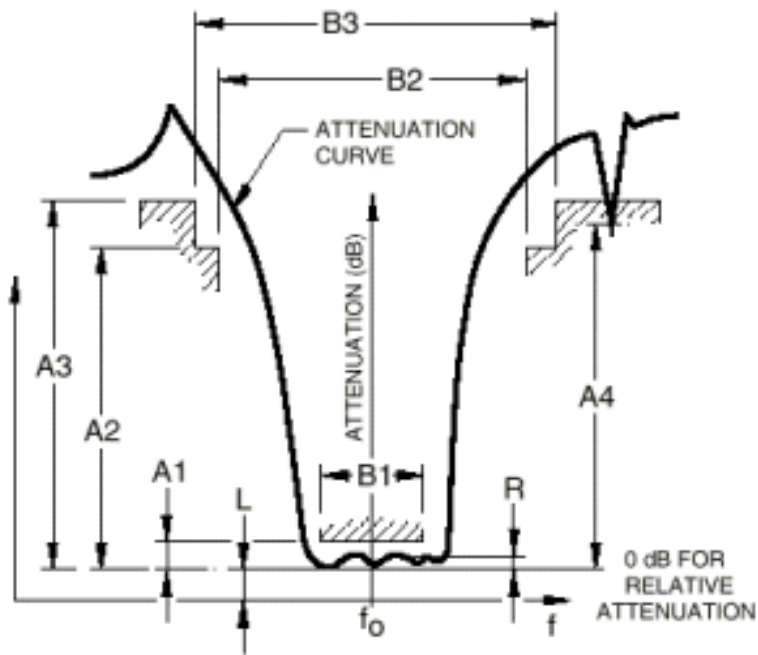


Fréquence fixe
Limité en fréquence
Faible coût
Adapté aux systèmes grand public (radio, TV)



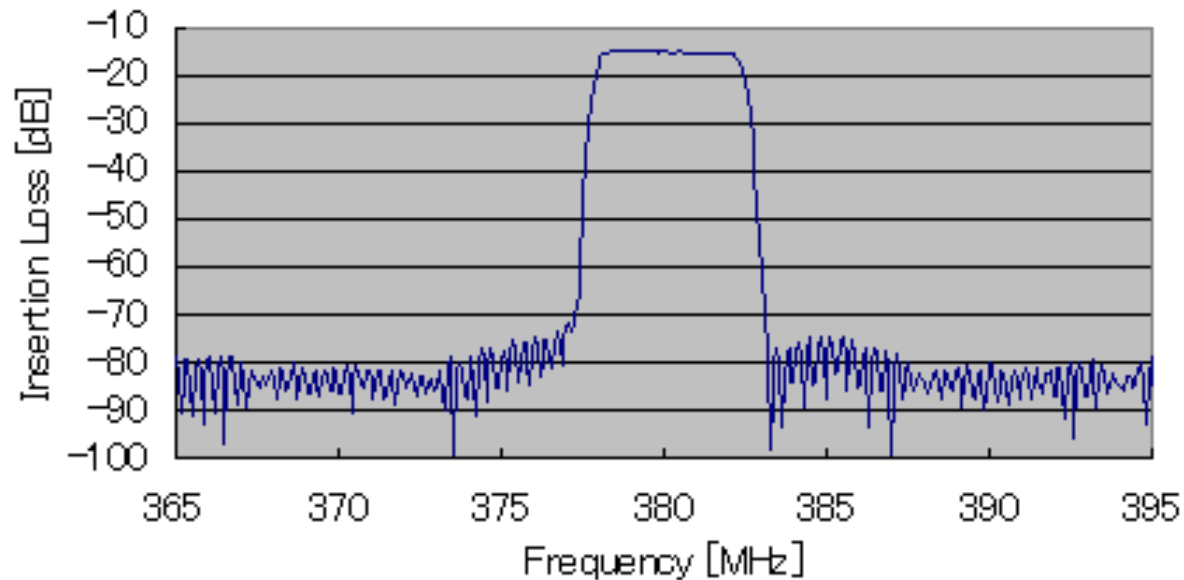


Filtres à quartz



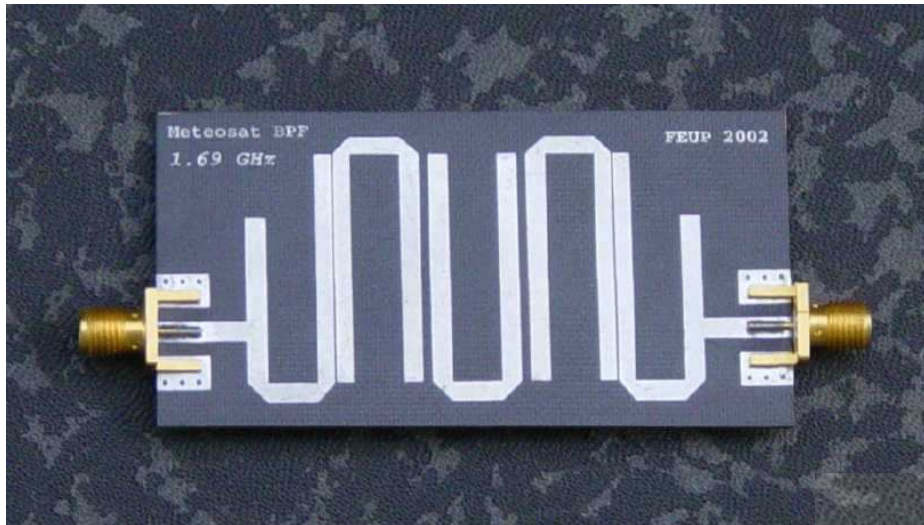
Très bonne réjection
Fréquence fixe
Limités en fréquence

Filtres à ondes de surface (SAW)



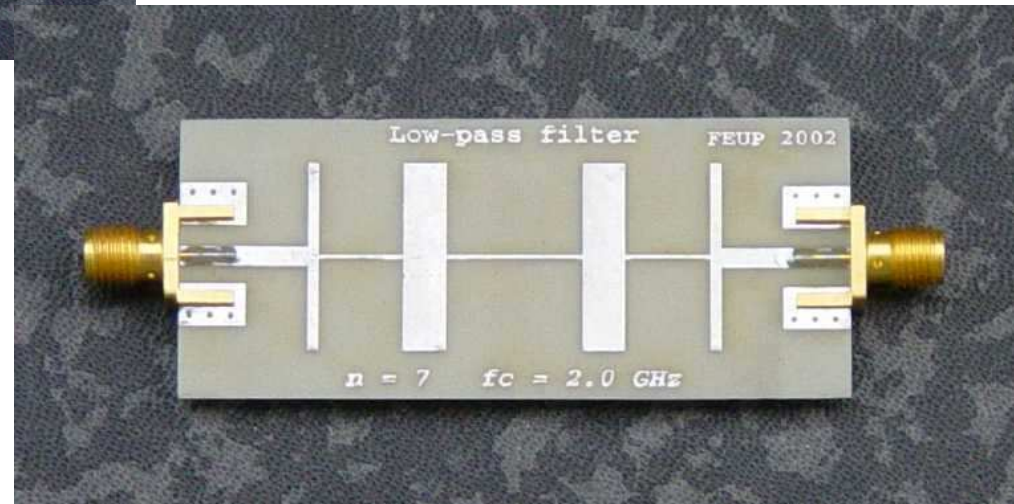
Fréquence fixe
Fréquence élevée (GSM, tuner sat)
performant

Filtres en microstrip



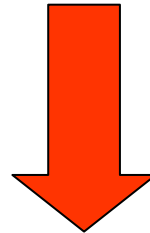
Hairpin $F_c = 1.69$ GHz, BW = 100 MHz

Filtre passe bas $F_c = 2.0$ GHz



Conclusion

On sait faire des filtres très sélectifs à fréquence fixe, mais pas à fréquence variable



Nécessité d'une transposition de fréquence