Rx filters for a direct RF sampling SDR with Fs = 60MHz

Design goals:

* Chebyshev, 0.1dB ripple
* loaded Q < 10
* alias rejection > 69dB (AD9226 has SNR 69dB)
* IMDR > 100dB (requires T50-X toroids)
* Z₀ = 50 Ohm

| LPF | order | -3dB, MHz | -70dB, MHz | Vil | Vih | Vol | Voh | IL, dB | Notes |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 40m  20m | 4 | 16 | 28.5 |  |  |  |  |  | L2, L8 = 11t 0.34mm2 on T50-6, 676nH  L4, L6 = 12t 0.34mm2 on T50-6, 784nH |
| 15m  10m | 5 | 30 | 45.1 |  |  |  |  |  | L2, L10 = 9t 0.34mm2 on T50-10, 375nH  L4, L6, L8 = 10t 0.34mm2 on T50-10, 446nH |

| HPF | order | -3dB, MHz | -70dB, MHz | Vil | Vih | Vol | Voh | IL, dB | Notes |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 80m | 4 | 3 | 1.5 |  |  |  |  |  | L1 = 23t 0.25mm2 on T50-6, 2.5uH  L3, L5 = 17t 0.34mm2 on T50-6, 1.44uH  L7 = 19t 0.25mm2 on T50-6, 1.76uH |
| 40m  20m | 4 | 6.5 | 3.1 |  |  |  |  |  | L1 = 15t 0.34mm2 on T50-6, 1.156uH  L3, L5 = 11t 0.34mm2 on T50-6, 676nH  L7 = 12t 0.34mm2 on T50-6, 784nH |
| 15m  10m | 4 | 20 | 9.7 |  |  |  |  |  | L1 = 9t 0.34mm2 on T50-10, 375nH  L3, L5 = 6t 0.34mm2 on T50-10, 198nH  L7 = 7t 0.34mm2 on T50-10, 251nH |

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Up to 18t on T50-X, use 0.34mm2, more than 18t, use 0.25mm2.

T50-X can’t handle more than 34 turns 0.25mm2 with a diameter spacing.