mcHF Building Notes and Measurements

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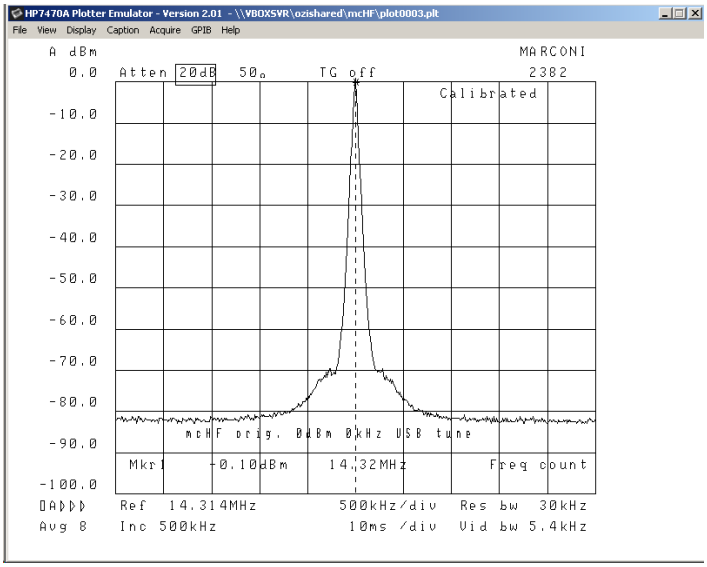
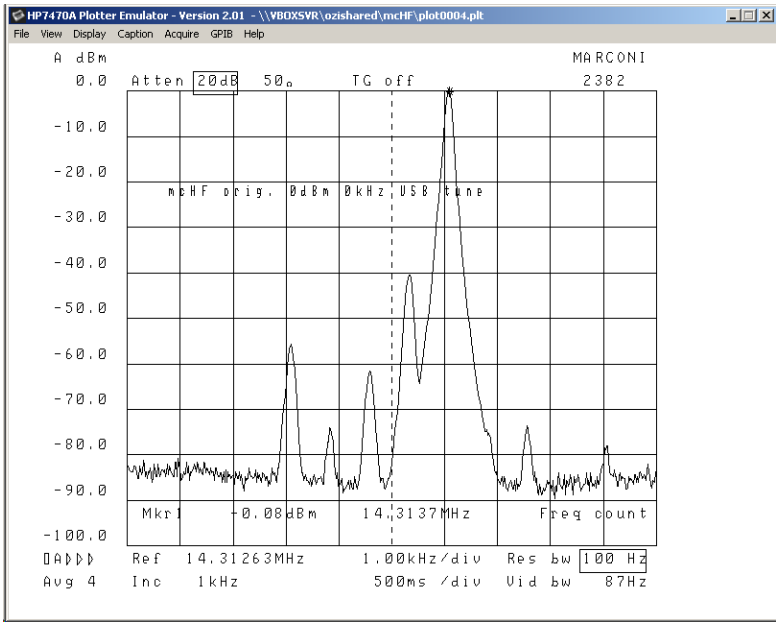
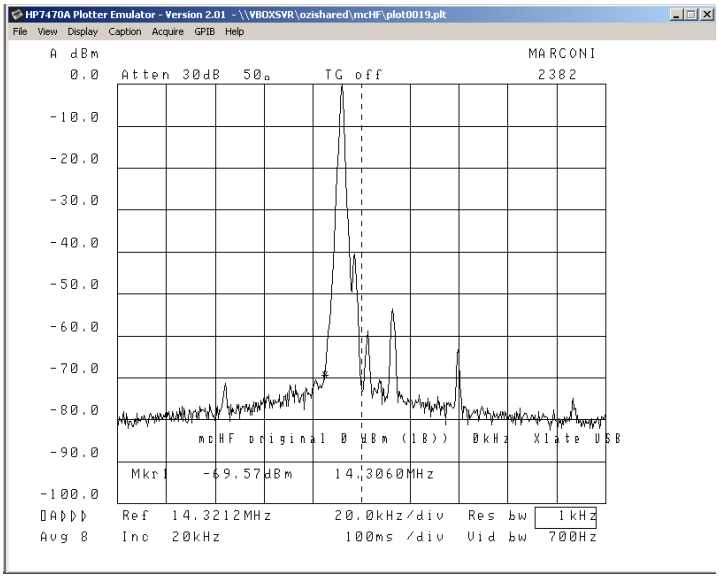
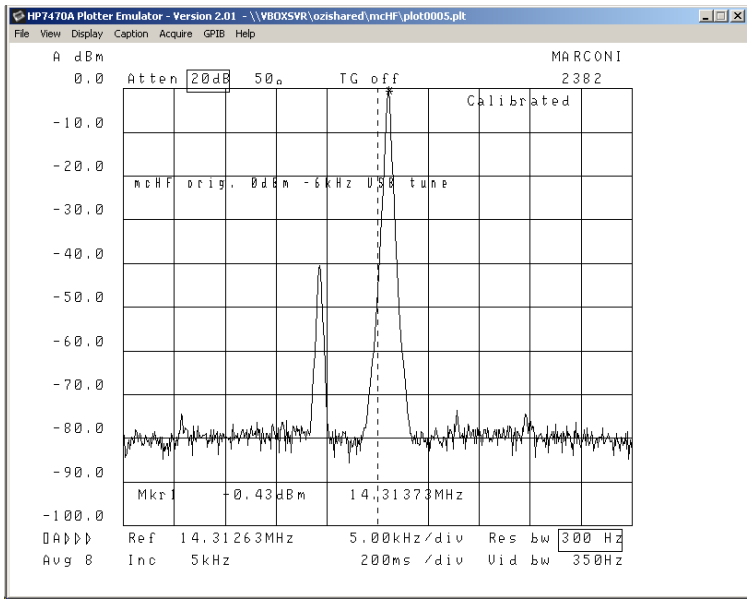
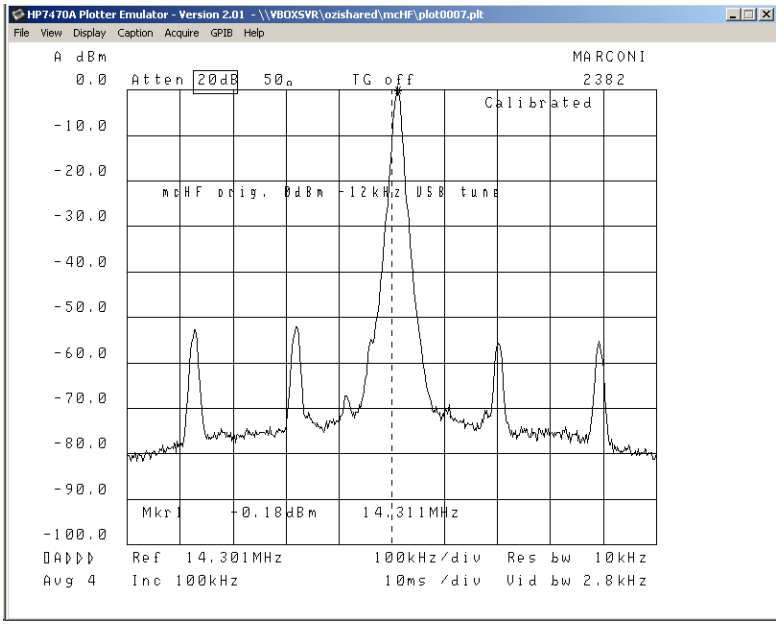
History

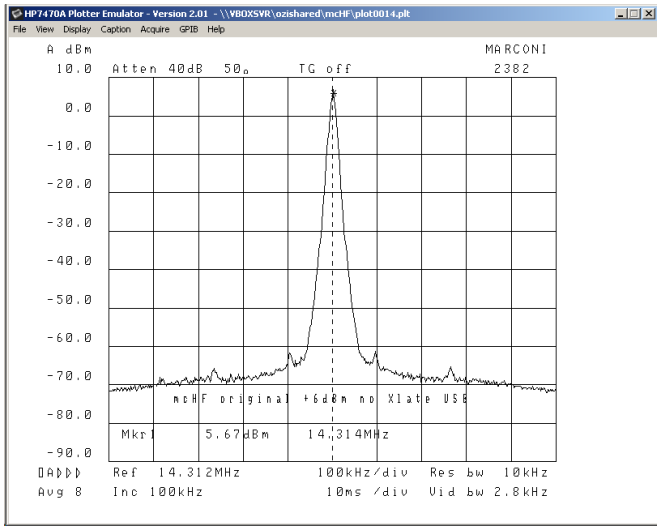
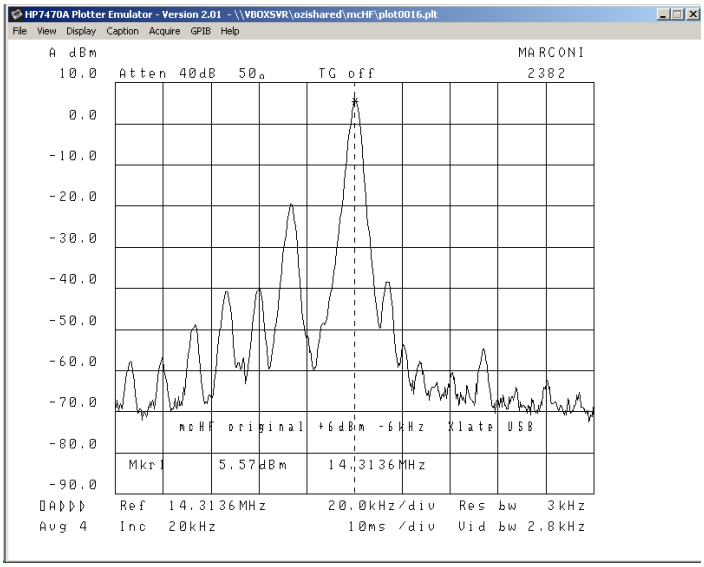
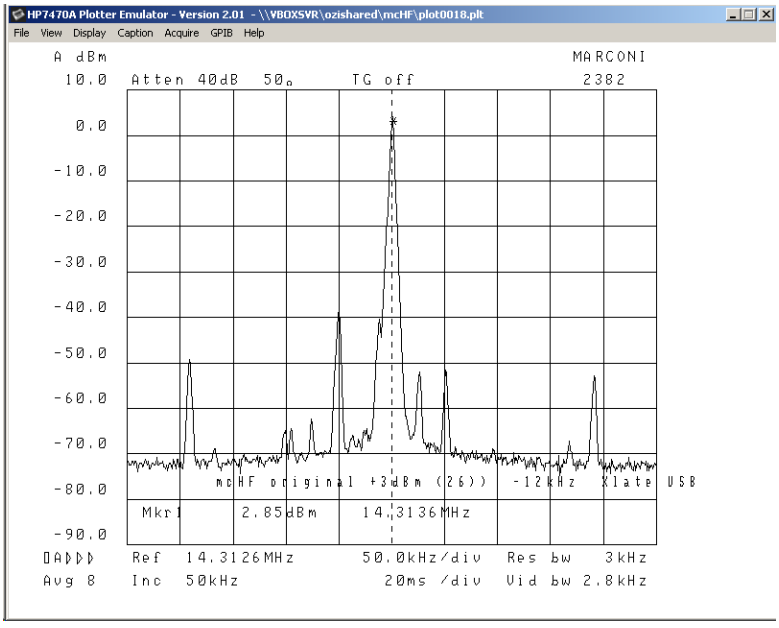
- 14.08.2016 created, Measurements of V0.5 unmodified

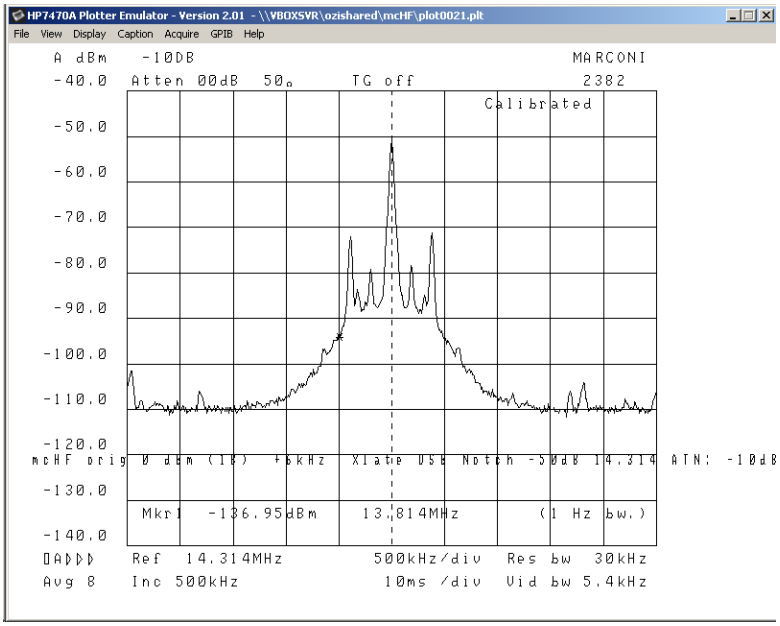
Measurements V0.5 unmodified

- measured signal: TXPAIN after the BPF “ R3
- T5 not connected

	0 dBm, USB, Tune signal 500 kHz/div
	Dito, 1kHz/div

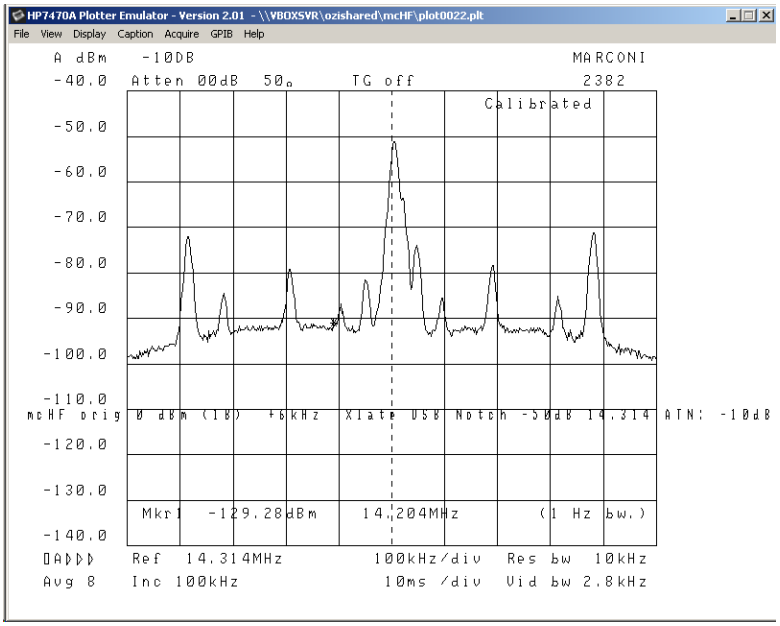
	0 dBm, 0IF, USB, Tune 20 kHz/div
	0 dBm, USB, -6kHz IF shift
	0 dBm, USB, -12 kHz, tune

	+6 dBm, USB, 0IF, tune
	+6 dBm, USB, -6 kHz IF, tune
	+3 dBm, -12kHz IF, tune USB



0 dBm, USB, tune, +6kHz IF
- 10 dB pre-attenuator
- signal suppressed ca. 50 dB by xtal notch filter

So the noise floor is about -127dBc/Hz far(!) from the signal

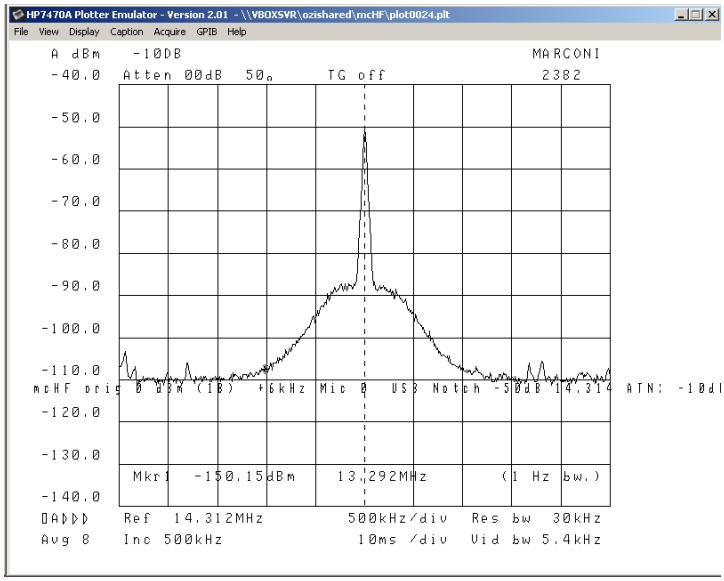


Dito as above at 100kHz/div

TX noise ca. 100KHz from signal is only -119 dBc/Hz

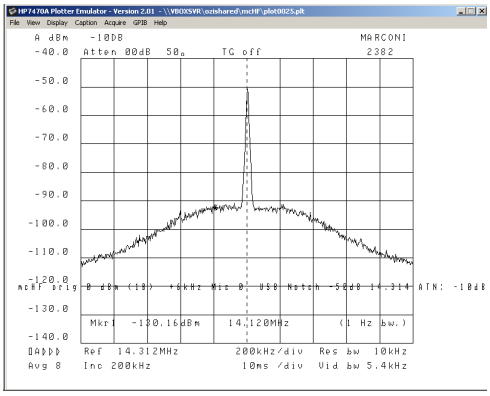
For QRP RF operation this is ok.
The K2 for instance at full power is not better than -130dBc/Hz

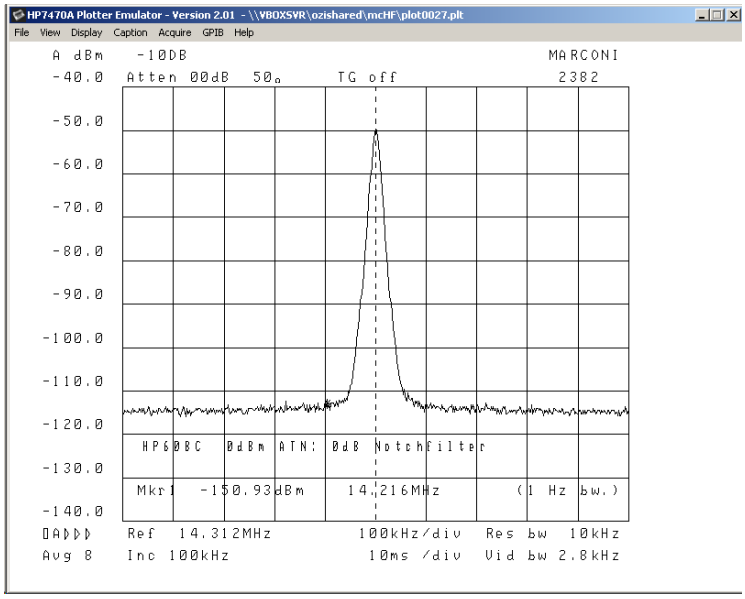
For VHF/UHF transverter work I like to bring it down to -130 dBc/Hz or better.



Dito, but with no transmitted signal (PTT active, mic gain minimum).

Note: easy to measure, no notch filter needed
Below with 200kH7/div

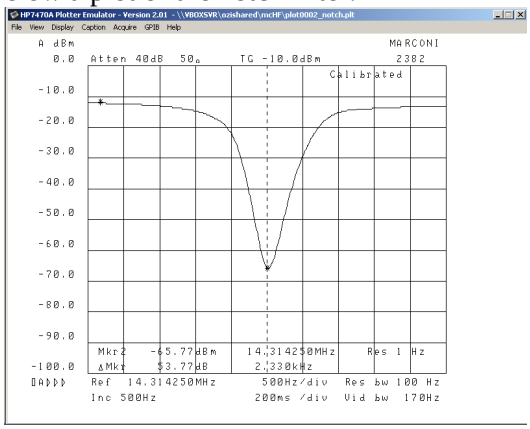




Verification of test bench.

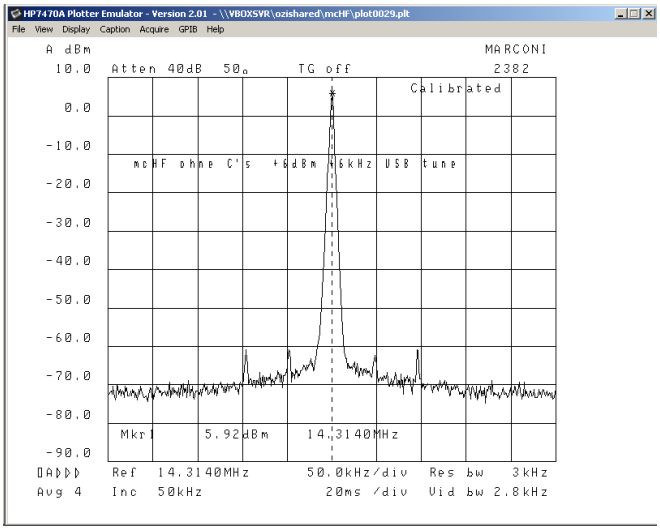
HP 608C 0dBm signal, measured w/o attenuator and with -50dB notch at carrier.
→ better -150 dBc/Hz

Below a plot of the notch filter:



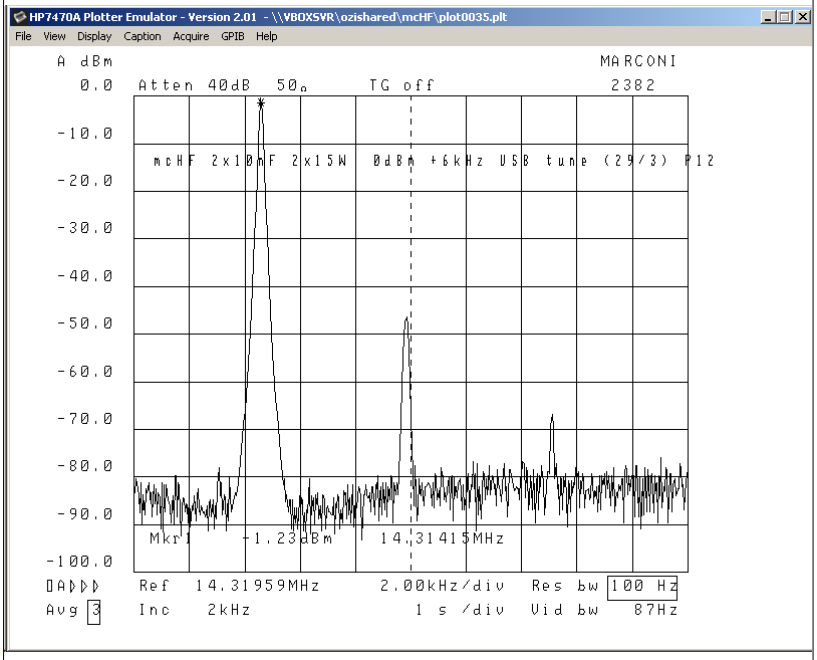
Modifications

Some attempts to understand the effect of component changes to the circuit.



Measurement w/o sampling capacitors for the QSE. C63..C66 = 0pF

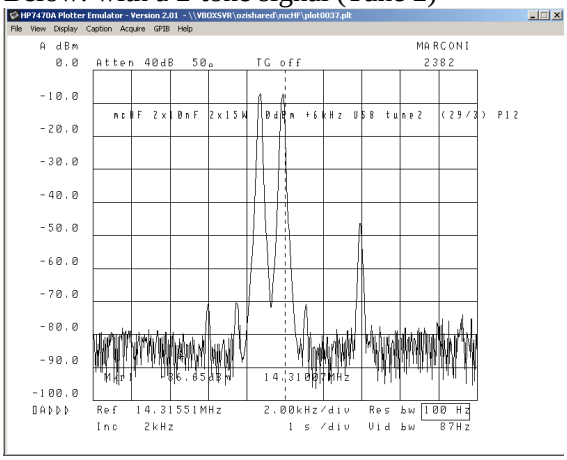
- Amplitude loss was about 8 dB

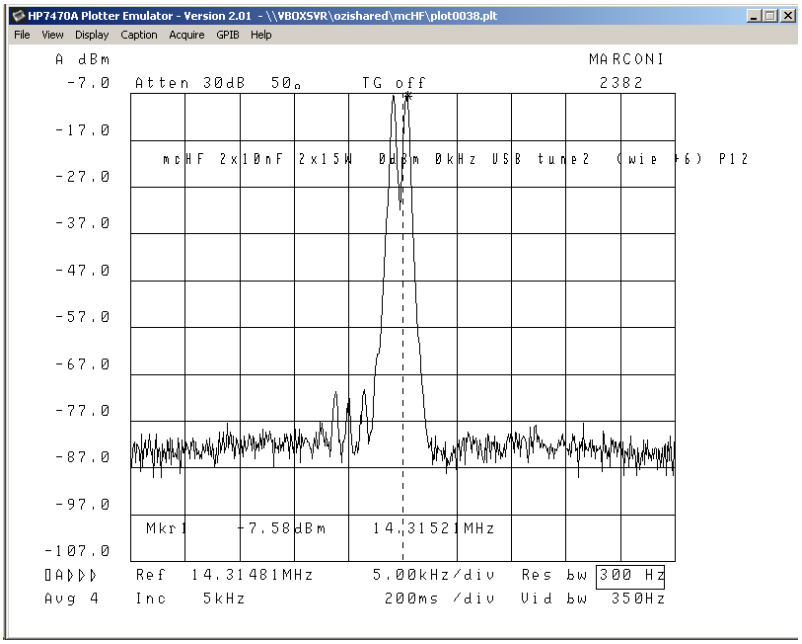


- R67, R68 changed to 15 Ohms (was 47W)
  → about 3 dB stronger QSE output but also higher TX noise.

- C63..66 replaced by 2 C's 10nF.
One between TXE 0° and TXE 180°, and the other between TXE 90° and TXE 170°

Below: with a 2-tone signal (Tune 2)





As above, 2-tone tune signal
5 kHz/div

Below with 6 dBm PEP