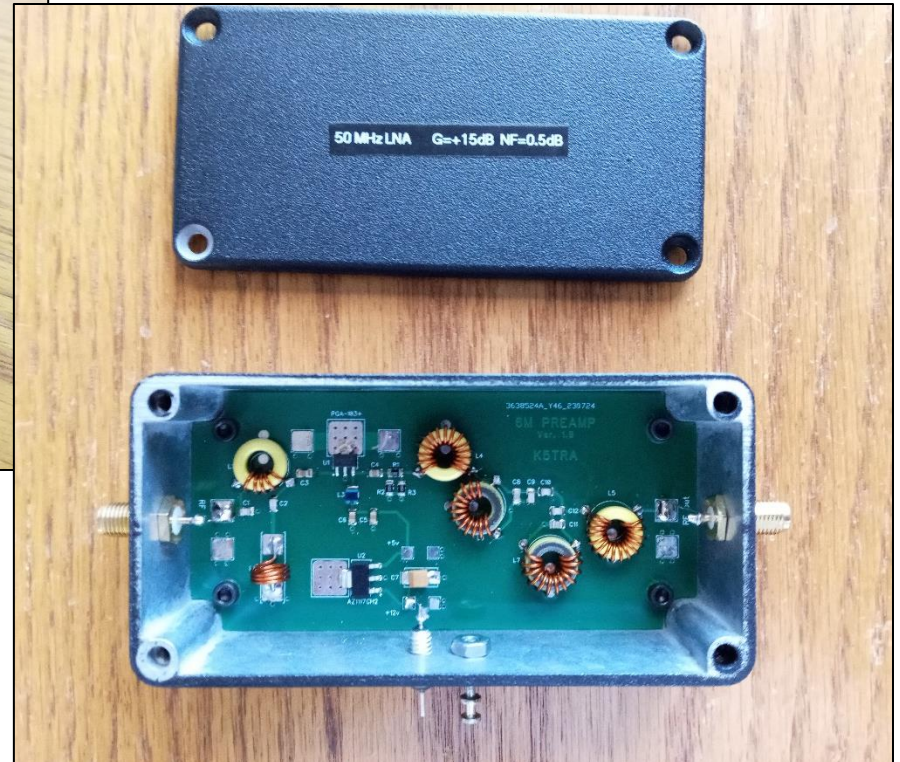


50 MHz LNA

*DESIGN, LAYOUT, PHOTOS and
MEASUREMENTS*

50 MHz LNA



INITIAL CONSIDERATIONS

- Filtering is needed to attenuate FM broadcast
- A good BPF will have 2 dB insertion loss
- Any loss added in front of the LNA degrades NF
- A high dynamic range LNA with an input LPF will:
 - Not have issues with 88-108 MHz FM
 - Not degrade NF significantly (< 0.2 dB)
- Receiver out of band protection from BPF at LNA output will not degrade NF
- Optional π pad after LNA allows use with receiver with high gain front-end. This is not needed with direct connection to SDR receiver.

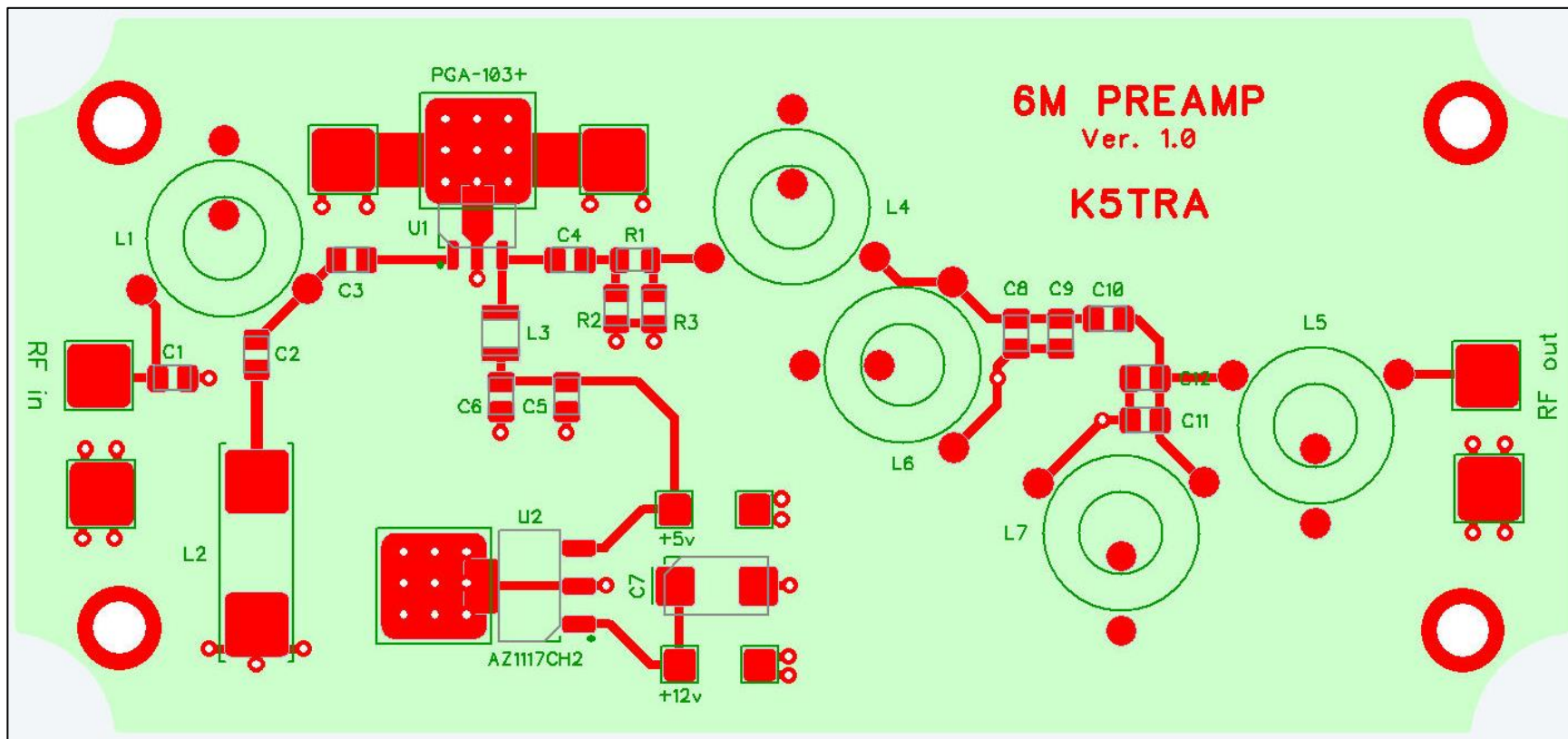
PREAMP OVERVIEW

- +12v DC operation
- Typical < 0.5 dB NF
- Typical +24 dB gain (without π pad)
- Typical IIP3 10 dBm
- SMA or Type-N connector options
- Internal filtering – no problems with FM broadcast
 - Input LPF has 0.2 dB loss and rejects FM broadcast
 - Output BPF provides excellent out of band rejection
- Surface mount assembly PC boards

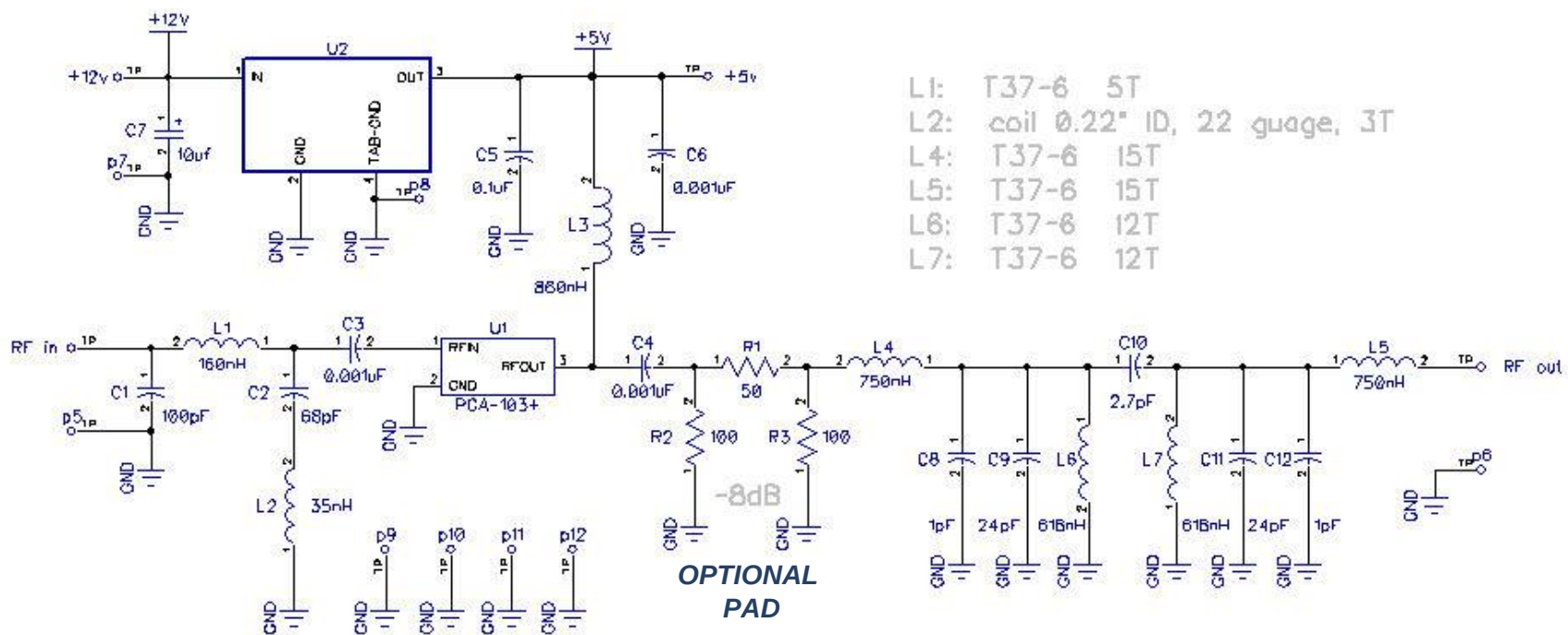
DETAIL

- Minicircuits LNA IC: PGA-103+
- Internal +5v regulator: AZ1117CH2
- 1.750" x 3.750" circuit board
- Hammond 1590G2BK 3.94" x 1.97" x 1.22"
- Toroids: T37-6 used in internal filters

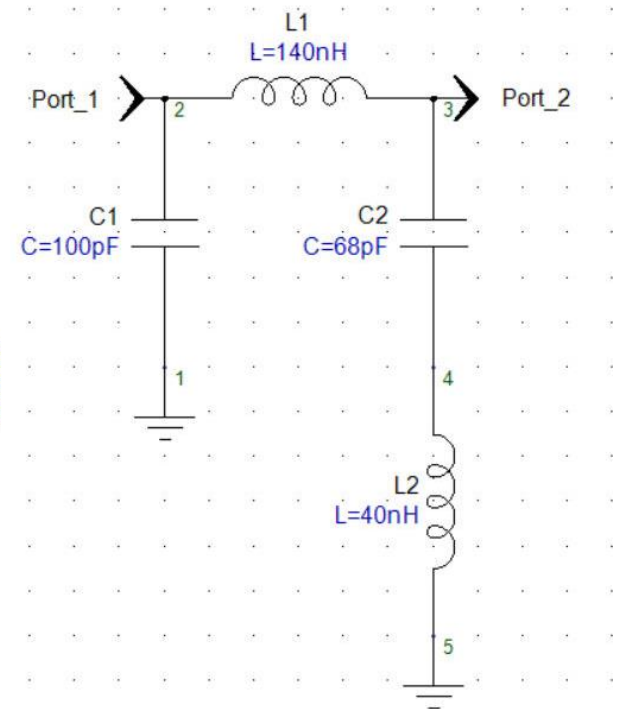
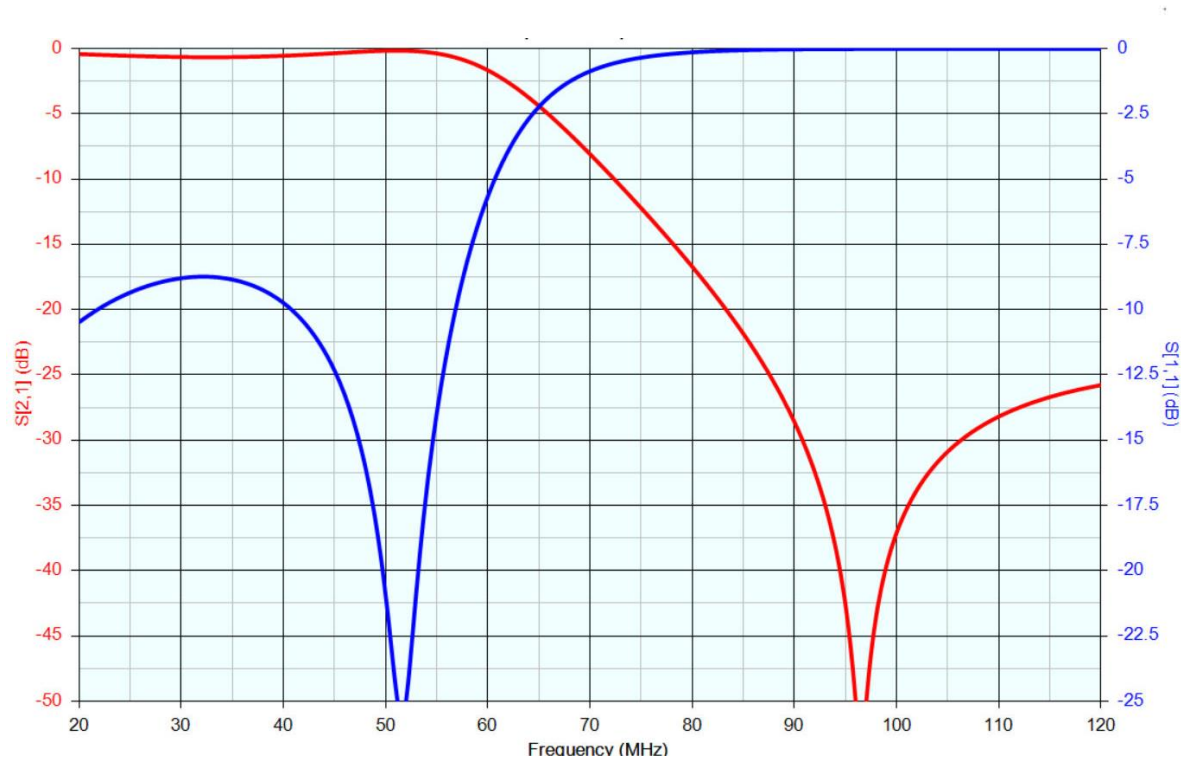
50 MHz LNA BOARD



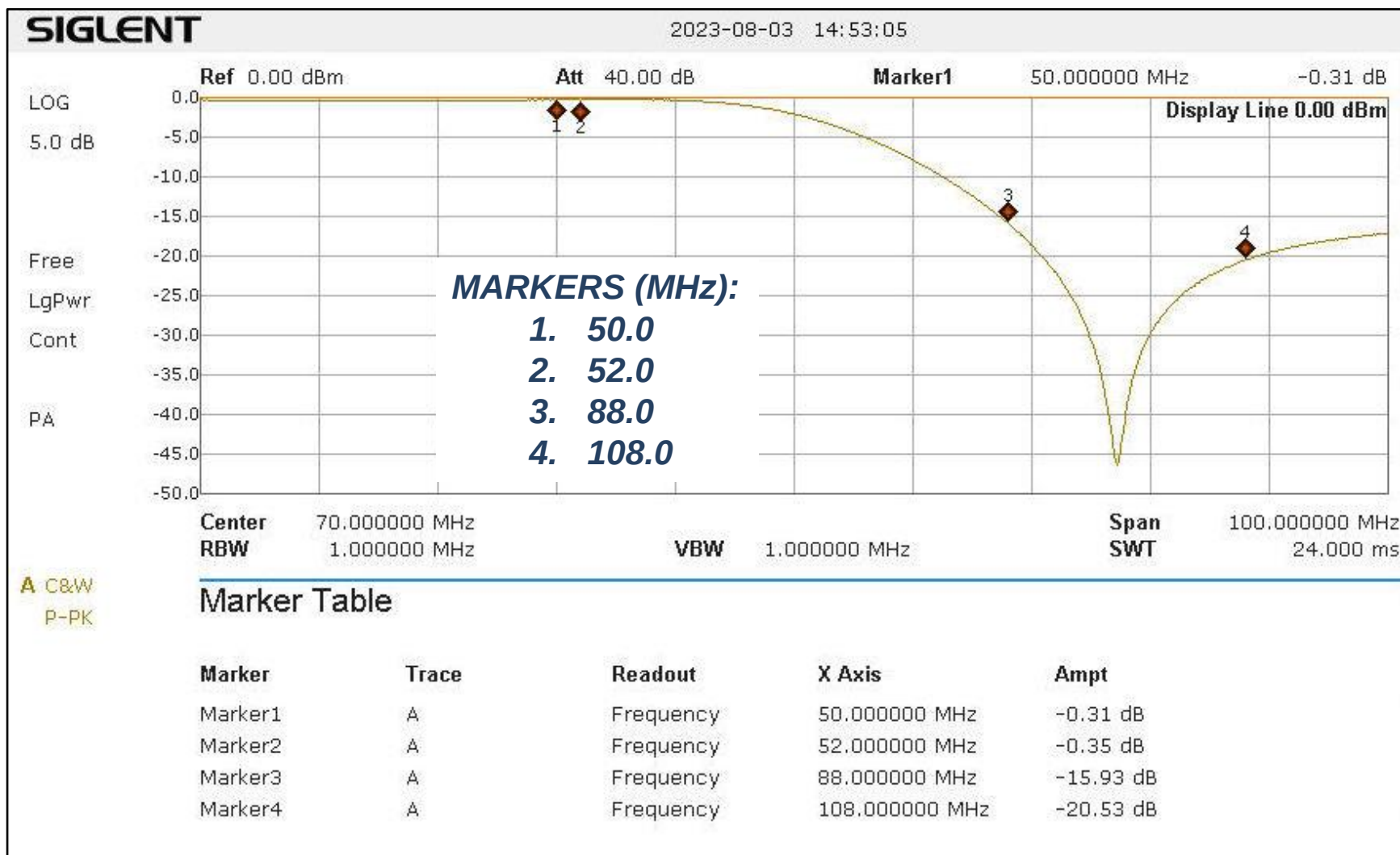
50 MHz LNA SCHEMATIC



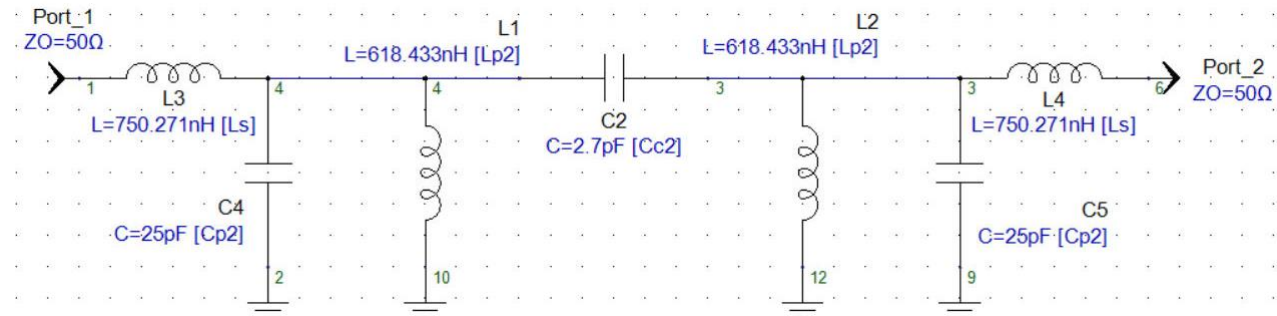
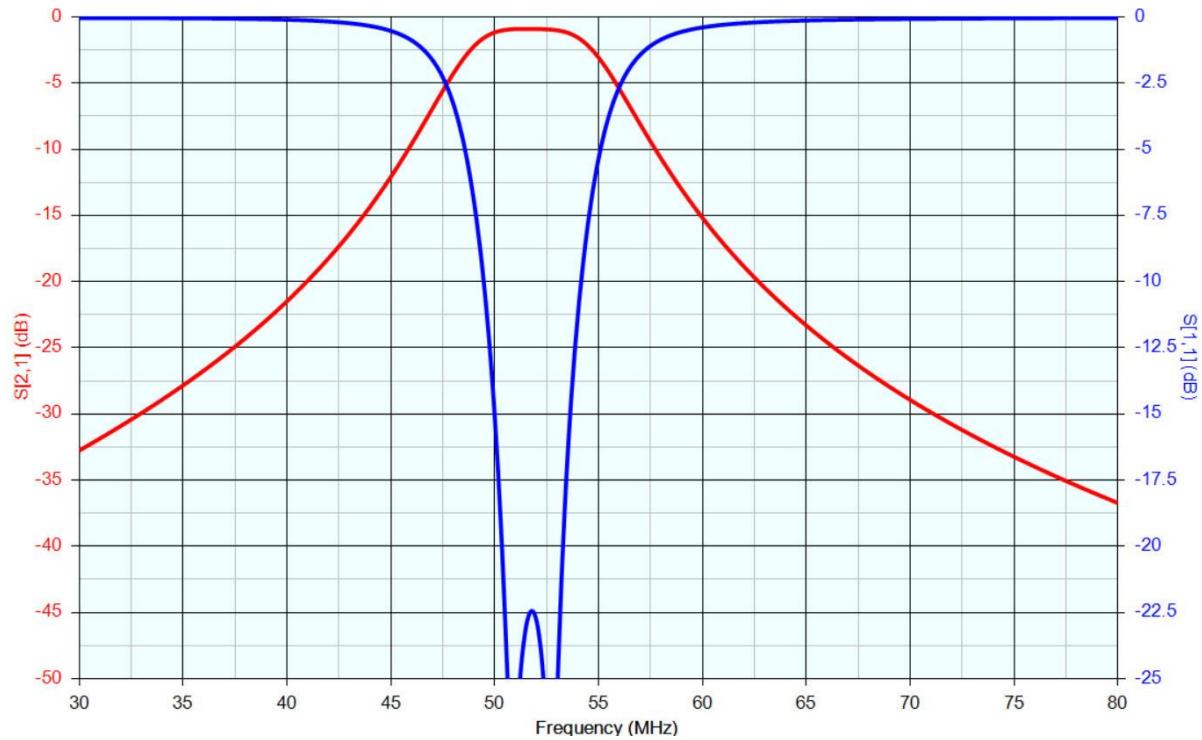
INPUT LPF & NOTCH



INPUT FILTER MEASUREMENT

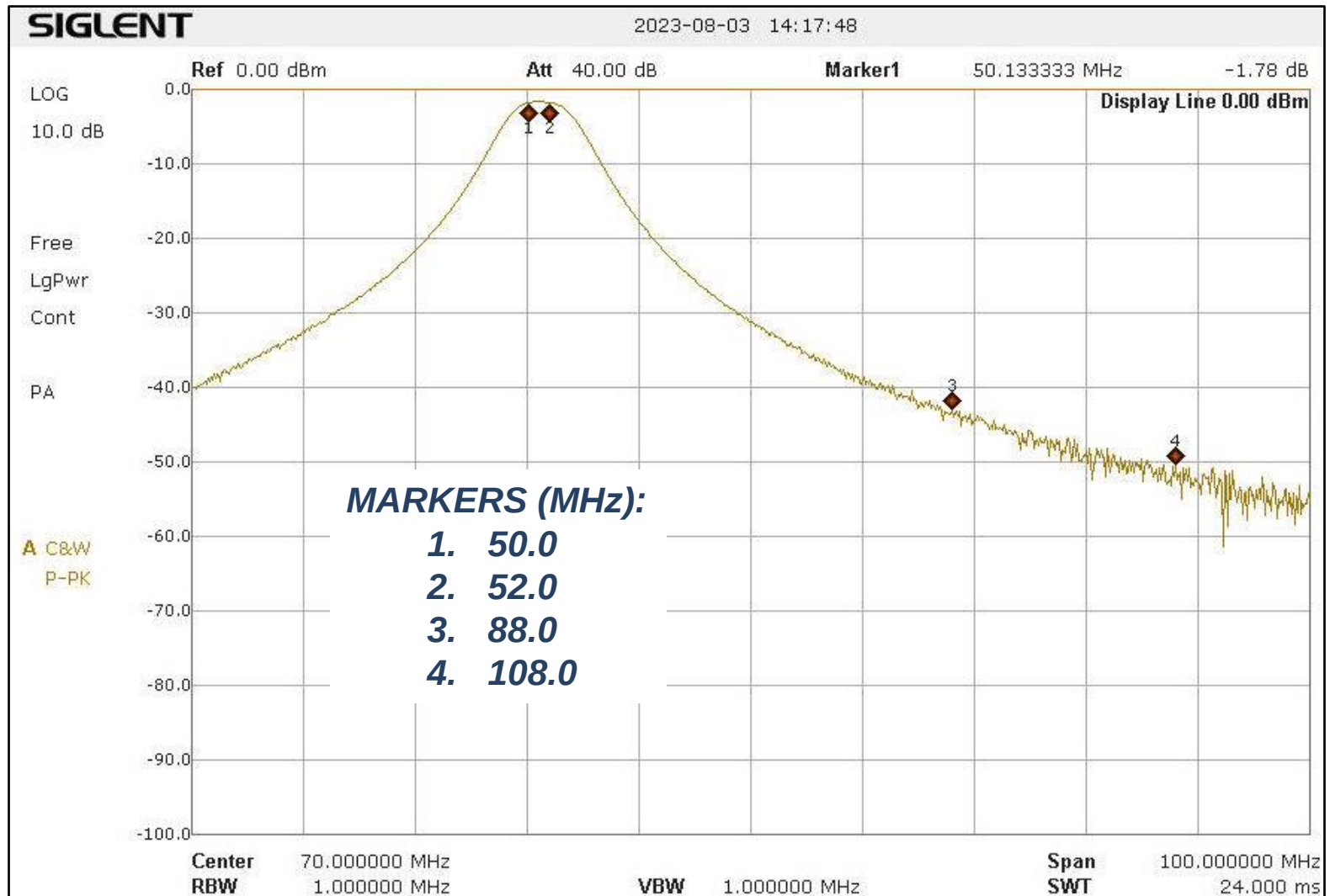


OUTPUT BPF

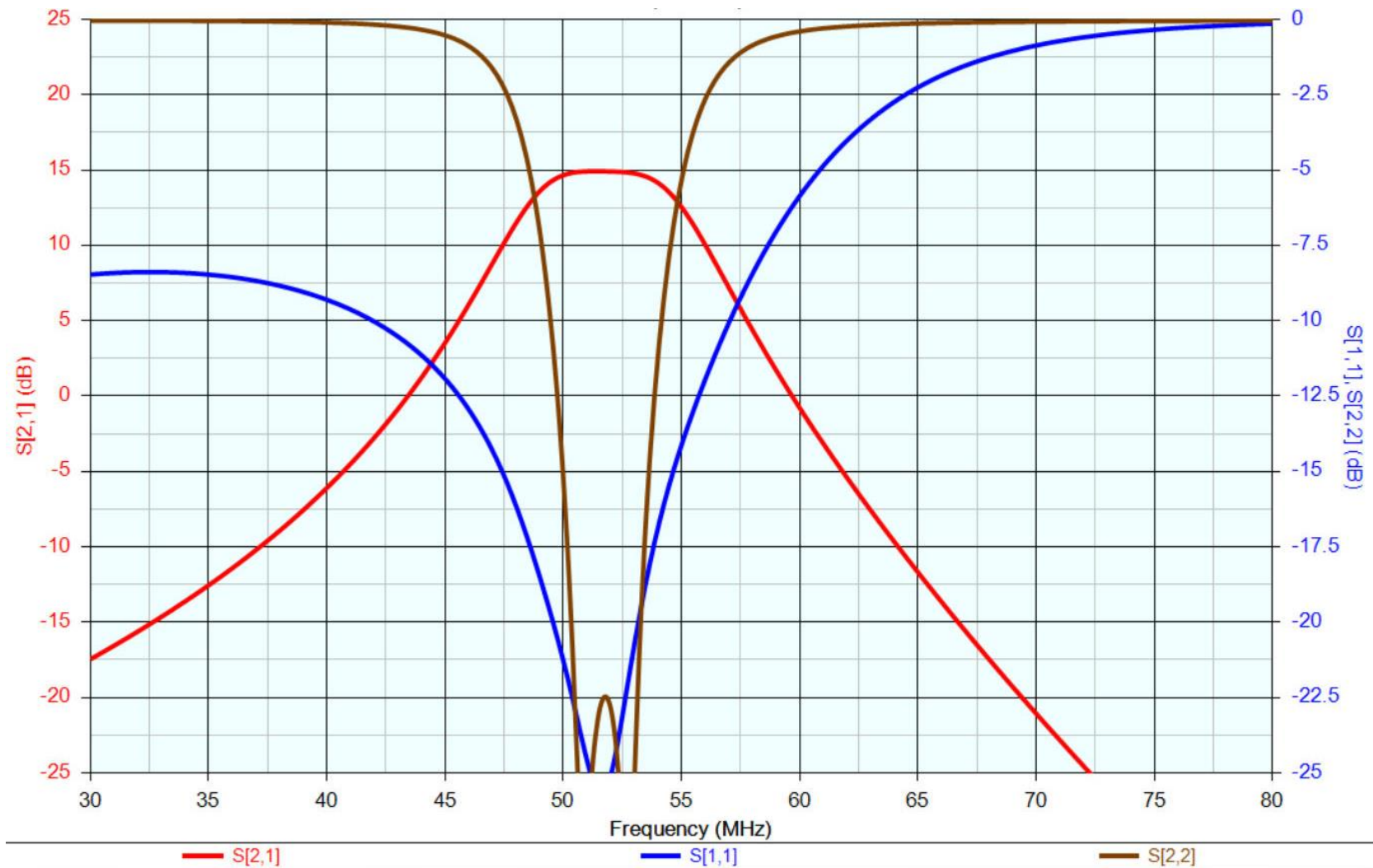


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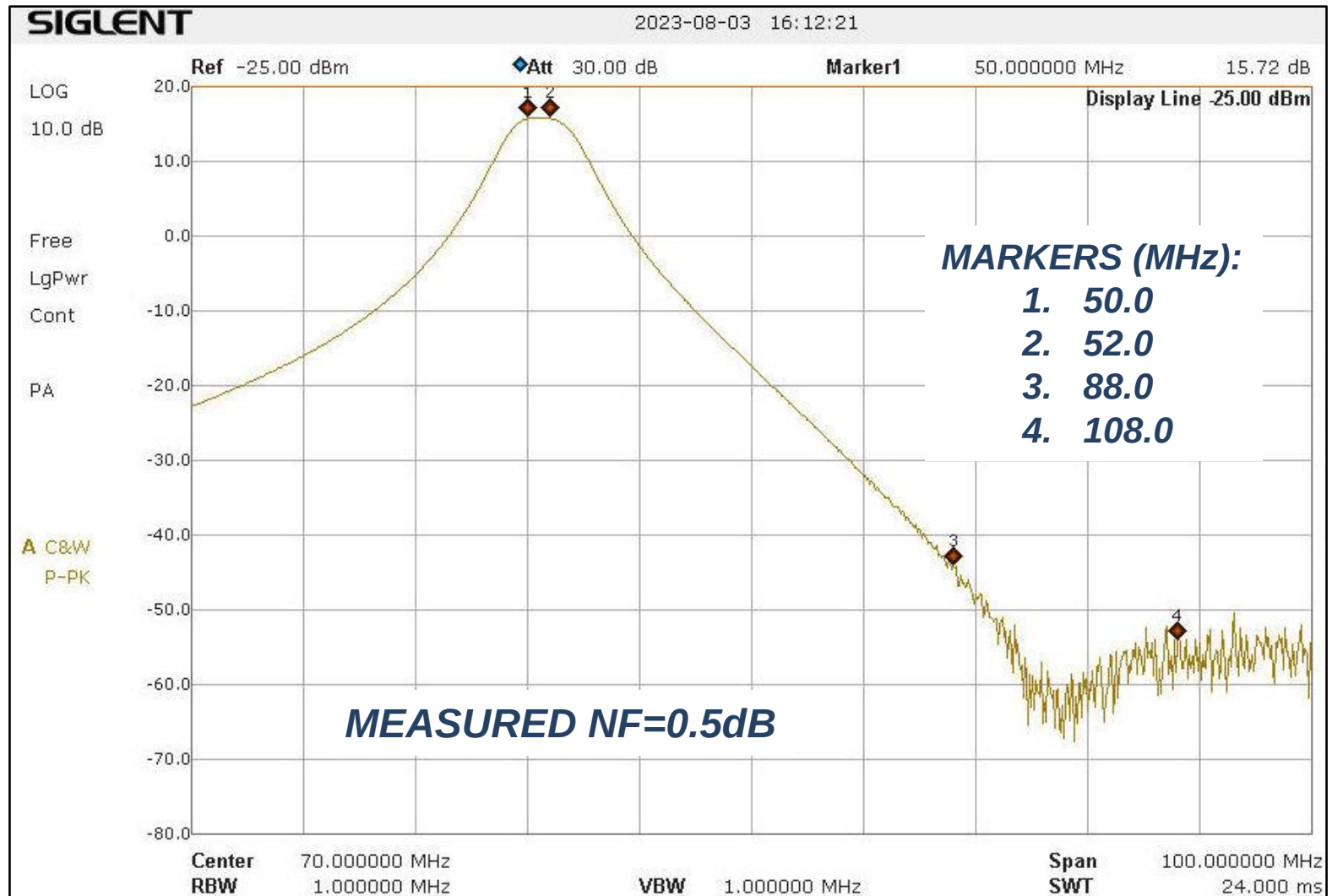
OUTPUT BPF MEASUREMENT



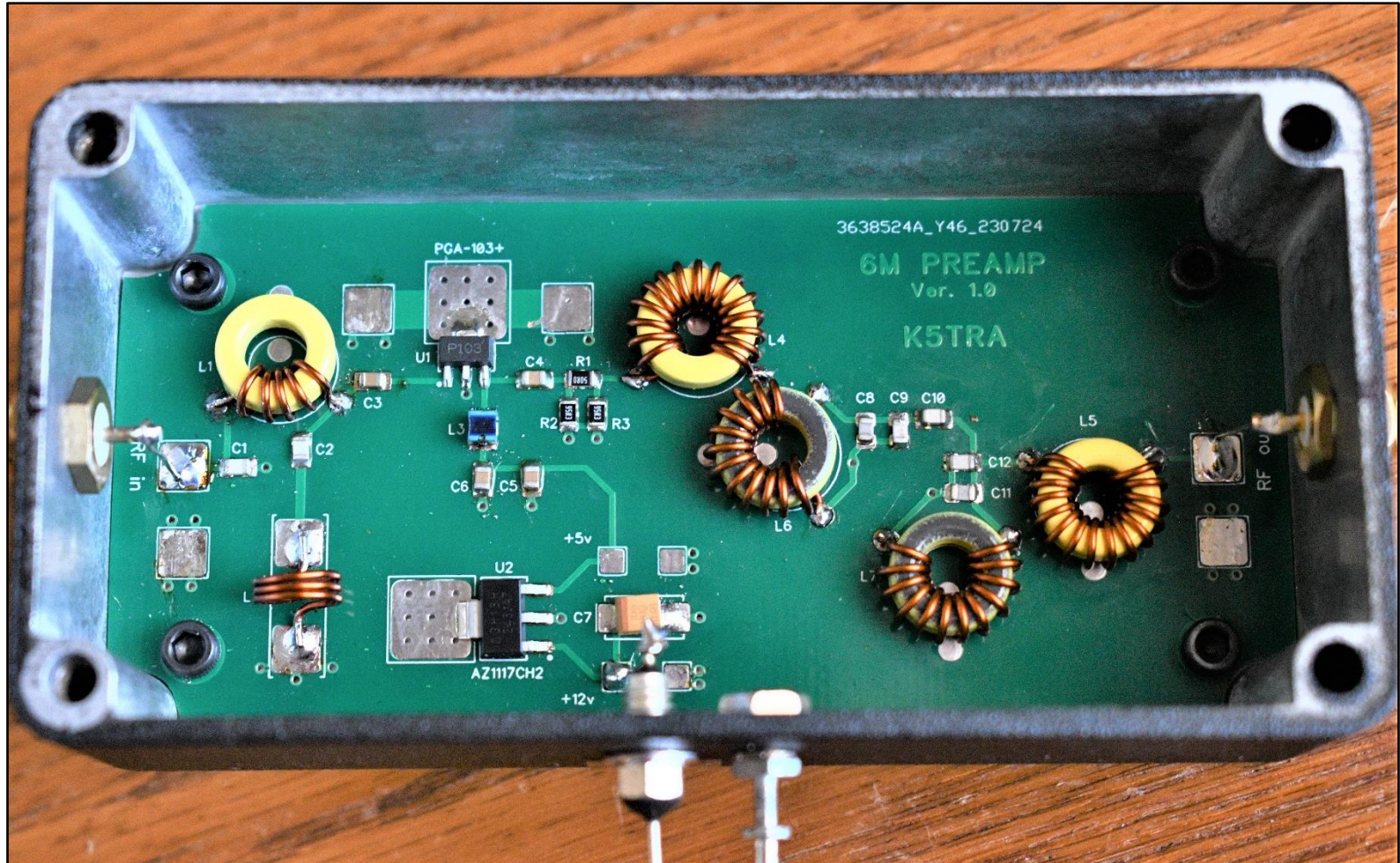
PREAMP SIMULATION



PREAMP MEASUREMENT



LNA BOARD PHOTO



FINAL COMMENTS

- pHEMT LNA technology provides outstanding NF and dynamic range
- Input return loss is much better than some off the shelf amplifiers (like ARR GaAs preamp)
- Operation with a high power transmitter would, of course, need T/R switching.
- Depending on RF switch isolation and power level, additional LNA protection could be added.
- These HPA operational considerations apply to all LNAs