

Garth RF Filters

We look at a pair of good quality filters for 70cm and 23cm



The 70cm and 23cm filters

TABLE 1: Test results

Filter	Centre frequency	Min. through loss	-3dB bandwidth	-40dB bandwidth	-60dB bandwidth	Passband ripple (pk-pk)
70cm	434MHz	1.2dB	8.5MHz	30MHz	68MHz	0.8dB
23cm	1250MHz	2dB	20MHz	90MHz	186MHz	0.6dB

WHY DO YOU NEED ONE? If you have ever experienced cross-band interference at VHF, UHF or above, interference from out-of-band signals, or want to operate in-band duplex (eg for 'lookthrough' on 23cm ATV) then a good filter is a great place to start. Garth RF Filters produces a range of filters at reasonable prices. We take a look at the 70cm and 23cm versions.

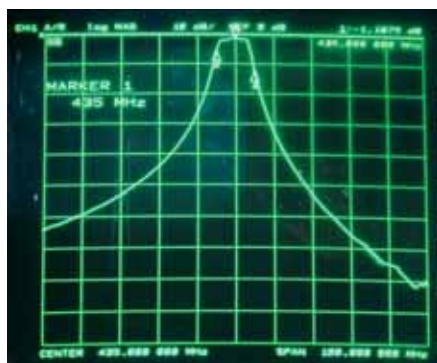
GENERAL DESCRIPTION. The 70cm and 23cm filters are housed in ABS boxes approximately 160mm x 95mm x 55mm. N sockets are provided for input and output, and as the filters are symmetrical it doesn't matter which way round you connect them. On the lid of each is a brief specification and frequency response plot of the individual filter – a nice touch. Each filter is a 3 element design, and the adjustment screws are accessible on the underside in case you need to tweak the response. But be warned, don't try this unless you have professional test equipment like a network analyser or you will ruin the frequency response.

Construction quality seems pretty good. One of the simple tests of a filter is to give it a squeeze while looking at its response on an analyzer. Poor mechanical construction shows up as the filter going off tune as it gets stressed – and you can also expect a dodgy filter to go out of kilter as the temperature changes.

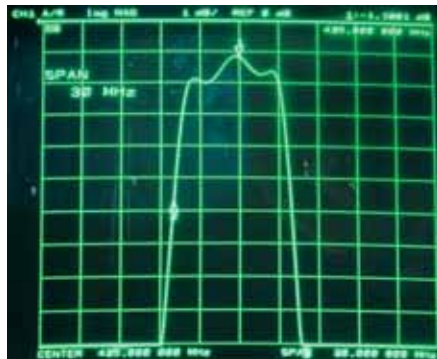
TESTING AND IN USE. Without a source of local interference on 70cm it was difficult to give a subjective assessment of its ability to reject out of band signals. The 23cm filter was tuned to 1249MHz so we

put it on the output of an ATV transmitter. It drastically reduced the in-band noise and spuri, to the extent that it was easily possible to operate lookthrough on the local ATV repeater, something which was impossible without a filter on our equipment.

For objective results we tested the filters on an HP 8753A network analyzer. Each was first tested on a wide frequency sweep at 10dB/div to see the overall response,



70cm filter response, 10dB/div, centre 435MHz, span 100MHz



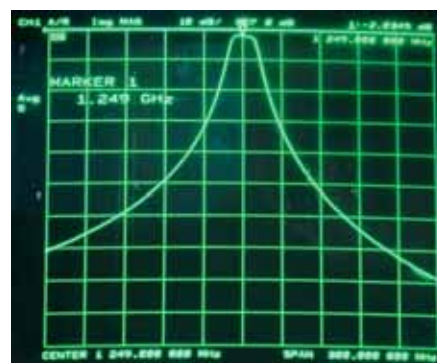
70cm filter close-in response, 1dB/div, centre 435MHz, span 30MHz

then over a much narrower range to check the through loss and passband ripple. The results are shown in the analyser screenshots and summarised in Table 1. Note that measurements have been rounded to the nearest 0.1dB. It is gratifying to note that the manufacturer's claims were very close to our results.

Although they are designed for transmitting as well as receiving, no power handling figures were stated. We used the 23cm one at about 20W and tried the 70cm one at 50W without any problems.

CONCLUSION. If you need a 70cm or 23cm filter with a decent frequency response and insertion loss then these would certainly seem to fit the bill. At £85 plus £5 postage they are pretty good value, too. The filters can be tuned to specified spot frequencies, and different bandwidths are available for different purposes. Full details are on the Garth Filters web site, www.gw4kaz.cymru1.net/. Many thanks to Brian Davies, GW4KAZ, for the loan of the review filters.

STOP PRESS: Garth Filters tell us that they can produce filters for any frequency from about 100MHz well into the microwave bands. Dimensions naturally vary with frequency, for example a 2m version (2MHz 3dB BW, 1.2dB loss) is around 360mm long.



23cm filter response, 10dB/div, centre 1249MHz, span 300MHz



23cm filter close-in response, 1dB/div, centre 1249MHz, span 100MHz