DuneStar Model 600 Bandpass Filter Characteristics

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The DuneStar 600 is a relay-selected bandpass filter array that allows operating two stations on different bands simultaneously-without blowing up your receiver front-ends.This model consists of six bandpass filters, one each for 160m, 80m, 40m, 20m, 15m, and 10m.The rigs transmit and receive through the proper bandpass filter, which 1), reduces wideband phase noise radiated from the active transmitter; and 2), prevents out-of-band power (and noise) from reaching the active receiver.A band select signal from the radio or a manual switch selects the correct operating bandpass filter. Coupled with the band select schemes described previously, the DuneStar filter array is completely transparent in operation. Besides its utility in protecting adjacent receiver's front ends, the filters also reduces TVI by a small amount (10dB to 20dB). Figure 1 shows the system block diagram of a dual-rig contest station employing auto-switching bandpass filters.

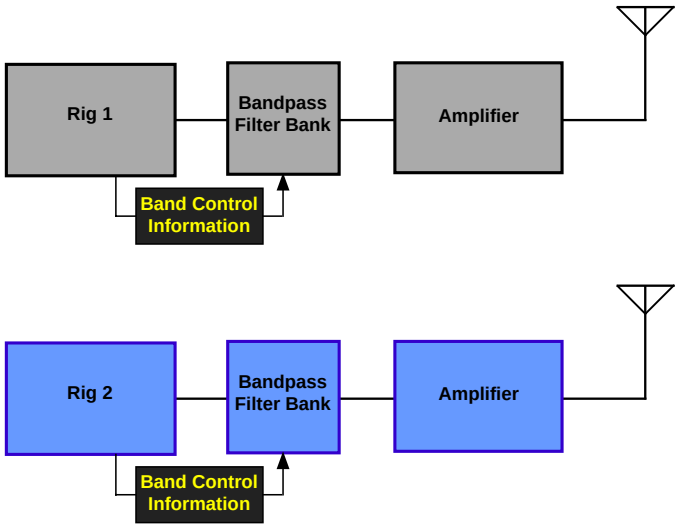


Figure 1. Block diagram of two radio contest station using automatically selected bandpass filters.

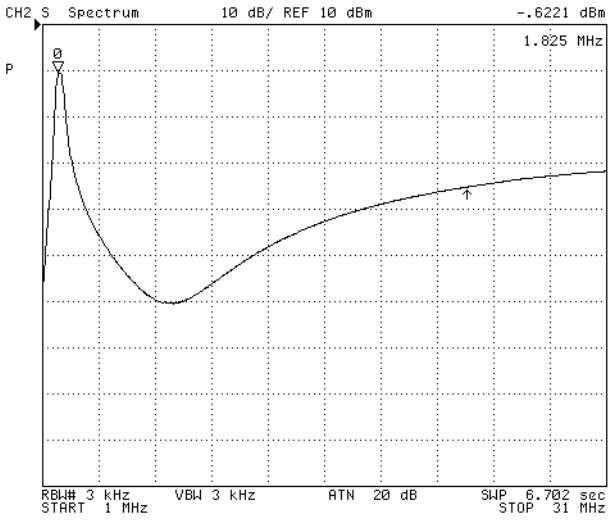
Filter Characteristics

The DuneStar 600 was evaluated with a HP 4396B Network/Spectrum analyzer. Table 1 summarizes the band-to-band rejection characteristics of the individual filters. Spectrographs for each bandpass filter follow.

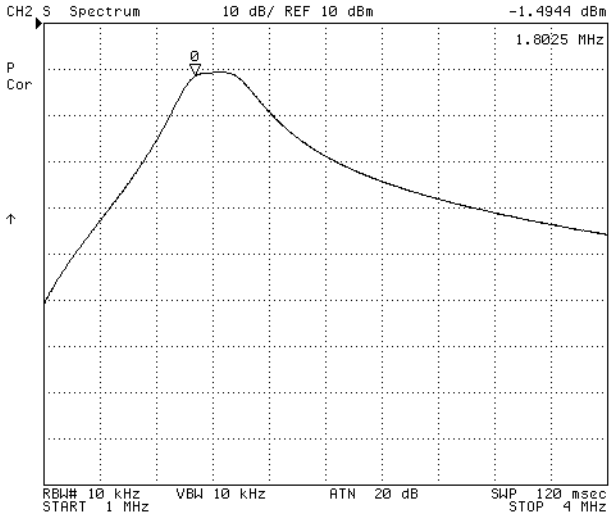
Band / Filter	160m	80m	40m	20m	15m	10m
160m	0.6	32	49	36	28	23
80m	52	0.8	36	53	37	38
40m	46	50	0.9	56	41	46
20m	48	43	40	0.4	50	37
15m	47	44	40	42	0.6	42
10m	55	49	44	43	34	0.8

Table 1. Band-to Band Filter Characteristics of DuneStar 600 (Loss in dB)

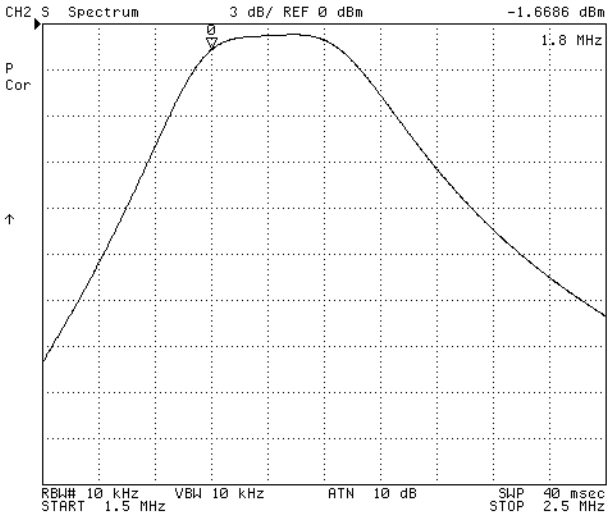
Filter Spectrographs—160m



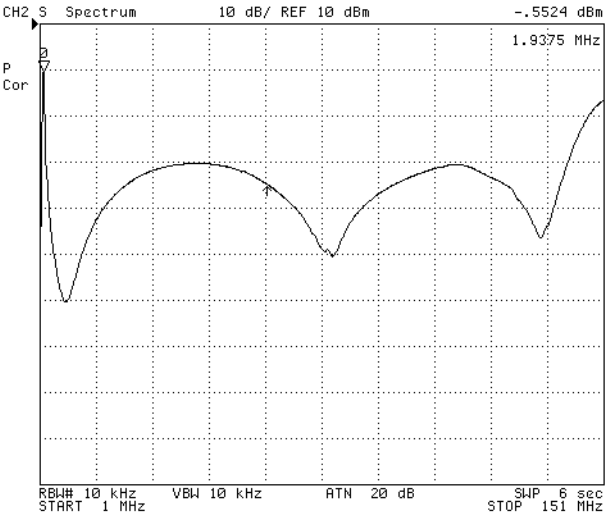
160m filter from 1MHz to 31MHz (3MHz/division)



160m filter from 1MHz to 4MHz



160m filter broadband characteristics from 1MHz to 151 MHz (15MHz/division)

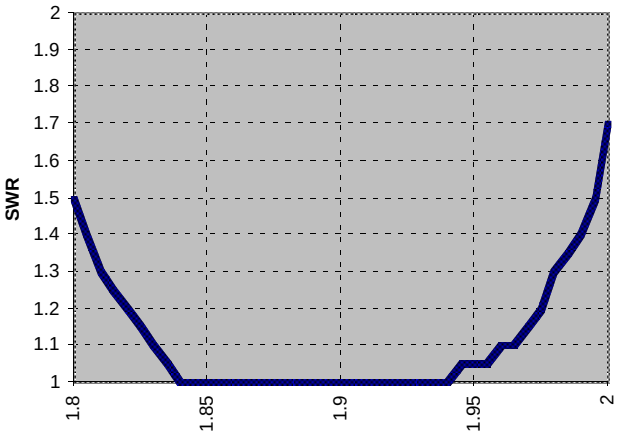


160m filter bandpass

The four spectrographs show the filter passband from 1MHz to 31MHz, the filter broadband characteristics to mid-VHF (1MHz to 151MHz), the rejection characteristics from 50% to 200% of the filter design frequency, and the bandpass characteristic.The first three graphs have a vertical scale of 10db per division; the bandpass graph is 3dB per division to show detail.

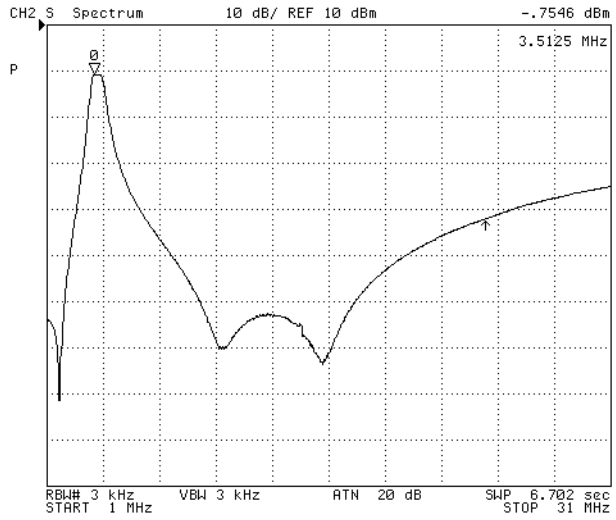
Several of the filters provide 1.0 : 1 SWR across the entire amateur band. Others, 160m, 80m, and 10m, have the measured SWR graphed. Note the SWR graph is not from the HP 4396B network analyzer, as I do not have access to the additional hardware necessary .

DuneStar 600--160m

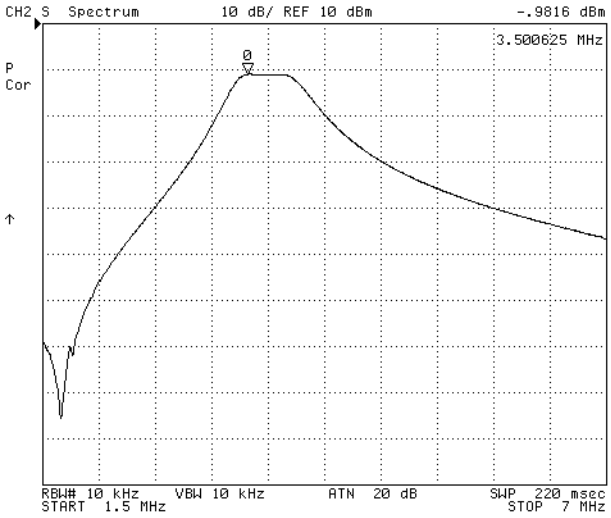


160m filter in-band SWR

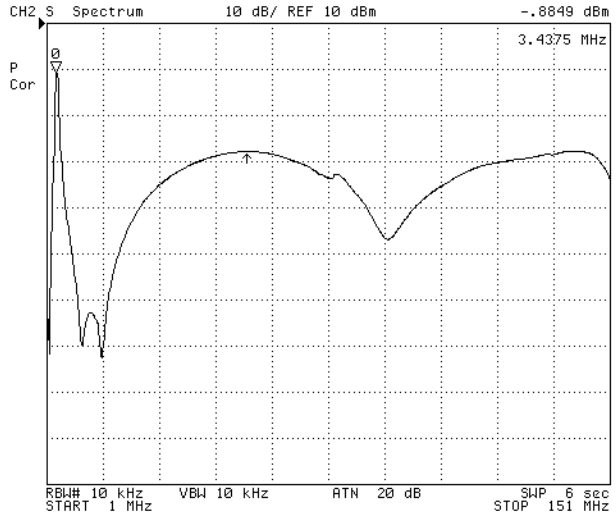
80m Filter



80m filter from 1MHz to 31MHz (3MHz/division)



80m filter from 1.5MHz to 7MHz

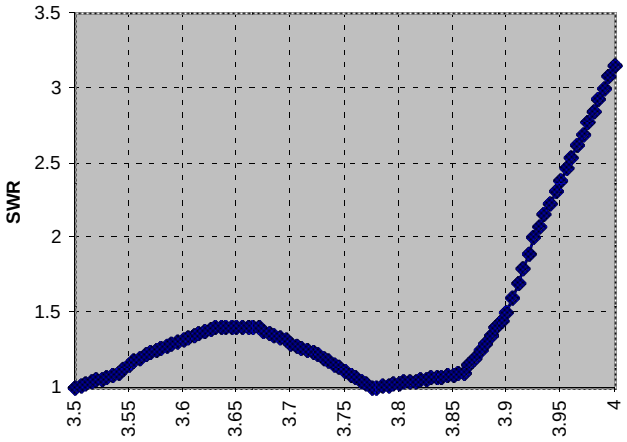


80m filter broadband characteristics from 1MHz to 151 MHz (15MHz/division)

80m filter bandpass

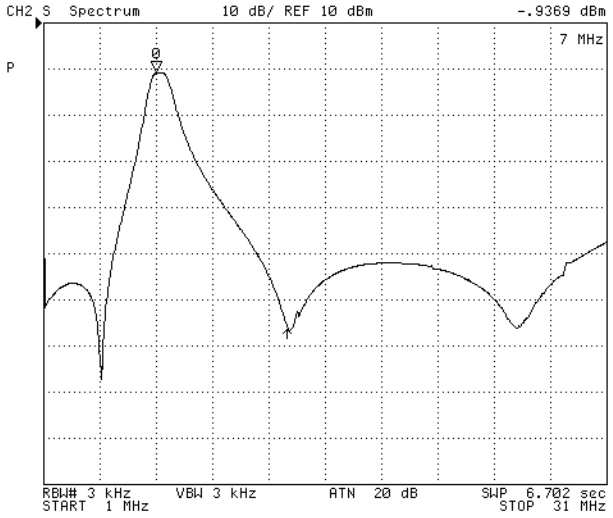
Note that the 80m bandpass spectrograph shows excessive attenuation. I believe this is a measurement error.

DuneStar 600--80m

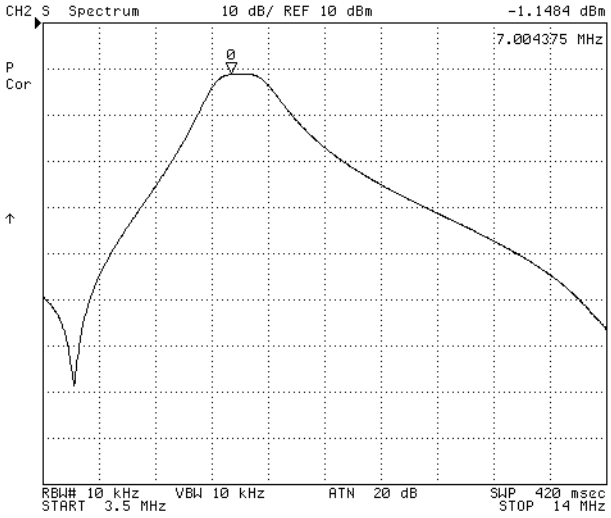


80m filter in-band SWR

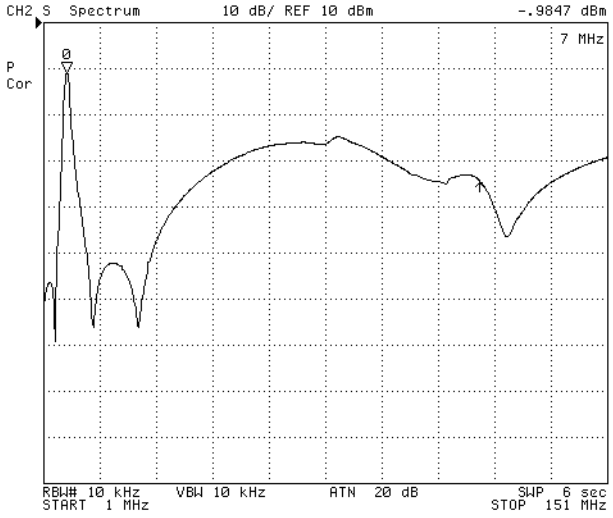
40m Filter



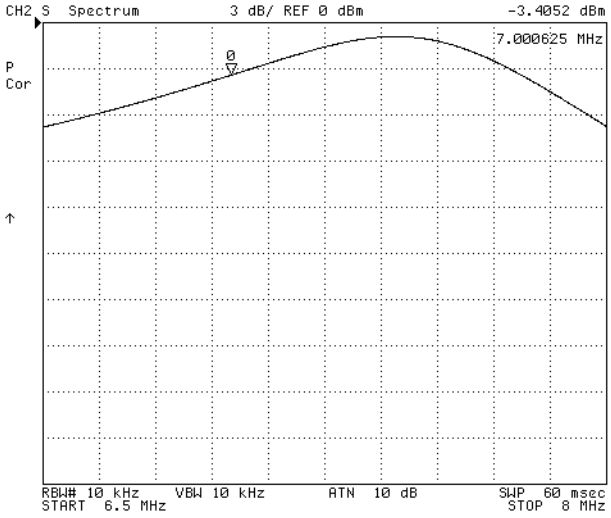
40m filter from 1MHz to 31MHz (3MHz/division)



40m filter from 3.5MHz to 14MHz



40m filter broadband characteristics from 1MHz to 151 MHz (15MHz/division)



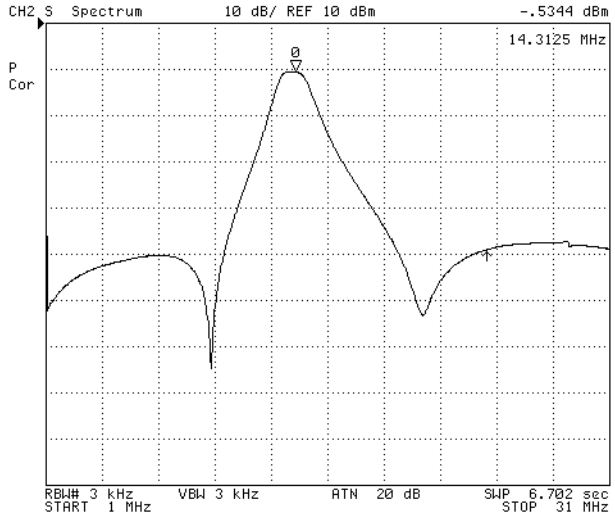
40m filter bandpass

Note that the 40m bandpass spectrograph shows excessive attenuation. I believe this is a measurement error.

Unlike coaxial stubs, the DuneStar 600 has flat SWR (1.0 : 1) across the entire band, 7.000 MHz to 7.300MHz.

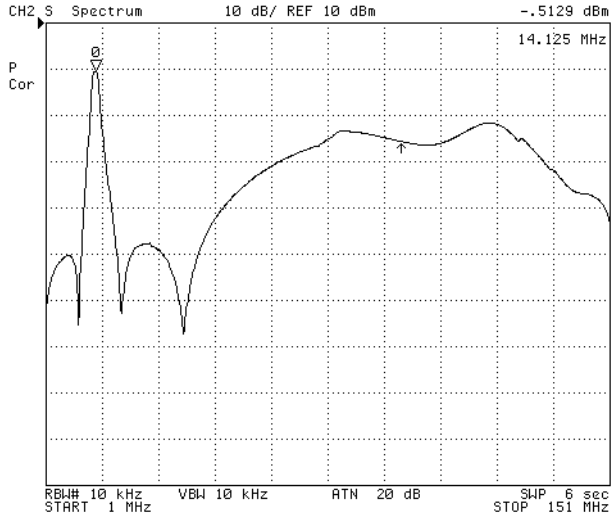
40m filter in-band SWR

20m Filter

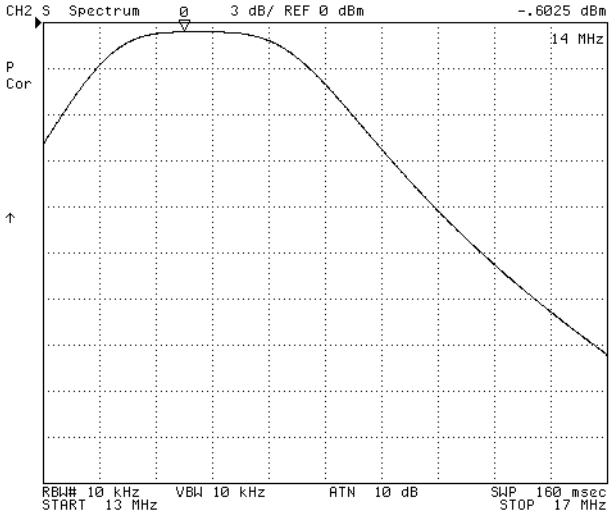


20m filter from 1MHz to 31MHz (3MHz/division)

20m filter from 7MHz to 28MHz



20m filter broadband characteristics from 1MHz to 151 MHz (15MHz/division)

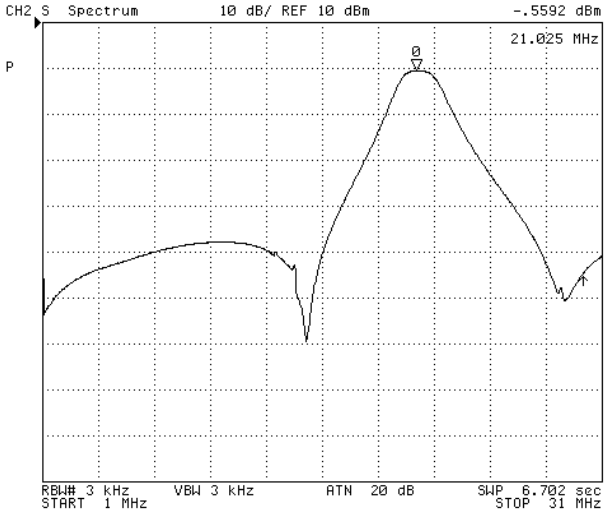


20m filter bandpass

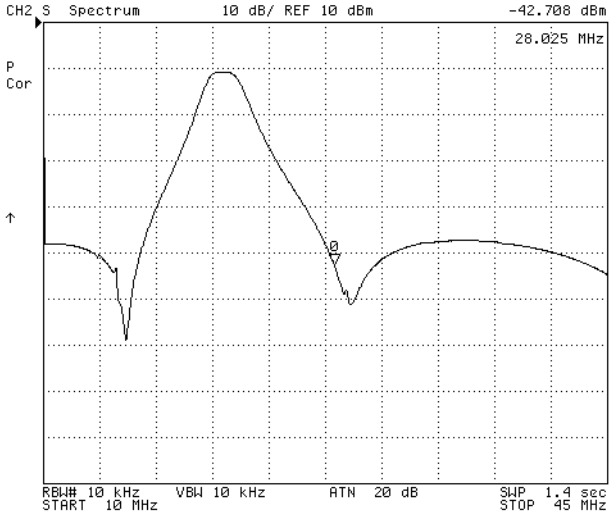
Unlike coaxial stubs, the DuneStar 600 has flat SWR (1.0 :1) across the entire band, 14.000 MHz to 14.350MHz.

20m filter in-band SWR

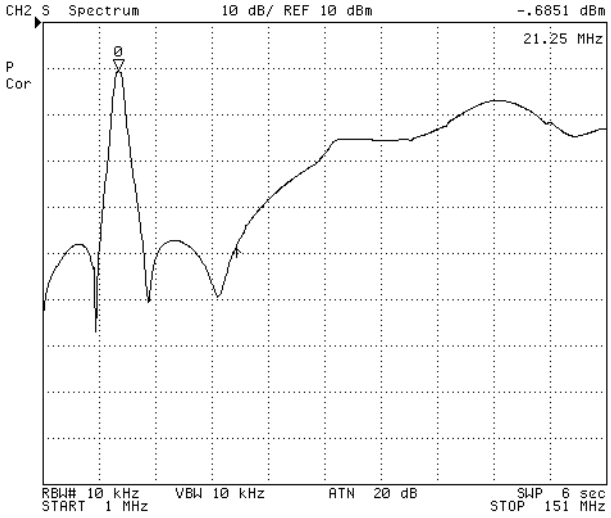
15m Filter



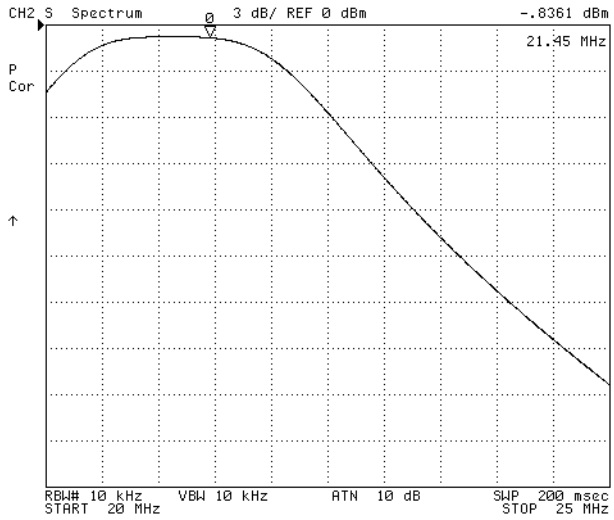
15m filter from 1MHz to 31MHz (3MHz/division)



15m filter from 10MHz to 45MHz



15m filter broadband characteristics from 1MHz to 151 MHz (15MHz/division)

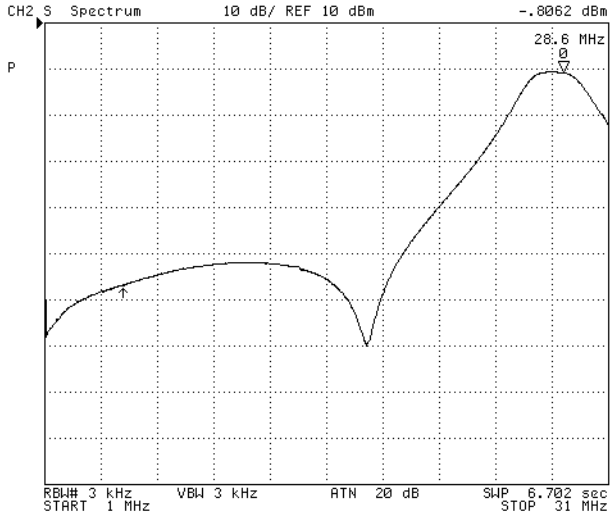


15m filter bandpass

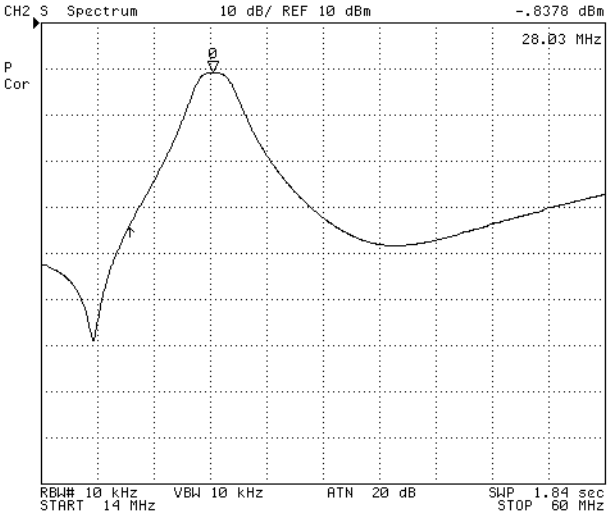
The DuneStar 600 has flat SWR (1.0 : 1) across the entire band, 21.000 MHz to 21.450MHz.

15m filter in-band SWR

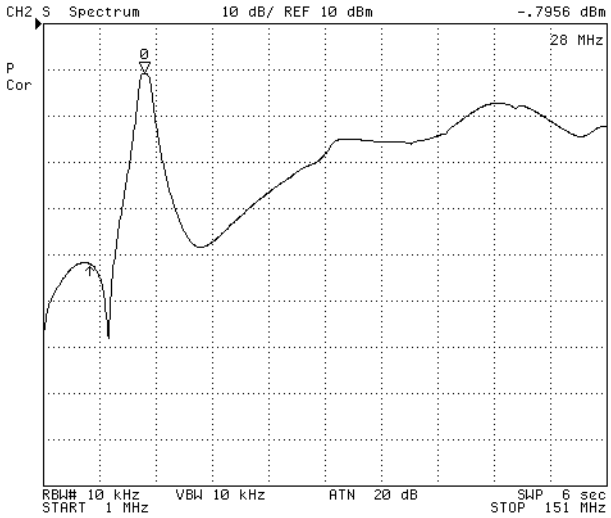
10m Filter



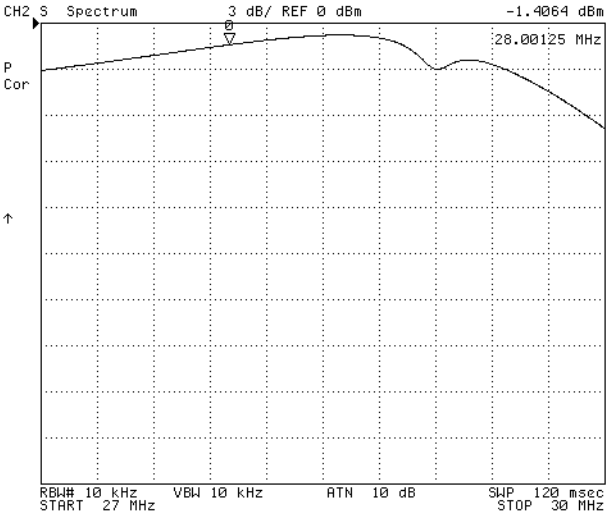
10m filter from 1MHz to 31MHz (3MHz/division)



10m filter from 14MHz to 60MHz



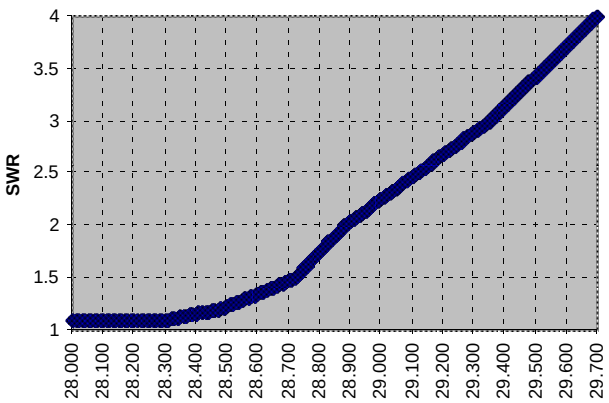
10m filter broadband characteristics from 1MHz to 151 MHz (15MHz/division)



10m filter bandpass

Note that the 10m bandpass spectrograph shows excessive attenuation. I believe this is a measurement error.

DuneStar 600—10m Filter



10m filter in-band SWR