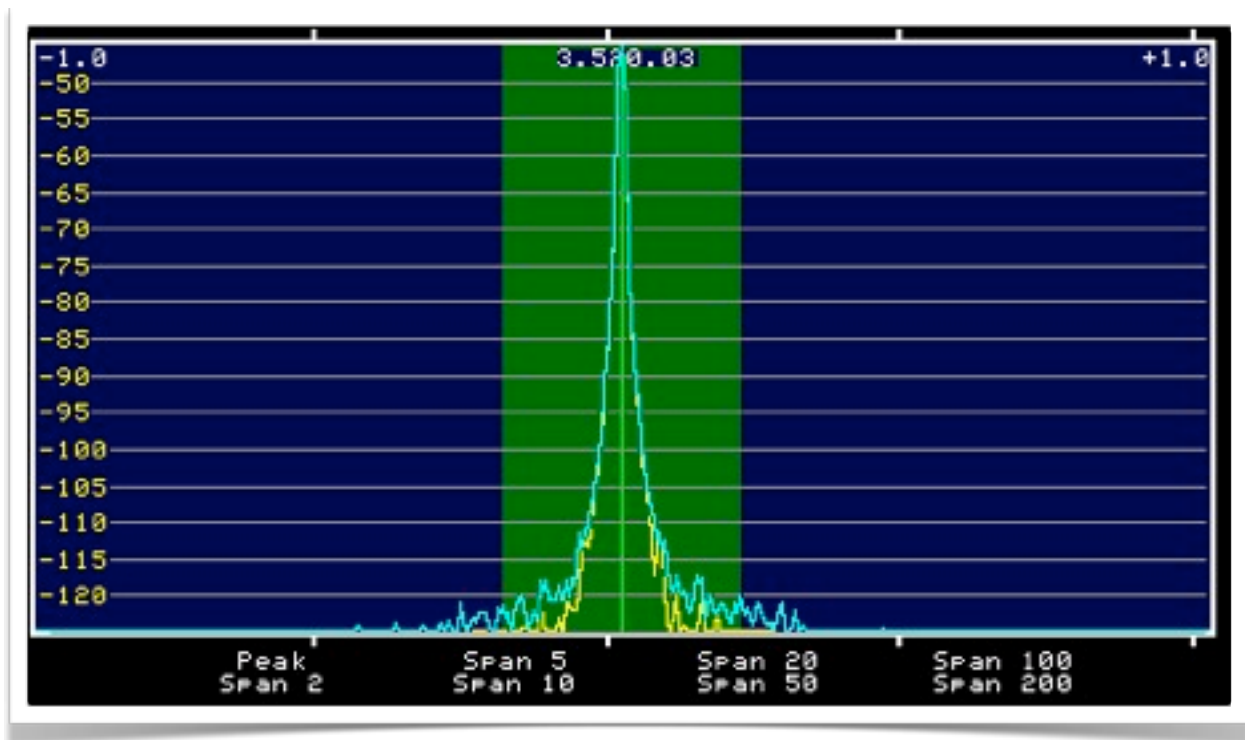




## W1WEF SPECTRAL EXPERIMENTS

Jack asked me to capture spectral data for each setting of the Rise/Set Time parameter in his FT5K radio set at 200W output. In addition, we looked at the spectrum at the default setting with his AL1500 turned on.

First, there's a valid question about whether or not the measurement scheme might be introducing misleading content. These pictures are acquired by feeding the IF OUT port of a Elecraft K3 transceiver into the Elecraft P3 Panadapter. The IF OUT port taps into the transceiver's receive signal path after the first mixer and before the roofing filters, so receiver selectivity settings and AGC action do not affect the signal into the P3. I've done the P3 amplitude calibration procedure with the Elecraft XG3 Signal Source, which accounts for transfer gain between the K3 antenna input and the IF OUT port, so that the vertical scale on the P3 images represent signal level at the receiver input in dBm. The reference picture below show the spectral data for a carrier generated by the XG3 with the XG3 set at -33 dBm and fed into the K3 through a 12 dB attenuator.



*XG3 signal at -45 dBm*

The vertical axis range of the P3 is 80 dB. For these tests, I've set the minimum (REF VAL) to -125 dBm, so the maximum is -45 dBm (S9 + 28 dB). An ideal result would



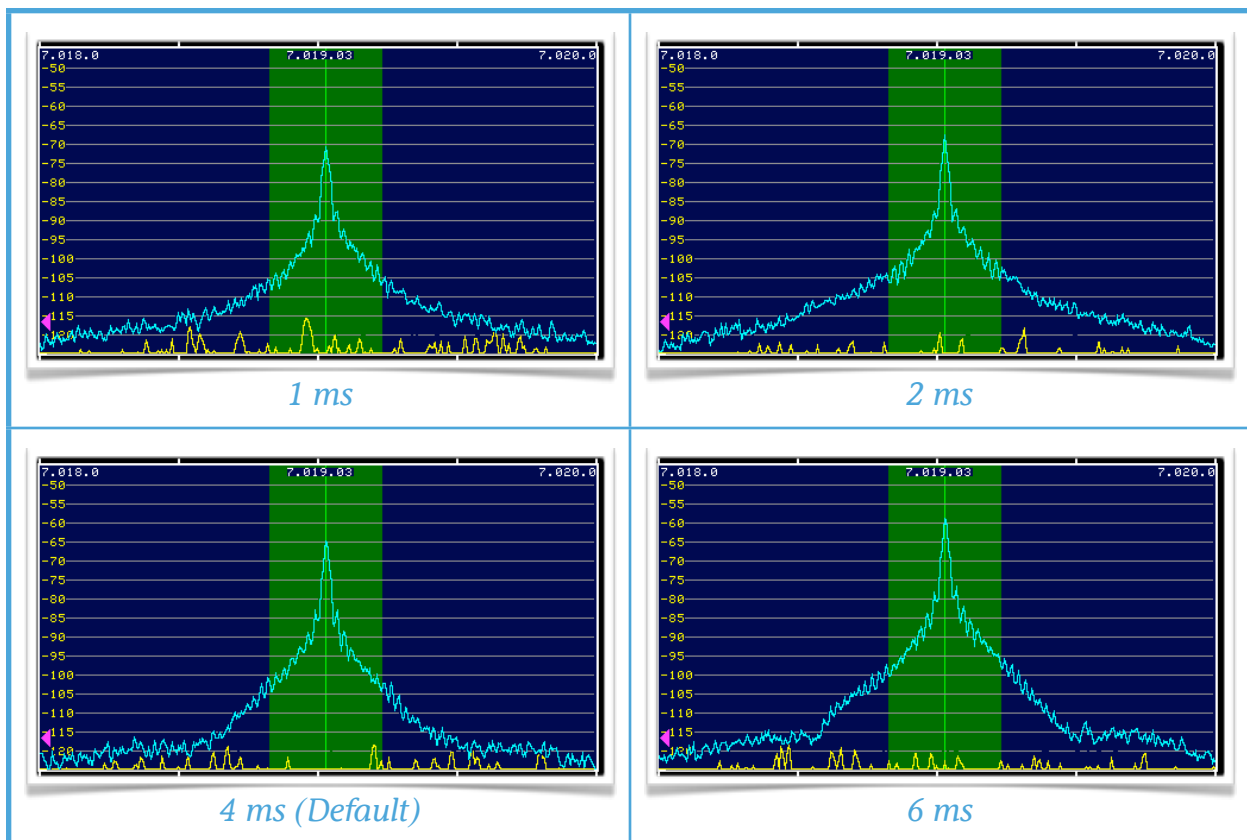
show a single vertical line at the carrier frequency. This result shows low-level signal content symmetrically disposed on each side of the carrier, probably due to a combination of phase noise in the signal source and finite resolution in the analyzer. In any case, it's clear that the measurement system isn't contributing significant content to on-air observations of signals with peak levels below -45 dBm.



## EFFECT OF VARYING RISE/SET TIME SETTING

These pictures were capture 2011.12.07 at about 1415Z on 40m. Jack was fairly loud at the time. In the pictures, the blue trace shows peak signal level over about 5 seconds while Jack was sending PARIS at about 32 WPM. The yellow trace shows a single-sweep spectrum when Jack wasn't transmitting (i.e., background band noise). The peak noise level is typically 5 to 10 dB or so above the average single-sweep level. So anything on the blue trace above about -115 dBm came from Jack.

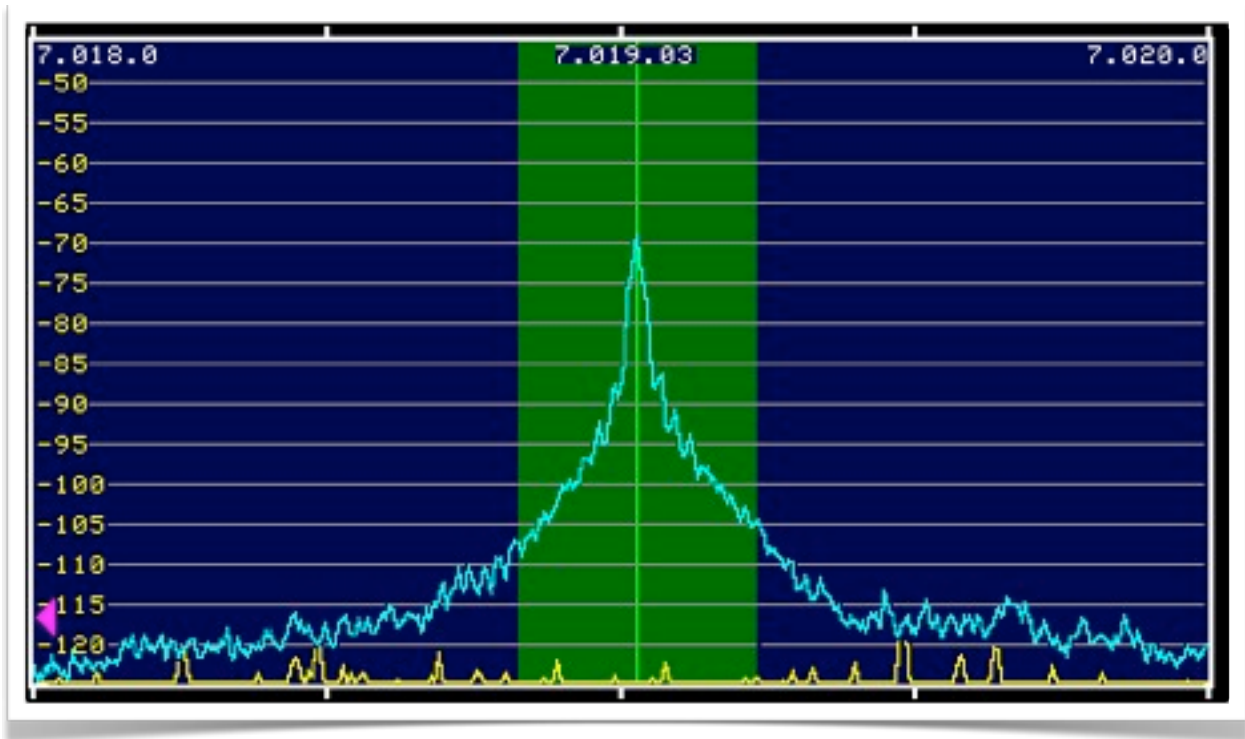
The horizontal axis in these pictures is labeled along the top. That is, Jack was transmitting on 7019 kHz, and the data spans 2 kHz around that frequency. The broad green bar indicates the K3 main receiver bandwidth, which happened to be 400 Hz while performing these measures.





## EFFECT OF AMPLIFIER

As a final test, jack returned the Rise/Set setting to the default, 4 ms, and turned on his AL1500 with drive set to yield 1500 W output. Compare this carefully with the no-amplifier result, which has a 5 dB higher peak signal level. The amplifier was working; propagation was working against us.



*4 ms with Amplifier*