Sherwood Engineering HF Test Results

Model Elecraft K3S Serial # 10020 Test Date: 10/15/2015

IF BW 2400 -6 / -60, Hz 2380 / 3290	Ultimate	102	dB*
IF BW 500 -6 / -60, Hz 410 / 640	Ultimate	108	dB*

*Ultimate measured 3 filter-bandwidths removed from center frequency.

Front End Selectivity (A – F)	Bandpass	B
First IF rejection	90	dB

Dynamic Range with preamp OFF

DR3 @ 20 kHz, SSB roofing filter, DSP 500 Hz	102	dB
DR3 @ 20 kHz, 400 Hz roofing filter, DSP 400 Hz	105	dB
DR3 @ 20 kHz, 200 Hz roofing filter, DSP 200 Hz	109	dB
DR3 @ 5 kHz, SSB roofing filter, DSP 500 Hz	91	dB
DR3 @ 5 kHz, 400 Hz roofing filter, DSP 400 Hz	104	dB
DR3 @ 5 kHz, 200 Hz roofing filter, DSP 200 Hz	108	dB
DR3 @ 2 kHz, SSB roofing filter, DSP 500 Hz	82	dB
DR3 @ 2 kHz, 400 Hz roofing filter, DSP 400 Hz	104	dB
DR3 @ 2 kHz, 200 Hz roofing filter, DSP 200 Hz	107	dB
Blocking above noise floor, 400 Hz filter	141	dB*

*AGC ON, 100 kHz spacing, desired signal 1 uV.

Noise floor, SSB bandwidth 14.2 MHz, no preamp	-129	dBm
Noise floor, SSB bandwidth 14.2 MHz, Preamp ON	-131	dBm
Sensitivity SSB at 14.2 MHz, no preamp	0.27	uV
Sensitivity SSB at 14.2 MHz, Preamp ON	0.20	uV
Noise floor, 400 Hz, 14.2 MHz, no preamp	-135	dBm
Noise floor, 400 Hz, 14.2 MHz, Preamp ON		dBm
Noise floor, 500 Hz, 14.2 MHz, no preamp, SSB roofing filter		dBm
Noise floor, 200 Hz, 14.2 MHz, no preamp	-138	dBm
Noise floor, SSB, 50.125 MHz, no preamp	-127	dBm
Noise floor, SSB, 50.125 MHz, Preamp ON	-129	dBm

Sensitivity, SSB, 50.125 MHz, no preamp		1.0	uV
Sensitivity, SSB, 50.125 MHz, Preamp ON		0.77	uV
Noise floor, 400 Hz, 50.125 MHz, no preamp		-133	dBm
Noise floor, 400 Hz, 50.125 MHz, Preamp ON		-137	dBm
Signal for S9, no preamp	-67 dBm	99	uV*
Signal for S9, Preamp ON	-77 dBm	29	uV*
*Measured with 2.4 kHz DSP bandwidth			
Gain of preamp			
Preamp		11	dB
AGC threshold at 3 dB, no preamp		1	uV
AGC threshold at 3 dB, Preamp 1 On		0.27	uV
Threshold set to 5, Slope set to 15			

Notes:

The 400-Hz roofing filter has passive IMD issues when a test signal is in the transition band. When tuned 500 Hz away from a DR3 test signal, and then the receiver is re-tuned to a 2 kHz offset, the IMD drifts down 5 to 8 dB over several 10s of seconds. No passive IMD was observed with the 200-Hz roofing filter.

The new synthesizer board is significantly lower in phase noise compared to the previous version. The radio is no longer RMDR limited, and the DR3 value is a true third-order product.

Microphonics of the synthesizer are also significantly reduced, another major improvement.
Noise floor of the K3 without the preamp was measured 5 dB lower (-135 dBm vs. -130 dBm) than in 2008 with S/N 00149. However, with the lower native noise floor, the preamp doesn't lower receiver noise floor significantly. On SSB the improvement is only 2 dB.

With an SSB bandwidth, noise at the speaker output increases 8 dB; with a 400-Hz bandwidth, noise increases 7 dB; with a 200-Hz bandwidth noise increases 6 dB.

Generally 10 dB preamps lower a noise floor 7 dB. At most, this 11 dB preamp lowers noise floor 4 dB. This issue warrants further investigation.

NOTE: The initial 10 dB S+N/N sensitivity measurements were not to spec due to an RX gain alignment error. N0QO ran the gain calibration program and the same K3 was measured again for sensitivity. The web site was updated to reflect that data in Rev B.

Rev B.