Sherwood Engineering HF Test Results

Model FT-950 Serial # 7K0200xx Test Date: 4/13/2012

IF BW 2400 –6 / -60, Hz 2.34 / 3.87		Ultimate		80	dB
IF BW 500 –6 /-60, Hz 500 / Noise		Ultimate		80	dB
First IF rejection at 69.450 MHz				83	dB
Dynamic Range with radio, no preamp					
Dynamic Range 20 kHz	105	dB	IP3	+37	dBm
Dynamic Range 5 kHz	98*	dB	IP3		dBm
Dynamic Range 2 kHz L/H	79/82	dB	IP3	-2	dBm
* Consisted of phase noise only					
Dynamic Range with uTune 160 meters					
Dynamic Range 20 kHz bypassed	101	dB	IP3	+30	dBm
Dynamic Range 20 kHz enabled	117	dB	IP3	+53	dBm
Noise floor, 160 meters, 500 Hz BW			-122		dBm
Dynamic Range with radio, 2nd radio					
Dynamic Range 20 kHz		dB	IP3		dBm
Dynamic Range 2 kHz		dB	IP3		dBm
Dynamic Range with radio, alternate conversion scheme					
Dynamic Range 20 kHz		dB	IP3		dBm
Dynamic Range 2 kHz		dB	IP3		dBm
Blocking above noise floor, 1uV signal @ 100 kHz, AGC On, Measured as a 3 dB increase in noise floor			125		dB
Phase noise (normalized) at 2.5 kHz spacing:				-106	dBc
Phase noise (normalized) at 5 kHz spacing:				-117	dBc
Phase noise (normalized) at 10 kHz spacing:				-125	dBc
Phase noise (normalized) at 20 kHz spacing:				-132	dBc
Phase noise (normalized) at 40 kHz spacing:				-137	dBc
Phase noise (normalized) at 80 kHz spacing:				-140	dBc
Phase noise (normalized) at 100 kHz spacing:				-139	dBc
Phase noise (normalized) at 200 kHz spacing:				-144	dBc
Phase noise (normalized) at 300 kHz spacing:				-146	dBc
Phase noise (normalized) at 400 kHz spacing:				-147	dBc
Phase noise (normalized) at 500 kHz spacing:				-148	dBc

Noise floor, SSB bandwidth 14 MHz, no preamp		-116	dBm
Noise floor, SSB bandwidth 14 MHz, Preamp 1 On		-127	dBm
Noise floor, SSB bandwidth 14 MHz, Preamp 2 On		-134	dBm
Sensitivity SSB at 14 MHz, no preamp		1.1	uV
Sensitivity SSB at 14 MHz, Preamp 1 On		0.31	uV
Sensitivity SSB at 14 MHz, Preamp 2 On		0.15	uV
Noise floor, 500 Hz, 14.2 MHz, no preamp		-120	dBm
Noise floor, 500 Hz, 14.2 MHz, Preamp 1 On		-132	dBm
Noise floor, 500 Hz, 14.2 MHz, Preamp 2 On		-138	dBm
Noise floor, SSB, 50.125 MHz, no preamp		--113	dBm
Noise floor, SSB, 50.125 MHz, Preamp 1		-124	dBm
Noise floor, SSB, 50.125 MHz, Preamp 2		-132	dBm
Sensitivity, SSB, 50.125 MHz, no preamp		1.6	uV
Sensitivity, SSB, 50.125 MHz, Preamp 1		0.44	uV
Sensitivity, SSB, 50.125 MHz, Preamp 2		0.18	uV
Noise floor, 500 Hz, 50.125 MHz, no preamp		-119	dBm
Noise floor, 500 Hz, 50.125 MHz, Preamp 1 On		-131	dBm
Noise floor, 500 Hz, 50.125 MHz, Preamp 2 On		-138	dBm
Signal for S9, no preamp		107	uV
Signal for S9, Preamp 1		32	uV
Signal for S9, Preamp 2		12	uV
Gain of preamp(s)			
Preamp 1		10	dB
Preamp 2		18	dB
AGC threshold at 3 dB, no preamp		4.5	uV
AGC threshold at 3 dB, Preamp 1 On	1.2	uV	
AGC threshold at 3 dB, Preamp 2 On	0.47	uV	

Notes:
All measurements were made with the 3 kHz roofing filter. No discernible difference was noted between the 6-kHz filter and the 3-kHz filter, except at 5-kHz dynamic range testing where the 3-kHz was slightly better.

I used the radio on the air for several weeks, driving an Alpha 99 amplifier. Ergonomically the biggest problem is the lack of a dedicated power output control on the front panel. It can take up to 4 steps to adjust and save a power setting, which is

unacceptable in a contest, when changing bands or frequency with a limited bandwidth antenna.

The key line for the linear is an inconvenient mini-DIN jack. It would be must more convenient if there was also an RCA jack for the linear key line.

The DSP filter bandwidth at 2.4 kHz at -60 dB was somewhat affected by phase noise. The DSP filter bandwidth a 500 Hz at -60 could not be made at all due to phase noise.

Overall the performance of the radio is excellent, particularly for the street price of under $1500.00.

The tuner seemed to tune quite slowly for a relay-switched L/C tuner. It also did not seem to remember where it was tuned, and would seem to start from scratch each time.

I only was able to test the uTune preselector on 160 meters. The stepper motor for the L/C circuit tracks the receiver tuning automatically. The improvement in dynamic range is significant at 20 kHz spacing, increasing from 101 dB to 117 dB, a 16 dB improvement. Considering the ARRL and CQ 160 meter CW contests have heavy activity from 1.800 MHz to 1.860 MHz or higher in the band, the uTune performs as advertized. The IP3 jumps from +30 dBm with the uTune bypassed to +53 dBm when activated. Of course on 160 meters when using ones normal transmit antenna on receive, one can increase the IP3 even more by using the 6 or 12 dB attenuator. The measured -122 dBm noise floor on 160 meters by itself is not useful, unless one is using a Beverage or similar low gain antenna.

The transmit EQ adjustments are very robust, allowing good EQ with any microphone. The included hand microphone is in drastic need of a wind screen, as it pops terribly on breath noise. I slipped my XYLs “footie” (small sock) over the microphone, which completely solved the breath noise problem.

On the other hand I did not find the contour controls particularly useful.

The speech processor works well, but I find too much processing is being done in the ALC. This is just a design philosophy difference between Yaesu and I. The ALC decay time constant is very fast, operating at a syllabic rate.

I did not measure blocking with the ARRL 3-Hz filter method. This typically increases the value by 20 to 40 dB. Since almost every modern radio is phase noise limited in the blocking test, I consider the measurement with a 3-Hz filter rather meaningless since no one listens through a 3-Hz filter.

DUM and spectrum display will be tested in the coming weeks.

Rev C