Sherwood Engineering HF Test Results

Model Ten-Tec Omni VII Serial #11C10866 Test Date: 03/11/07

IF BW 6000 –6 / -60			Ultimate		dB
IF BW 2400 –6 / -60, Hz			Ultimate		dB
IF BW 1800 –6 /-60, Hz			Ultimate		dB
IF BW 500 –6 /-60, Hz			Ultimate		dB
Front End Selectivity (A – F)					
IF Rejection, 14.2 MHz @ kHz IF					dB
First IF Rejection @ MHz IF					dB
Dynamic Range 100 kHz		dB	IP3		dBm
Dynamic Range 20 kHz	92	dB	IP3		dBm
Dynamic Range 5 kHz		dB	IP3		dBm
Dynamic Range 2 kHz	80	dB	IP3		dBm
Dynamic Range 1 kHz		dB	IP3		dBm
Blocking above noise floor at 100 kHz spacing, AGC On					dB
Phase noise (normalized) at 10 kHz spacing:					dBc
Noise floor, SSB bandwidth 14 MHz, Preamp Off				-123	dBm
Noise floor, SSB bandwidth 14 MHz, Preamp On				-132	dBm
Sensitivity at 14 MHz, Preamp Off)				0.45	uV
Sensitivity at 14 MHz, Preamp On				0.17	uV
Noise floor, 500 Hz, 14.2 MHz, Preamp Off				-130	dBm
Noise floor, 500 Hz, 14.2 MHz, Preamp On				-140	dBm
Noise floor, SSB, 2 MHz					dBm
Noise floor, CW, 2 MHz					dBm
Sensitivity, 2 MHz					uV
Signal for S9, Preamp Off / On				50/50	uV
Preamp, dB gain,				12	dB
Attenuators:			6, 12 & 12		dB
AGC threshold at 3 dB, Preamp Off,					uV
AGC threshold at 3 dB, Preamp On,					uV

Comments:

I used the Omni VII (O7) in a 160 meter contest in 2007 or 2008. For good CW operation, at least one of the Collins distributed roofing filters must be installed. My sample has both the 500-Hz and 300-Hz Collins filters. Without the Collins filters, too much blow-by gets around the DSP filtering on CW. There would also likely be a desense problem for signals inside the standard Collins 2.6 kHz filter but outside the CW DSP filtering when adjusted to a 1000 Hz or narrower bandwidth. I found the O7 performed quite well in the very crowded 160 meter CW contest, and at no time had to enable the 6 or 12 dB pads.

At my QTH 35 miles east of Ft. Collins, CO, the Omni-VII needed an in-line 1.8-MHz high-pass filter (made by now defunct ICE) when connected to my 160 meter Marconi T antenna due to AM broadcast overload. Many transceivers have this problem at my QTH, as several BC signals are stronger than -10 dBm. If a high-pass filter is not available, the 12 dB pad eliminated the intermod problem. (The ICE filter is rated at 300 watts, and thus was simply inserted between the transceiver and my Alpha 89 amplifier.)

The Omni-VII has the typical AGC issue of exaggerating impulse noise. Note: The firmware for the Argonaut demonstrates that T-T is finally addressing this problem, as did Elecraft and Flex years ago. Ten-Tec is working on improving how the AGC handles impulse noise even further on the Argonaut, and is working on updating the firmware for the Orion II and Omni-VII. Currently I am evaluating beta firmware on the Orion II, and initial results are positive. Note: I do not consider running the noise blanker 100% of the time to mitigate an improperly-operating AGC an acceptable solution. Most Japanese rigs also have this AGC problem with exaggerated impulse noise.

Ergonomically the Omni-VII is somewhat challenged, which isn't T-T's strong point with any transceiver. The RF & AF controls are one knob, and one switches back and forth between modes by pushing on the knob which is also a switch. I found it annoying as I often reached for the volume knob and inadvertently pushed it, swapping functions to RF gain.

The option of connecting the Omni-VII via Ethernet for remote operation, without a computer, was never refined to the point I found it usable. The Boulder Amateur Radio Club also abandoned the O7 for remote operation, and instead switched to Kenwood products and their proprietary software. My station has been operated remotely quite successfully for one year using various Icom transceivers and their proprietary software, plus Microsoft Remote Desktop Protocol software.

The T-T Eagle and Argonaut VI have better close-in dynamic range numbers than the Omni-VII by about 10 dB. That said, the 80 dB 2-kHz dynamic range (DR3) of the O7 proved to be completely adequate in my contesting operation. It is better than the DR3 of my main rig (Icom 781) that requires me use its 10 dB pad during 160-meter CW contests.

I would rate the ergonomics of the Omni-VII superior to the Eagle and Argonaut. The Eagle could use more dedicated buttons, and the Argonaut doesn't even have an output for an external speaker.

The bandscope of the O7 is virtually useless, while the Orion II scope is only marginally better. At this time it does not appear Ten-Tec will be offering any improvements in their bandscopes for current production rigs. Hams who want a good bandscope are left with solutions like LP-PAN or the Elecraft P3. (As a side note, I used a P3 on a Drake R-4C with excellent success. The P3 is even programmed for the Drake first IF frequency!)

QSK operation of the O7 and my PIN diode-switched Alpha 89 was excellent, not a surprise since T-T has been noted for excellent QSK for years.

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