

Sherwood Engineering HF Test Results

Model TS-590SG Serial # B4A00181 Test Date: 12/08/2014

IF BW 2400 –6 / -60, Hz	2460 / 3950	Ultimate	95 * dB
IF BW 500 –6 / -60, Hz	490 / 880	Ultimate	100 * dB

* Measured at 10 kHz offset

Front End Selectivity (A – F)	Bandpass	B
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First IF rejection @ 11.374 MHz	86	dB
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Dynamic Range of radio, no preamp

Dynamic Range 20 kHz	104 dB	IP3	dBm
Dynamic Range 10 kHz	104 dB	IP3	dBm
Dynamic Range 5 kHz	102 # dB	IP3	dBm
Dynamic Range 2 kHz	92 * dB	IP3	dBm

Combination of phase noise and 3rd order product

* Consisted of phase noise only

Dynamic Range of radio, alternate conversion scheme (Measured on 17 meters)

Dynamic Range 20 kHz	103 * dB	IP3	dBm
Dynamic Range 10 kHz	95 # dB	IP3	dBm
Dynamic Range 5 kHz	86 * dB	IP3	dBm
Dynamic Range 2 kHz	79 * dB	IP3	dBm

Combination of phase noise and 3rd order product

* Consisted of phase noise only

Blocking above noise floor, 1uV signal @ 100 kHz, AGC ON.	137*	dB
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1 uV desired signal. Block in 500 Hz BW, 1 dB increase in audio level from phase noise* or 1 dB reduction from gain compression.

Phase noise (normalized) at 2.5 kHz spacing:	-124	dBc
Phase noise (normalized) at 5 kHz spacing:	-132	dBc
Phase noise (normalized) at 10 kHz spacing:	-139	dBc
Phase noise (normalized) at 20 kHz spacing:	-143	dBc
Phase noise (normalized) at 30 kHz spacing:	-144	dBc
Phase noise (normalized) at 40 kHz spacing:	-141	dBc
Phase noise (normalized) at 50 kHz spacing:	-141	dBc
Phase noise (normalized) at 80 kHz spacing:	-147	dBc
Phase noise (normalized) at 100 kHz spacing:	-148	dBc
Phase noise (normalized) at 200 kHz spacing:	-147	dBc
Phase noise (normalized) at 300 kHz spacing:	-148	dBc
Phase noise (normalized) at 400 kHz spacing:	-149	dBc
Phase noise (normalized) at 500 kHz spacing:	-149	dBc

Noise floor, SSB bandwidth 14 MHz, no preamp	-124	dBm
Noise floor, SSB bandwidth 14 MHz, preamp ON	-132	dBm
Sensitivity SSB at 14 MHz, no preamp	0.42	uV
Sensitivity SSB at 14 MHz, preamp ON	0.17	uV
Noise floor, 500 Hz, 14.2 MHz, no preamp	-127	dBm
Noise floor, 500 Hz, 14.2 MHz, preamp ON	-135	dBm
Noise floor, 500 Hz, 18.1 MHz, no preamp	-131	dBm
Noise floor, 500 Hz, 18.1 MHz, preamp ON (Alternate conversion scheme)	-139	dBm
Noise floor, SSB, 50.125 MHz, no preamp	-126	dBm
Noise floor, SSB, 50.125 MHz, preamp ON	-136	dBm
Sensitivity, SSB, 50.125 MHz, no preamp	0.34	uV
Sensitivity, SSB, 50.125 MHz, preamp ON	0.10	uV
Noise floor, 500 Hz, 50.125 MHz, no preamp	-131	dBm
Noise floor, 500 Hz, 50.125 MHz, preamp ON	-142	dBm
Signal for S9, no preamp (-71 dBm)	62	uV
Signal for S9, Preamp ON (-82 dBm)	20	uV
Gain of preamp	10	dB
Attenuator	11	dB
AGC threshold at 3 dB, no preamp	2.2	uV
AGC threshold at 3 dB, preamp ON	0.65	uV

Notes:

S meter linearity above S9 is excellent, within +/- 2 dB.
Below S9 each S unit is 3.5 dB from S2 to S9.

The AGC thresholds are excellent values.

Comments:

The TS-590SG was used on SSB during the CQWW 160 meter SSB contest in February 2015. It drove an Alpha 89 PIN-diode switched legal-limit amplifier. Microphone was a Heil GM5 set on narrow, with one of the EQ settings for some high boost. I would have preferred EQ adjustment be like the Icom 756 Pro III, where cut and boost could be set within the menu settings. Instead there are just seven preset selections. It is my understanding that more flexibility exists if EQ is set via computer, but that was never attempted.

Active Low was used to key the linear amplifier, rather than the internal relay, just like with the TS-990S. Since the rig only drove the Alpha, no experimenting was done with the internal antenna tuner.

Unlike the unmodified 590S, there was no ALC overshoot observed on the Alpha LED metering. The ALC port on the Alpha has not needed or recommended.

Receive DSP selectivity with the Hi Cut and Low Cut was used as necessary for QRM mitigation. The new feature compared to the 590S of having bandwidth and IF shift (like on CW) was not enabled. At least with the firmware the shipped with the radio, the range of SSB bandwidth selection was more limited with this optional mode. Having gotten used to the Hi Cut / Low Cut on the TS-990S, I stayed with the default setting.

There was little chance to evaluate noise reduction and noise blanking, as the rural QTH in question has little in the way of noise interference.

Logging was done with N1MM+, using the serial interface. There were no issues programming the N1MM+ to communicate with the radio. The optional VGS-1 voice synthesizer was not installed. No prerecorded messages were used in the contest via N1MM+ either.

Street pricing of the TS-590SG have been in the low \$1500s to low \$1600s, making it in my opinion the best bang for the bug on the market today.

Note: The TS-590S was used in a 160-meter CW contest, along with the Ten-Tec Eagle, the year the 590S shipped. Both rigs performed admirably on CW, but the ease of use / ergonomics of the Kenwood were superior from my perspective.

Since the TS-590 series is always up-conversion on the WARC bands, plus 10 and 6 meters, there may be cases where this dual architecture is a disadvantage in a CW contest. On SSB having only up-conversion modes on these bands should be a non issue. On SSB, adjacent-channel splatter from a nearby station will predominate over any dynamic-range limitations on receive.

Rev B