Sherwood Engineering HF Test Results

Model Xiegu G90 Serial # X0420170780 Test Date: 03/11/2021

Front End Selectivity (A – F) Not known
First IF rejection +/- kHz, does not apply Direct conversion

Dynamic Range of radio, no preamp

Dynamic Range 20 kHz	78	dB
Dynamic Range 10 kHz	78	dB
Dynamic Range 5 kHz	77#	dB
Dynamic Range 2 kHz	76*	dB

Combination of phase noise and 3rd order product
* Consisted of phase noise only

Blocking above noise floor, 1uV signal, AGC On

100 kHz, phase noise limited at all test spacings	116	dB
50 kHz	107	dB
20 kHz	97	dB
5 kHz	85	dB

Phase noise increases the audio output before the radio starts to block in a 500-Hz CW bandwidth .

Reciprocal Mixing Dynamic Range (RMDR)

Spacing kHz		
2.5	81	dB
5	81	dB
10	86	dB
15	91	dB
20	95	dB
25	98	dB
30	100	dB
40	104	dB
50	107	dB
75	113	dB
100	114	dB
200	114	dB
300	122	dB
400	124	dB
500	124	dB

Phase noise (normalized) at 2.5 kHz spacing:	-105	dBc/Hz
Phase noise (normalized) at 5 kHz spacing:	-105	dBc/Hz
Phase noise (normalized) at 10 kHz spacing:	-113	dBc/Hz
Phase noise (normalized) at 20 kHz spacing:	-122	dBc/Hz
Phase noise (normalized) at 50 kHz spacing:	-134	dBc/Hz
Phase noise (normalized) at 100 kHz spacing:	-141	dBc/Hz

Noise floor, SSB bandwidth 14 MHz, no preamp	-113	dBm
Noise floor, SSB bandwidth 14 MHz, preamp on	-129	dBm
Noise floor, SSB bandwidth 14 MHz, attenuator on	-98	dBm

Sensitivity SSB at 14 MHz, no preamp	1.9	uV
Sensitivity SSB at 14 MHz, preamp on	1.0	uV
Sensitivity SSB at 14 MHz, attenuator on	11.5	uV

Noise floor, 500 Hz, 14.2 MHz, no preamp	-120	dBm
Noise floor, 500 Hz, 14.2 MHz, preamp on	-136	dBm
Noise floor, 500 Hz, 14.2 MHz, attenuator on	-105	dBm

Signal for S9, no preamp	-57 dBm	317	uV
Signal for S9, preamp	-66 dBm	112	uV
Signal for S9, attenuator	-51 dBm	633	uV

Gain of preamp		
Preamp	18	dB
Attenuator	15	dB

AGC threshold at 3 dB, no preamp	-100 dBm	2.1	uV
AGC threshold at 3 dB, preamp	-118 dBm	0.27	uV
AGC threshold at 3 dB, attenuator	-85 dBm	12.7	uV

Notes:

The CW noise floor values are quite reasonable in respect to the 18 dB of preamp gain. The 2400-Hz SSB noise floor is proportional to the 500-Hz CW noise floor.

The receiver phase noise in dBc/Hz is similar to the Icom IC-703+. The Lab599 TX-500 and Icom IC-705 are better in this respect, as are the KX3 and KX2.

Blocking is phase noise limited, though for SOTA and POTA this is not likely an issue.

The digital dBm signal level tracks from -120 to -10 dBm, but reads 9 dB low.

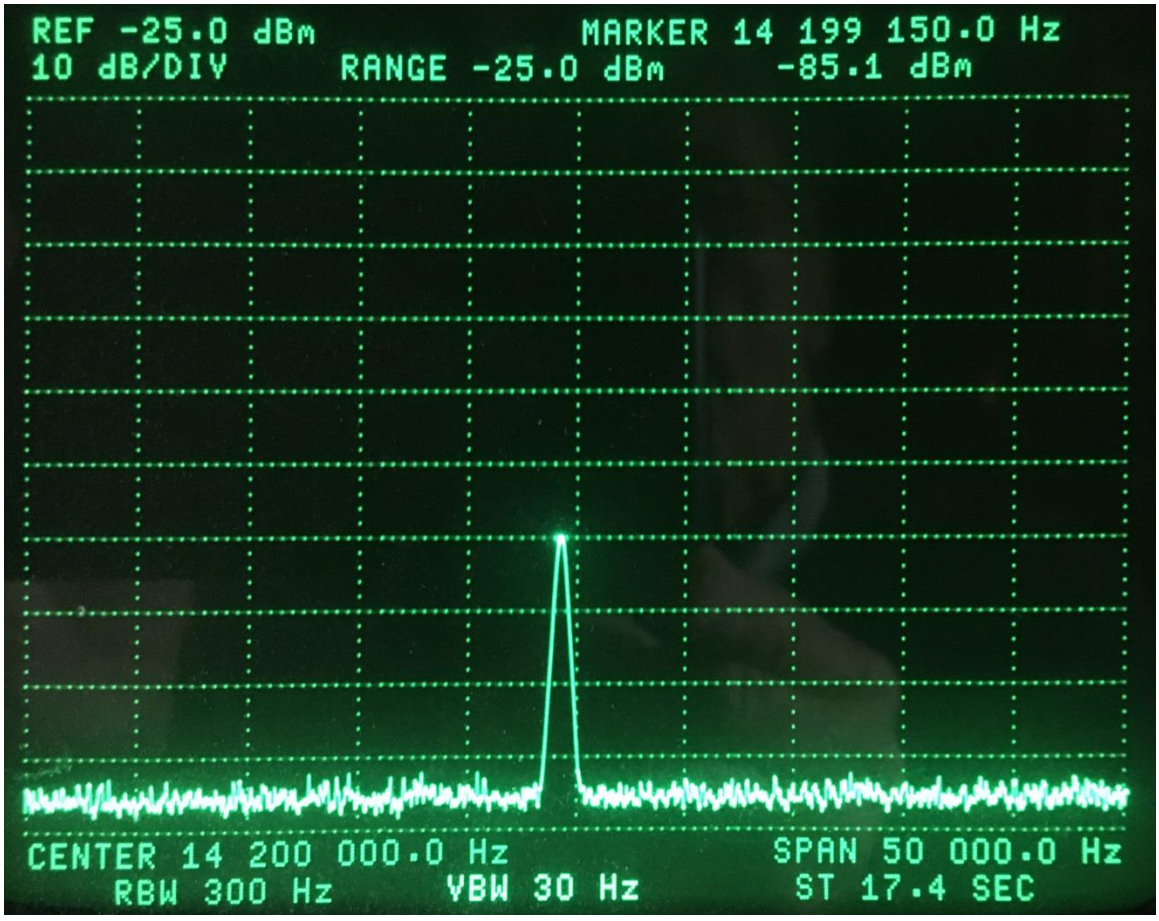
The AGC threshold is excellent with either no preamp or with the preamp on.

Transmit composite noise dBc/Hz

Offset kHz	20 watts	5 watts
2	-106	-100
5	-109	-106
10	-115	-113
20	-113	-119
50	-131	-124
100	-127	-118
200	-135	-126
300	-135	-126

Current drain
20 watts output: 3.5 amps
5 watts output: 2.2 amps

Local oscillator leakage out the antenna jack.



As with any direct conversion transceiver, such as with the Elecraft KX3, the LO radiates out the antenna jack. The above screen shot is through a 30 dB pad, thus when connected to an antenna, the level is -55 dBm with the preamp OFF and the attenuator OFF. The preamp's reverse isolation reduces the LO level 22 dB. The attenuator reduces the LO level 15 dB.

Operational observations:

The G90 UI could be better, but with a 1.8 inch display, that is difficult to accomplish. The display is very sharp and easy to read.

The SSB AGC decay speed on Slow is too fast for my liking. I did not find a way to adjust the decay speed.

Making a change to DSP filter bandwidth requires more than a single adjustment.

The AGC/Split button when held in affects the RF gain, which does not appear to be documented. The default is 50% and I did not change that setting. At that setting, the 500-Hz noise floor with and without preamp is very reasonable. There is no documentation as to where that gain stage is located in the signal chain.

Earphones are pretty much required as the internal speaker is very tinny, and headphone output can barely drive a speaker. An amplified computer speaker would be desirable for fixed operation.

The band scope works OK, but the waterfall is way too fast to be useful. I have found no way to slow down the waterfall.

The auto scale of the scope gain works well if an absolute value isn't desired.

The tuner finds a match faster than the FTdx10.

There is some internal spurious likely from a DC to DC converter.

The manual says it needs a 10 amp supply, but the current draw isn't anywhere near the 8 amps listed in the manual.

The switchable tuning rate by display digit is convenient to adjust by pushing the tuning knob.

There is no schematic or block diagram in the manual. State-side service options are unknown.

Rev E