Sherwood Engineering HF Test Results

Model Icom IC-7610 Serial # 12001056 Test Date: 12/22/2017

IF BW 2400 –6 / -60, Hz: 2525 / 3430	Ultimate	> 110	dB
IF BW 500 –6 /-60, Hz: 517 / 658	Ultimate	> 110	dB

Front End Selectivity (A – F) Half-Octave Band Pass + first order Trk Presel A

First IF rejection +/- kHz Does not apply dB

Dynamic Range measurements made on 20 meters. DigiSel OFF unless listed.

Dynamic Range of radio, Preamp OFF, IP+ OFF		
Dynamic Range 100 kHz, DigiSel ON	95	dB
Dynamic Range 20 kHz	90	dB
Dynamic Range 10 kHz	90	dB
Dynamic Range 5 kHz	90	dB
Dynamic Range 2 kHz	90	dB
Dynamic Range of radio, Preamp OFF, IP+ ON		
Dynamic Range 100 kHz, DigiSel ON	105	dB
Dynamic Range 20 kHz	98	dB
Dynamic Range 10 kHz	98	dB
Dynamic Range 5 kHz	98	dB
Dynamic Range 2 kHz	98	dB

Blocking above noise floor, 1uV signal @ 100 kHz, AGC ON,
Blocking refers to OVF indicator ON

DigiSel OFF IP+ OFF	122	dB
DigiSel OFF IP+ ON	119	dB
DigiSel ON IP+ OFF	124	dB
DigiSel ON IP+ ON	121	dB

Phase noise (normalized) at 2.5 kHz spacing:		-139	dBc/Hz
Phase noise (normalized) at 5 kHz spacing:		-142	dBc/Hz
Phase noise (normalized) at 10 kHz spacing:		-146	dBc/Hz
Phase noise (normalized) at 15 kHz spacing:		-148	dBc/Hz
Phase noise (normalized) at 20 kHz spacing:	OVF	> -149	dBc/Hz

RMDR at 2.5 kHz spacing:		112	dB
RMDR at 5 kHz spacing:		115	dB
RMDR at 10 kHz spacing:		119	dB
RMDR at 15 kHz spacing:		121	dB
RMDR at 20 kHz spacing:	OVF	> 122	dB

Measurements with IP+ OFF and IP+ ON	OFF	ON		
Noise floor, SSB bandwidth 14 MHz, Preamp OFF	-125	-122.5		dBm
Noise floor, SSB bandwidth 14 MHz, Preamp 1 ON	-134	-131.5		dBm
Noise floor, SSB bandwidth 14 MHz, Preamp 2 ON	-135	-134.5		dBm
Sensitivity SSB at 14 MHz, Preamp OFF	1.13	1.65		uV
Sensitivity SSB at 14 MHz, Preamp 1 ON	0.45	0.56		uV
Sensitivity SSB at 14 MHz, Preamp 2 ON	0.37	0.39		uV
Noise floor, 500 Hz, 14.2 MHz, Preamp OFF	-132	-129		dBm
Noise floor, 500 Hz, 14.2 MHz, Preamp 1 ON	-140	-138		dBm
Noise floor, 500 Hz, 14.2 MHz, Preamp 2 ON	-142	-141		dBm
Noise floor, SSB, 50.125 MHz, Preamp OFF	-124			dBm
Noise floor, SSB, 50.125 MHz, Preamp 1	-133.5			dBm
Noise floor, SSB, 50.125 MHz, Preamp 2	-135.5			dBm
Sensitivity, SSB, 50.125 MHz, Preamp OFF	1.33			uV
Sensitivity, SSB, 50.125 MHz, Preamp 1	0.46			uV
Sensitivity, SSB, 50.125 MHz, Preamp 2	0.37			uV
Noise floor, 500 Hz, 50.125 MHz, Preamp OFF	-130			dBm
Noise floor, 500 Hz, 50.125 MHz, Preamp 1 On	-139			dBm
Noise floor, 500 Hz, 50.125 MHz, Preamp 2 On	-140.5			dBm
Signal for S9, no preamp	-73 dBm		50	uV
Signal for S9, Preamp 1	-80 dBm		23	uV
Signal for S9, Preamp 2	-80 dBm		23	uV
Gain of preamp(s)				
Preamp 1			12	dB
Preamp 2			16	dB
Gains are estimates. Receiver gain is adjusted along with preamp settings. See additional information under NOTES.				
AGC threshold at 3 dB, Preamp OFF			2.7	uV
AGC threshold at 3 dB, Preamp 1 ON			1.20	uV
AGC threshold at 3 dB, Preamp 2 ON			1.16	uV

Notes:

When the preamps are enabled, the receiver noise at the speaker goes down 1 dB for preamp 1 and 2.5 dB for preamp 2. This keeps the volume of a signal near the noise floor of the receiver relatively constant regardless of preamp selection.

Enabling IP+ with no preamp turned on results in noise at the speaker increasing 3.5 dB. This increased noise from IP+ (which is dither) has less effect with each increment of the preamp.

Dither (IP+) reduces low-level ADC distortion products, which on the lower HF bands are likely covered up by band noise. On the higher HF bands the likelihood of needing IP+ to reduce low level distortion may be minimal. Whether IP+ should generally be enabled is unknown at this time. My guess is NO. NOTE: IP+ does NOT affect the level at which OVF indicator comes one.

Occasionally while making measurements, some spurious noise, as from a switching power supply, would drift through the passband when making noise-floor measurements. The spurious was relatively weak, and I simply moved the signal generator to a different frequency 10 kHz away.

Transceiver was tested using an Astron RS-35M linear power supply.

The 7610 was used during the 2017 ARRL 10 meter contest. Conditions were quite poor, with 37 contacts made on SSB and 88 contacts made on CW. Preamp 1 was used most of the time, with occasional use of preamp 2. The APF (audio peak filter) was also used on occasion to copy very weak CW signals. Noise reduction was run at 2 or 3 on CW and 1 or 2 on SSB. Bandscope was typically set for a span of +/- 2.5 kHz when on CW. This aided tuning a CW station right on frequency.

The RF “tail” key-up problem when keying a linear amplifier with the IC-7300 does NOT exist with the IC-7610.

The following default settings need to be changed:

If you key a linear amplifier, the default key-down delay should be changed from OFF to a longer time period. OFF provides only a 6 or 7ms delay, which will hot-switch any amplifier. An amp with PIN diode T/R switching may not hot-switch at 10ms, but I run mine at 15ms for both an Acom 1000 vacuum T/R relay and Alpha 89 PIN diode T/R switch. Amps with open-frame T/R relays may require 20 or 25ms.

The default CW rise time is 2ms, which is a key-click special. Choose 6ms or maybe even 8ms, depending on what CW speed you operate at.

For a clean first "dit" on CW, the ALC needs to be backed off. ALC is adjusted by pushing the QUICK key, then selecting DRIVE on the LCD display. Set the ALC level as read by the ALC scale on the LCD display for 1/3rd scale on CW. There is interaction between power output set by pushing the multi-function knob, and the DRIVE setting. You may have to go back and forth a few times. This adjustment will likely also vary by band.

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