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QST Issue: Apr 1988
Title: Advanced Radio Devices HF Linear Amplifier [model 230A]
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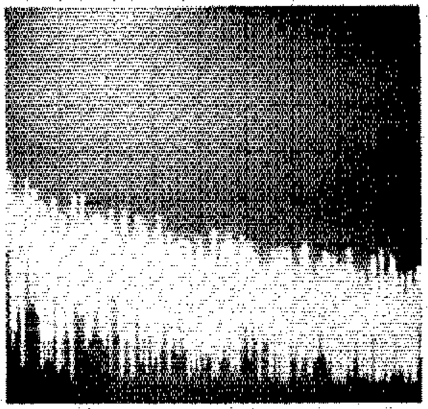

Fig D—Kenwood TS-440S (serial number 7051669) phase-noise characteristics. Measurement frequency: 3.5 MHz, power output: 104 W.

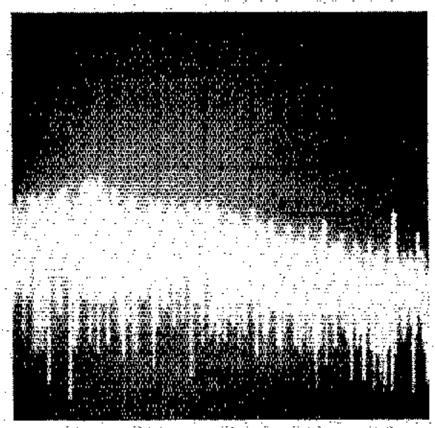

Fig E—Ten Tec Corsair II (serial number 58001721) phase-noise characteristics. Measurement frequency: 14 MHz, power output: 103 W.

removes all but a small slice of spectrum for further signal processing. If the desired filtered signal is a product of mixing an incoming signal with a noisy oscillator, signals far away from the desired one can end up in this slice. Once this slice of spectrum is obtained, however, unwanted signals cannot be reintroduced, no matter how noisy the oscillators used in further signal processing. As a result, some oscillators in receivers don't affect phase noise.

The difference between this situation and that in transmitters is that crystal filters are seldom used for reduction of phase noise in transmitting because of the high cost involved. Equipment designers have enough trouble getting smooth, click-free break-in operation in transceivers without having to worry about switching crystal filters in and out of circuits at 40-WPM keying speeds!—*Zack Lau, KH6CP, ARRL Laboratory Engineer*

their relationships to phase-noise levels in my IC-745 over this range of offset frequencies. The data obtained from the ratio of V_2 to V_1 indicates that the receiver was probably overloaded at offset frequencies from 5 kHz to 15 kHz. This measurement was limited to an SSB phase-noise floor of −154 dBc/Hz because of the low power-output level of the oscillator. Fig 7 is based on the far-out phase noise data obtained from Table 3, as well as the close-in phase noise measured using laboratory test equipment and the same IC-745. The data obtained using the method described earlier and that obtained from the laboratory test equipment closely track each other. The phase-noise performance of this transceiver generally exceeds that indicated by the "good" curve in Fig 5 of part 1 of this article.

Conclusion

Close-in phase noise generally has little effect on the performance of amateur communications systems. However, far-out phase noise *can* significantly reduce the dynamic range of a receiver. Far-out phase-noise performance has effects just as critical as blocking dynamic range and two-tone dynamic range performance of receivers. Ideally, these measurements should be made for a range of offset frequencies. Far-out phase noise in receivers can be measured with relatively inexpensive test equipment, as long as care is taken to perform the measurements properly.

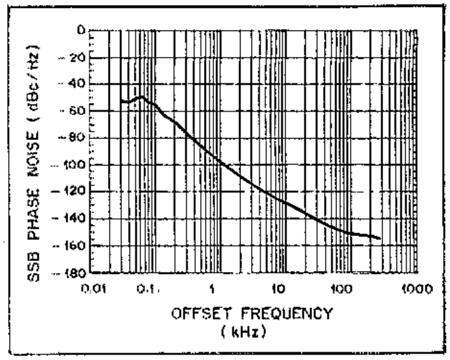

Fig 7—Measured SSB phase noise of an ICOM IC-745 transceiver (serial number 01528).

Notes

[1]Part 1 appeared in Mar 1988 *QST*, p 14-20.
[2]A simple oscillator circuit suitable for use in this application appears in W. Hayward and D. DeMaw, *Solid State Design for the Radio Amateur*, 2nd printing (Newington: ARRL, 1986), p 126, Fig 26.
[3]M. Wilson, Ed., *The ARRL Handbook*, 1988 edition (Newington: ARRL, 1987), p 25-43.
[4]Component values and construction information for fixed attenuators are given in *The ARRL Handbook*, 1988 edition, p 25-44.

New Products

ADVANCED RADIO DEVICES HF LINEAR AMPLIFIER

☐ The ARD model 230A is a legal-limit, continuous-duty HF linear amplifier covering the amateur bands from 1.8 to 21 MHz. (The 230A can be modified for Amateur Radio use at 28 MHz.) The 230A is a two-piece unit (separate control head and RF deck/power supply section) featuring full microprocessor control, backlit liquid-crystal status display, RS-232-C interface for external computer control, and automatic tuning and monitoring. A pair of Eimac 3CX800A7s handles power amplification, and the amplifier requires only 50 to 70 W drive for 1500 W output (CCS) on all bands. Other features include full QSK operation, built-in SWR calculation and protection circuitry, a heavy duty power supply, and automatic safety monitoring of filament voltage, reverse power, grid and plate current, airflow and amplifier efficiency. Price class: $3695 plus shipping. Manufacturer: Advanced Radio Devices, 103 Carpenter Dr, Sterling, VA 22170, tel 703-478-3100.—*Rus Healy, NJ2L*