Out of band interference amounted to a weak but copyable signal at several places over the Azden's tuning range. The maximum level of the interference was in the S2 range. It was quite enough to mask a weak wanted signal.

I explored the review unit's response over the frequency range 100 to 250MHz at a display setting of 145.5MHz and found at least half a dozen places where a difficulty could arise. I don't want to make too much of this problem though. Unless you were in an area of high interference field strength, the spurious response would only have minor significance.

Circuitry

Neglecting all the digital housekeeping and lightflashing circuitry, the *PCS4000* is a double conversion superhet with a first IF of 16.9MHz and a second one of 455kHz. A single loop mixer type frequency synthesiser provdes the local oscillator injection. In transmit, frequency modulation is achieved by pulling a 16.9MHz crystal with an inductance loaded varicap. The RF side of the box is in all respects downbeat and conventional. So why are there rough edges on the out of band rejection?

I think that it is down to money coupled with a bit of poor PCB design. For instance, the RX front end circuit includes a three stage helical filter assembly between the RF pre-amp (the inevitable dual gate MOSFET) and the mixer (an equally inevitable dual gate MOSFET). This alone should ensure that the image response is excellent. It wasn't particularly good when measured under test, a fact which can possibly be attributed to poor screening or layout.

My conviction that there is something a little bit untoward in this department is re-inforced by the following observation. I managed to work Tony Bailey G3WPO — he lives some eight miles down the road — using a dummy load screwed directly into the aerial socket at the back of the set. He received my dummy load transmission in the region of 5 by 3. I was able to give him a similar report on receive! This means that two way radiation was occuring from either the microphone or power lead. This would be quite enough to render the inherently excellent characteristics of the helical filter useless.

I am also of the opinion that Azden has saved a few bob, to the detriment of RF performance, by using a cheap first IF filter arrangement. Where a professional PMR set would use an eight pole monolithic crystal filter, the Azden uses a pair of cascaded two pole crystal roofing filters. Without pulling out these two 16.9MHz units and doing a measurement — which you can't do with someone else's equipment — you can only make a guess at the combined response of the two filters. I would wager the cost of the rig that it is at least 30dB worse than a proper eight pole filter, correctly installed.

The result of this is that adjacent channel signals, amplified by the RF pre-amp, find their way at fairly high level to the second mixer incorporated in the MC3359 IF and detector block. In practical terms this means that strong 2m signals from nearby stations can and do cause some desensing; the MC3359 was not intended for use without a high level of pre-filtering. Under lab test conditions, a 250μV signal 800kHz out from a wanted signal caused noticeable de-sensing.

Summary

I would cheerfully swop all the digital gizmology, bells and whistles of the *PCS4000* for a decent crystal filter unit. In fairness to everyone concerned, the Azden set isn't the only one on the market today with a few problems. A leading brand best seller is equally at fault, if not worse, yet no-one seems to notice. In a way, I feel that it all comes back to that tirade that I launched into at the beginning of this review. Many of today's amateurs are concerned more with buttons and lights than down-to-earth RF performance. The Azden will undoubtedly suit a large sector of the hobby who will be very satisfied with it. However, it is not for me but then I'm biased . . .

AZDEN PCS4000 TEST RESULTS

RECEIVER SECTION

All measurements carried out at 145.5MHz

Input level for 12dB SINAD: better than 0.2uV PD (limit of test equipment)

Signal level and frequency for noticeable desensing (15 to 12dB SINAD change):

12mV	147.5MHz
250uV	146.3MHz
300uV	144.7MHz
4mV	145MHz, 146MHz

Significant responses (12dB SINAD or greater) were found at the following frequencies: 119, 172.5, 177.5, 185, 240 MHz. The injected signal level was in the region of 10 to 25mV.

TRANSMITTER SECTION

12V	13.8V
5.5W in low power position	6W
24W in high power position	30W

OUR OBSERVATIONS

The receiver sensitivity was excellent - it was one of the best that we have come across in FM 2m boxes. However, the susceptibility to both in and out of band signals spoils the picture rather more than somewhat. The unit is compact, flashy and will undoubtedly find wide appeal given the reasonably competitive price tag of £239. The technical wrinkles would not be noticed for run of the mill operation.

G4JST