

If you've discovered the joys of 222 MHz, or you'd like to (and you should), then ADI's AR-247 FM mobile rig is an excellent choice on a very short list.

## CQ Reviews:

# The ADI AR-247 222 MHz FM Mobile Transceiver

BY RICH MOSESON,\* W2VU

In any market dominated by a few large companies, smaller firms must do something different in order to compete, whether it's offering lower-priced products or variations that the "big guys" don't have. That rule applies in amateur radio, where three large companies dominate the equipment marketplace. How does a smaller company set itself apart to "stay in the game"? In the case of ADI, one way has been through the bold step of introducing the first new mobile rig in years for the 222 MHz band—the AR-247.

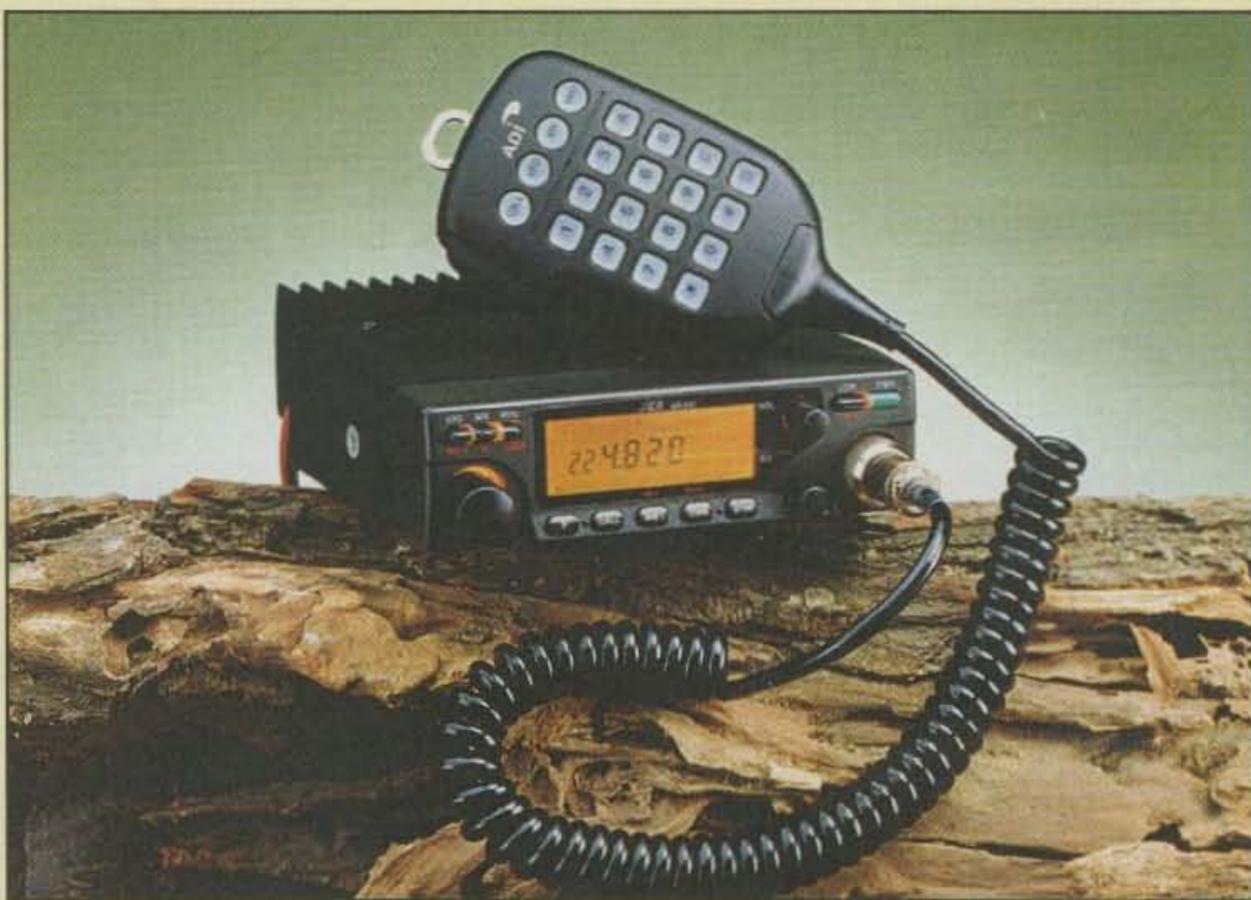
Before we talk about the radio, though, let's take a few minutes to explore the band and its recent history.

### The 222 MHz Band

Amateur radio in the United States has a primary allocation at 222–225 MHz. However, the band is so lightly used that it's been called "the forgotten band," and the FCC even took away two megahertz of it several years ago. Why is this band so lightly used and why should you consider investing in equipment for it?

First, let's look at the characteristics of the band. Halfway between 2 meters and 70 centimeters, 1.35 meters (also known as 135 centimeters, 1.25 meters, and 125 centimeters) shares some of the best features of each of those bands. Its normal ground-wave range is similar to that of 2 meters, but its shorter wavelength allows signals to more readily penetrate buildings. On the other hand, signals here are *less* likely than those at 440 MHz to bounce off

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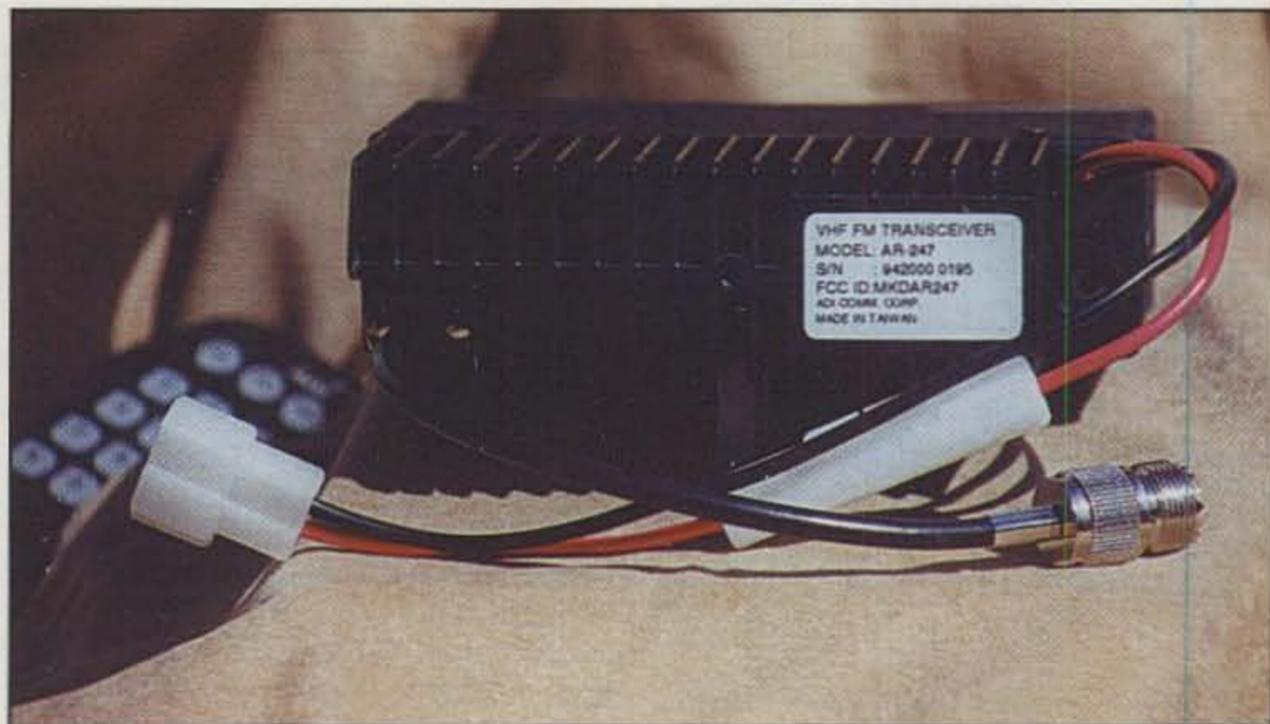


Front panel of ADI's AR-247 mobile rig for 222–225 MHz. The controls are easy to access, even without looking at the radio, and the big LCD display makes for easy viewing when you do look at it. (Photo courtesy of ADI.)

buildings and other objects, resulting in multipath (picket-fencing). Tropo "openings" and distances are similar to those on 2 meters, and you'll find aurora and meteor-scatter possibilities here as well. There have even been a few documented cases of sporadic-E propagation reaching as high as 222 MHz, an area in which greater research and experimentation are needed. Hams who operate 222 will tell you that it also has a distinctive "personality" that's hard to define in words. You just have to experience it. In addition, the band is less crowded than either 2 meters or 70 cen-

timeters (for reasons we'll discuss in a moment), so if you're looking for a place to get away from the crowds but still have good VHF coverage, this is the place. One other benefit: It is the *only* band below the microwaves where *all* hams have voice privileges, regardless of license class.

So why is the band less crowded than its neighbors? First of all, the amateur allocation at 1.35 meters is *not* worldwide. It is not available to hams in Europe, or perhaps most important from an equipment perspective, in Japan. Here in the U.S., the band used to extend



Rear view of the AR-247. Note the large heat sink and pigtail connections for power and antenna. (W2VU photos)

from 220–225 MHz, and amateur radio was a secondary allocation (although the primary user, government radiolocation, rarely used it, so it was effectively an exclusive amateur allocation). Because it's not a worldwide amateur band, equipment has been rather limited, and because equipment is limited, so is usage. Another problem is that the FCC spent nearly a decade deciding whether to reallocate some or all of the band to other services, and this "limbo" status for the band was an even greater deterrent for manufacturers and amateurs alike to invest in equipment for 220. Why build or buy a radio for a band that might soon be taken away?

Fortunately, the FCC finally made up its mind (in 1991), taking 220–222 away from amateurs, but at the same time making 222–225 a primary amateur allocation. In a later action, the FCC also gave hams limited access to 218–219 MHz for high-speed data links. Not a single amateur station has been put on the air on 218–219, but that's a whole other issue. In any event, even though it's been nearly a decade since the FCC realigned the band, the pattern had been established that typical dual-band FM rigs covered 2 meters and 440, but not 222.

Now some equipment makers are starting to test the waters by including 222 in multiband VHF/UHF rigs, and ADI has taken the somewhat risky step of introducing the AR-247, the first new FM mobile rig in years devoted exclusively to the 1.35 meter band.

### The AR-247

The AR-247 joins ADI's single-band radios for 2 meters (AR-147) and 70

centimeters (AR-447), and it has all the standard features that you'd expect in a modern FM mobile rig. It receives from 215–230 MHz, transmits only from 222–225<sup>1</sup>, and offers three power levels—5, 15, and 30 watts. The radio has 81 memory channels, including one quick-access "call" channel (I put 223.500 MHz, the national simplex frequency, into that slot). Each memory can store a dozen different parameters, including receive frequency, transmit frequency offset and direction (on 222, the standard for all repeater frequencies is negative offset, 1.6 MHz), CTCSS tones or DCS (digital coded squelch) codes, and more. There is an option for code squelch (C.SQ) on receive which keeps your receiver muted until a three-digit digital code is received. This also permits the system to be used (in a network with other similarly equipped radios) for paging. Memory contents may be shifted into the VFO, if you would like to tune from a preset frequency.

There are three memories that are reserved for specific functions, so keep this in mind when you program them. Channel 1 is the "dual watch" channel, where the rig will periodically listen for activity, even if you're on another frequency (this feature may be turned on or off). Put in a frequency that you'll want to be able to keep track of, perhaps a favorite repeater. In addition, the frequencies in channels 11 and 12 set out the limits of the programmable band scan function. Be sure the frequency in channel 11 is lower than the one in channel 12, and that both represent the borders of the frequency range you want to scan in the band-scan mode. If



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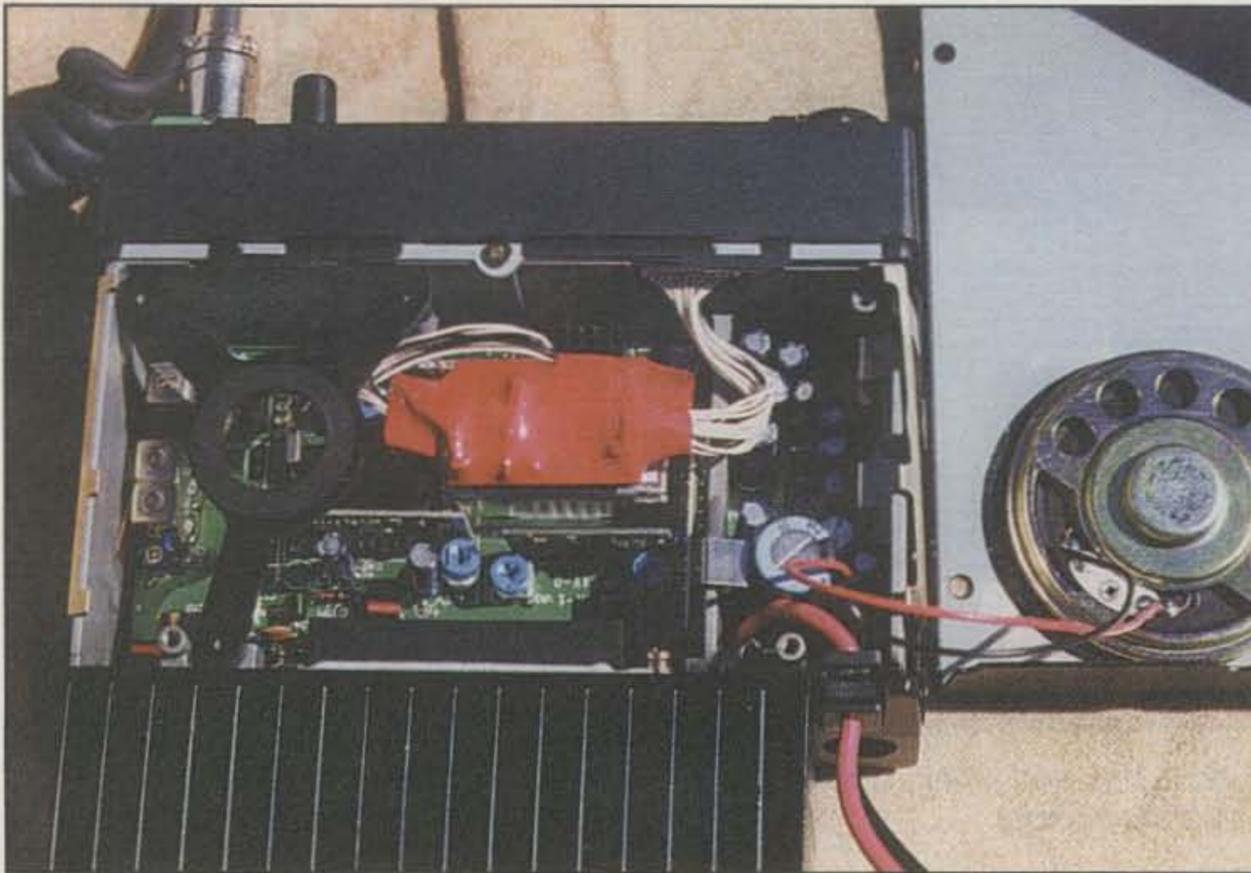
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Top inside view of the 247. The circle at the left is a bracket that fits around the speaker to keep it from vibrating.

channel 11 has the higher of the two frequencies, it will do a full band scan. The only memory-related feature found in many other mobile rigs that's missing here is alphanumeric memory labeling, so you'll have to remember which frequency is for which repeater.

There are three scanning options for the receiver: full band scan, programmable band scan (see above), and memory scan. You may also set the scan function to operate on either a time basis (about 3 seconds on each frequency) or a busy-channel basis (staying on a busy frequency until about 3 seconds after a signal drops). In addition, you may program any memory channel to be skipped during memory scanning. The receiver will also scan to identify an unknown CTCSS or DCS code on a received signal. The code can

then be quickly entered into memory just by clicking the press-to-talk (PTT) key on the microphone.

In VFO mode, frequency steps are user-selectable at either 5, 10, 12.5, 20, 25, or 50 kHz. Plus, there's a "MHz" button on both the radio and the microphone that lets you easily change frequency 1 MHz at a time.

### A Quick Tour

The front panel of the AR-247 is well laid out, and the most commonly used controls are easy to learn for "no-look" operating while driving. In addition, the microphone contains frequency up/down keys and four buttons—call channel, VFO, memory, and MHz—for easily accessing a variety of frequencies. These four buttons duplicate front-

panel buttons, but are placed on the mic for safer use while driving.

The cable of the supplied mic has a lumpy thing right near the connector. This is an RF choke that was added to eliminate problems that had been encountered with direct frequency entry from the microphone's tone pad. The manual says the microphone jack has a pin containing receive audio, but ADI tells us this was eliminated at the last minute because of PC board layout problems. Therefore, if you're using the 247 for digital communication, you'll need to run two wires between the radio and the computer or TNC—one from the rear speaker jack for receive audio and another to the mic jack for transmit audio and PTT.

The radio's back end is taken up mostly with a large heat sink, which does its job well. Other radios I've had get quite hot after extended high-power use. This one doesn't. Also on the back side are the power and antenna connectors, both on pigtailed with connectors attached, in order to minimize the radio's overall size. The case is metal, and the circuitry inside is neatly laid out and well-manufactured. There's even a three-point device to hold the speaker in place. Presumably, this is to help prevent speaker damage in high-vibration settings.

### On the Air

Of course, the true test of any radio is on-the-air performance, and the AR-247 passed with flying colors. Signal reports were excellent, and received audio was loud and clear, even in a relatively noisy mobile environment. Operation is quite intuitive, and programming new repeaters on the fly was relatively easy. I am fortunate to live in an area where there is a reasonable amount of 1.35 meter activity, so I was able to make a variety of contacts on several different repeaters.

ADI has taken a risk by bringing a 222 MHz mobile rig onto the market. The other manufacturers are certainly watching to see if it succeeds. If you want to see 222 become a "mainstream" ham band and want to have a similar level of equipment choices for this band as we do for 2 meters and 70 centimeters—and you want an excellent radio at the same time—then you certainly should consider the AR-247. It is virtually the only high-powered 1.35 meter transceiver with the features most of us have come to expect from our VHF mobile rigs today. List price is \$324.95, and it's generally selling in the \$275 range.

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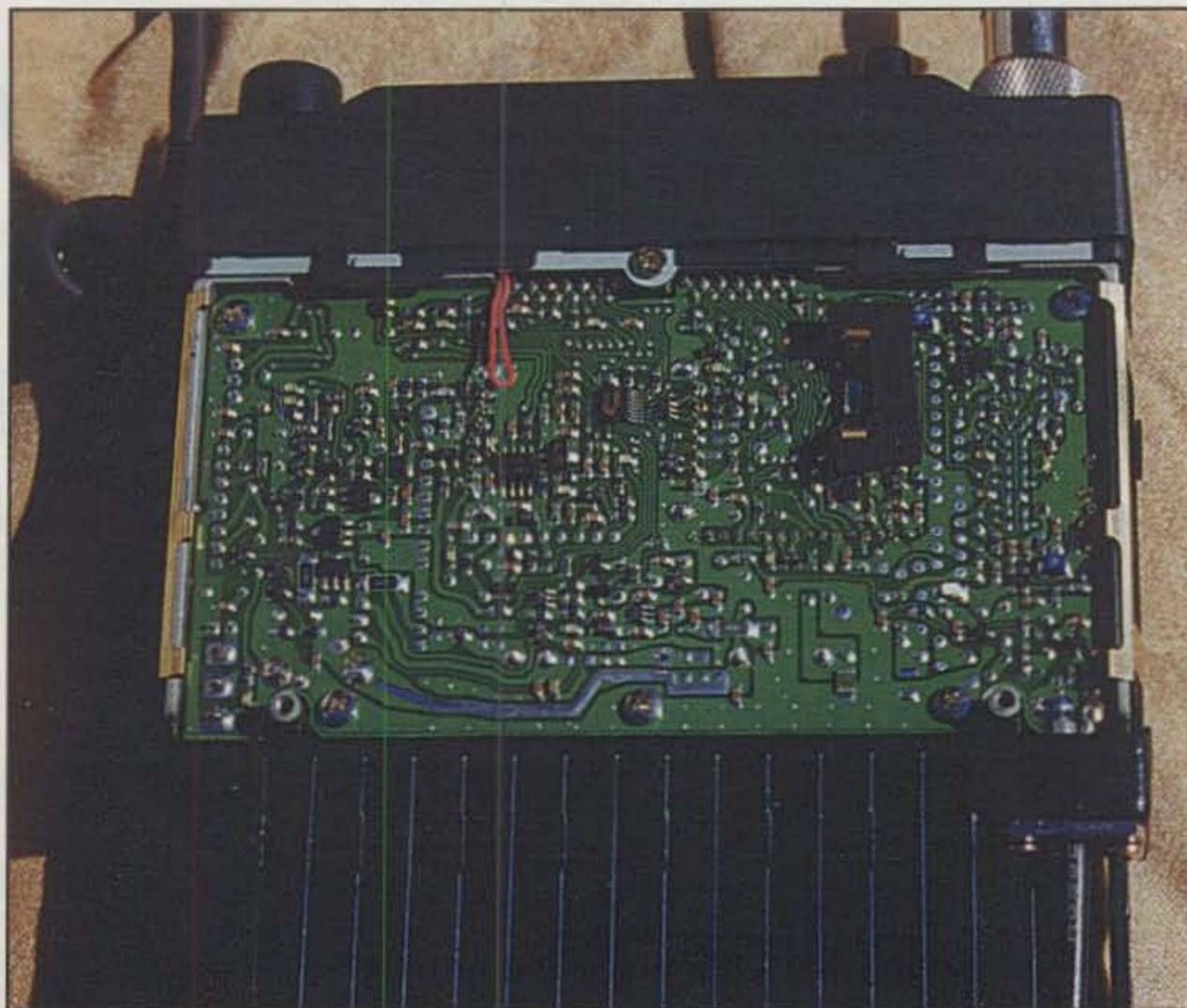
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Before you buy anything, though, try to find out about 220 activity in your area. If there isn't much, don't let it stop you. Just find another equally-interested ham and buy *two* radios! Then start telling everyone else how great the band is and stir up more activity. ■

### Note

1. Transmit range can be extended to cover the radio's entire 215–230 MHz tuning range. This will be particularly helpful for hams in Canada, where 220–222 is still an amateur allocation, and for MARS members who have nets in the MARS allocation above 225 MHz. In the unlikely event that anyone is able to jump through the necessary hoops to get permission to run high-speed packet on 218–219 MHz, this modification will allow the AR-247 to operate there as well. To make the mod, remove the bottom cover and find the red wire loop (the only wire visible). Cut it, cover both ends with electrical tape or heat-shrink tubing, and then do a soft reset of the radio by turning it on while holding down the MR key on the front panel.



Bottom interior view of the AR-247. Note the wire loop that can be cut to expand transmit range to 215–230 MHz. (See note 1 for possible applications and instructions.)

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