

AnyTone AT-D878UV Dual-Band DMR/FM Handheld Transceiver

Reviewed by
Pascal Villeneuve, VA2PV
va2pv@arrl.net

In the November 2018 issue of *QST*, I reviewed the AnyTone AT-D868UV dual-band DMR/FM handheld transceiver. I'm always enthusiastic about any new radio, but this one was indeed special. After the AT-D868UV review appeared, I learned about a new and improved model, the

AT-D878UV. When I saw it for the first time at a local hamfest and read the banner explaining the added features, I just had to get one.

This review will be short, as the new AT-D878UV is very similar to the AT-D868UV. I will focus on the new features here, so for more information on the basic features and operation, see the AT-D868UV review in the November 2018 issue of *QST*.

The main difference between the AT-D868UV and AT-D878UV is that they added traditional Automatic Packet Reporting System (APRS) and DMR roaming capability (the ability to automatically switch among repeaters that are in range to stay connected to the network). They also increased the memory to support the new features. And as this review wrapped up, AnyTone announced a version of the

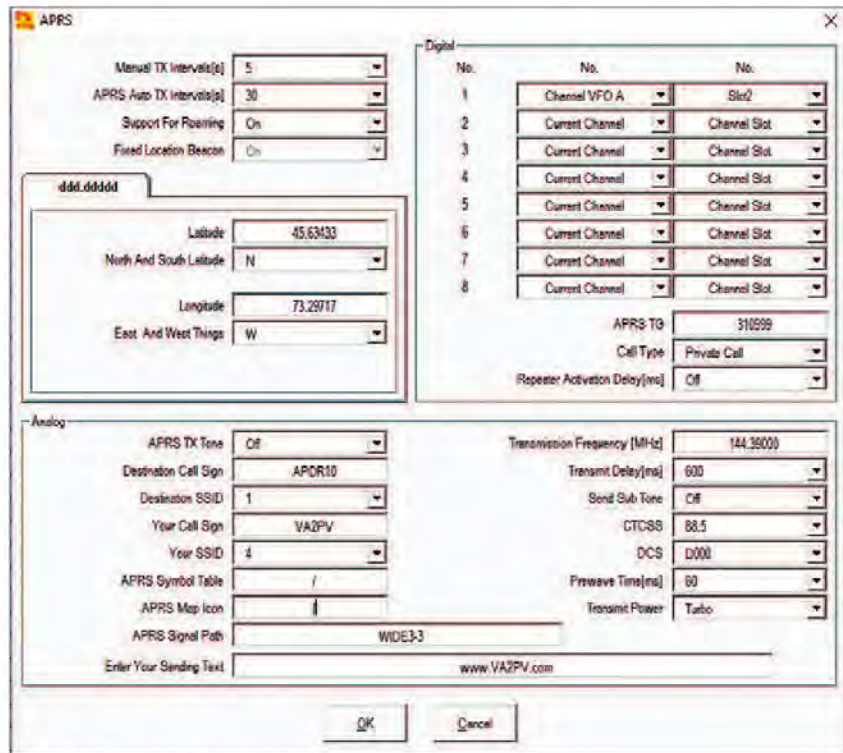


Figure 7 — APRS and DPRS settings screen.

AT-D878UV with a Bluetooth interface for hands-free operation with Bluetooth audio devices.

Overview

The package included the AnyTone AT-D878UV radio, a 3,100 mAh lithium-ion battery, a desk charger with ac adapter, a dual-band antenna (SMA female screwing into the radio), a belt clip, a USB programming cable, and the user manual.

This radio covers VHF (136 – 174 MHz) and UHF (400 – 480 MHz), and it can also receive FM broadcast stations between 87.5 and 108 MHz. It has four programmable power levels: 6, 5, 2.5, and 1 W. The 1.77-inch, color LCD has a lot of information just like the previous model. By default the background is black and the fonts are white, and I think it looks better like this. Other than that, the only visible

difference is the top button that is blue instead of orange.

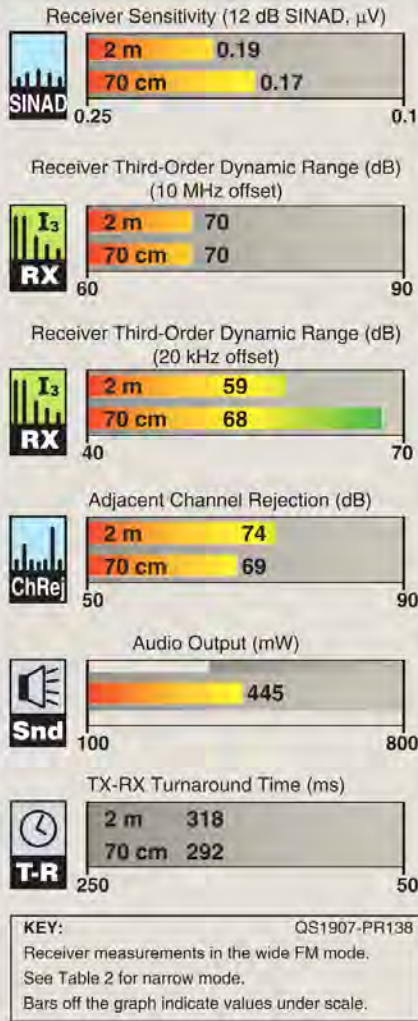
Just like its predecessor, the AT-D878UV supports up to 4,000 memory channels, 10,000 DMR talk groups (TG), and 150,000 digital contacts. It is compatible with DMR Tier I and Tier II, so it can be used on the ham radio repeater networks and with any digital hotspots compatible with DMR.

When I received the AT-D878UV, it was locked, and I had to use the soft-

Bottom Line

The AnyTone AT-D878UV DMR/analog FM dual-band handheld adds APRS and roaming features to a radio that is user-friendly, well supported, and offers features useful for radio amateurs.

AnyTone AT-D878UV Key Measurements Summary



ware to unlock the radio — an easy task for a licensed Amateur Radio operator. Configuration was easy. I just uploaded my existing AT-D868UV code plugs, and it worked right away.

APRS and Roaming Setup

AnyTone is paying attention to the Amateur Radio market, as they added traditional APRS features. On the manufacturer's website, in the support section, you can download a video for the new APRS feature (see cn.anytone.net/download.html). The video is in English and made by Duane Reese, N6DMR. It was helpful to me in setting up APRS. There's also a similar video on the roaming feature, but with the latest firmware, it may be outdated. The APRS and

Table 2
AnyTone AT-D878UV, serial number 12301182950286

Manufacturer's Specifications	Measured in ARRL Lab
Frequency coverage: 136 – 174, 400 – 480 MHz.	Tested in the 2-meter and 70-centimeter amateur bands.
Modes: DMR, analog FM.	As specified.
Power requirements: 7.4 V dc, $\pm 20\%$ (3,100 mAh battery standard).	At 8.3 V dc (full charge): Receive, 170 mA (max volume, max backlight); 152 mA (min backlight); 80 mA (standby, backlight off). Transmit (high/med/low): 146 MHz, 1.50/0.99/0.38 A 440 MHz, 1.42/1.01/0.39 A. Power off, <1mA.
Receiver	Receiver Dynamic Testing*
Sensitivity: For 12 dB SINAD, <0.25 μV (wide), <0.35 μV (narrow).	For 12 dB SINAD: 146 MHz, 0.19 μV (wide & narrow); 440 MHz, 0.17 μV (wide & narrow); 100 MHz, 0.78 μV .
FM two-tone, third-order IMD dynamic range: Not specified.	20 kHz offset: 146 MHz, 59 dB, 440 MHz, 68 dB, 10 MHz offset: 146 MHz, 70 dB, 440 MHz, 70 dB.
FM two-tone, second-order IMD dynamic range: Not specified.	146 MHz, 87 dB; 440 MHz, 99 dB.
Adjacent-channel rejection: ≥ 70 dB (wide), ≥ 60 dB (narrow).	20 kHz offset: 146 MHz, 74 dB (wide), 76 dB (narrow); 440 MHz, 69 dB (wide), 73 dB (narrow).
Squelch sensitivity: Not specified.	At threshold: 146 MHz, 0.16 μV (min), 0.42 μV (max); 440 MHz, 0.15 μV (min), 0.34 μV (max).
S-meter sensitivity: Not specified.	For four bars: 146 and 440 MHz, 1.32 μV .
Audio output: 1,000 mW into 16 Ω .	445 mW at 10% THD into 16 Ω . THD at 1 V_{RMS} , 2.7%.
Transmitter	Transmitter Dynamic Testing
Power output: <5.0 W (high), <1 W (low).	At 8.3 V dc (full charge), high/med/low: 146 MHz, 5.6/2.3/0.24 W 440 MHz, 4.4/2.7/0.29 W
Spurious signal and harmonic suppression: >60 dB.	>70 dB; meets FCC requirements.
Transmit-receive turnaround time (PTT release to 50% audio output): Not specified.	Squelch on, S-9 signal: 146 MHz, 318 ms; 440 MHz, 292 ms.
Receive-transmit turnaround time ("TX delay"): Not specified.	146 MHz and 440 MHz, 20 ms.
Size (height, width, depth): 5.1 \times 2.4 \times 1.6 Inches (including protrusions). Antenna length, 7.0 inches. Weight: 11.2 ounces (including battery and antenna).	
*Specified receiver bandwidth, 25 kHz (wide), 12.5 kHz (narrow).	

DPRS (DMR APRS) setup screen is shown in Figure 7.

Operation on the Air

Except for the added features, this radio operates exactly like the AT-D868UV. Keep in mind that the APRS support is for transmit only. You can send your position manually or as a timed beacon, but you won't be receiving any APRS data from other stations or viewing that information on the display.

This radio is not full duplex (you can use one VFO at a time), but it will monitor both VFOs and, when one goes quiet, the other will become active. It won't transmit an APRS beacon (see Figure 8) while a signal is received.

The roaming option is not completely seamless like your cell phone, and you need to program the radio in order for it to behave as you wish. Remember, roaming is only possible if the



Figure 8 — The AnyTone AT-D878UV sending an APRS beacon.

repeaters in your area are configured the same way — the talk group (TG) you want to roam on must be available on all the repeaters. Luckily for me, that's the case in our region.

There are two different types of roaming, “active” and “passive.” Active roaming sequentially queries a list of repeaters to verify which ones may be reached, and it doesn't necessarily use the strongest one. Passive roaming is based on received signals from repeaters that are on your

roaming list. Signals received may be from a repeater beacon or an incoming contact.

This feature will improve over time, and that's already the case with the latest firmware update (version 1.11 when this article was written). For now, the GPS has no effect on roaming, but perhaps GPS location data will be used to enhance the roaming feature in the future.

Conclusion

The AnyTone AT-D878UV is designed with the Amateur Radio operator in mind. It has a lot of cool features, and it's easy to program and use via its keypad as well as the programming software. It looks and works similar to the AT-D868UV, but with more features and more memory. For the difference in price, I would go for the AT-D878UV. If you're not interested in APRS and roaming, you can save a few bucks with the AT-D868UV, which is still available.

For more about DMR operation and a detailed video showing the

AT-D878UV during setup and operation, check out my YouTube channel, **Laboenligne.ca** (or search for VA2PV).

ARRL purchased the review radio from BridgeCom Systems. Their website Support section has a page dedicated to the AT-D878UV with the latest firmware and programming software, frequently asked questions (FAQs), operating tips, and videos demonstrating how to use a number of the key features. As we were wrapping up this review, BridgeCom indicated that new firmware will be available with changes to the APRS beaconing feature.

Manufacturer: Qixiang Electron Science & Technology Co. Ltd., Fujian, China; **www.anytone.net**. Available from several US suppliers, including BridgeCom Systems, Inc., 102 NE State Route 92 Hwy, Ste. C, Smithville, MO 64089; **www.bridgecomsystems.com**. Price: \$238.99 (Bluetooth version with GPS and programming cable). Extra 3,100 mAh battery, \$30. BCS-200 speaker/mic, \$30.

SainSmart DS212 Handheld Mini Oscilloscope

Reviewed by Paul Danzer, N1II, n1ii@arrrl.net

When this oscilloscope came in the mail, I was just finishing an audio preamplifier using a 741 integrated circuit, and it did not sound very good. The next step would have been to drag out my 17-pound workbench oscilloscope. However, the pocket-sized DS212 begged to be tried.

The scope is similar in size and appearance to a smartphone. It is menu driven with four controls. It comes with one probe for input signals and one dual-clip lead connector, primarily for the included signal generator. Unfortunately, the probe kept falling apart — apparently a common problem, as noted in online reviews. We ordered two optional accessories as part of the evaluation package. One was a selectable $\times 1/\times 10$ probe, with an MCX connector to match the DS212 input connector. The other accessory was a package of two BNC-to-MCX adapters, which allows the use of standard probes with BNC connectors.



Bottom Line

This dual-channel 1 MHz digital storage oscilloscope is about the size of a typical smartphone and performs a number of measurements normally found on larger units.