

Dry Case Review

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The Consumer Electronics Show (CES) isn't usually a place where I find the type of audio gear that regularly I use and review. There are a few interesting (as well as downright odd) headphones, and a few of the mic and portable manufacturers are there, but usually what catches my eye at that show are nifty gadgets that don't pass audio, but might come in handy around the studio or in the field. Though I'm fascinated by the high end audiophile gear section of the show, usually it's a power distribution or switching system, a tool, or maybe a flashlight that I find worth mentioning in a report.



There are truckloads of accessories for portable phones and other portable electronics, and that's where I spied the Dry Case. It's a clear vinyl bag with a locking closure at the top with a one-way valve allowing you to pull a partial vacuum (there's a squeeze bulb, but you can do it with your mouth) and seal a portable device tightly in order to keep water out. A cable with a TRRS plug on the inside end and a pass-through to a jack on the outside allows you to connect a headset. The rig is claimed to be watertight to a depth of 100 feet, though there's no apparent seal on the external jack.

The manufacturer, Dry Corp LLP is a manufacturer of vacuum sealed waterproof protectors for arm and leg casts, catheters, and other medical devices too fierce to mention. With the proliferation of portable hand held devices that people want to have with them everywhere they go, it occurred to the company that there might be another market for their technology. While the Dry Case is designed to be used with a phone, by users compelled to tweet that at the moment they're riding a colossal wave, it seemed that it might accommodate a handheld recorder for recording under adverse conditions such as rain, the surf, or off road biking. They were kind enough to send me a sample to review, so here's what it's all about.

The Dry Case comes in two models. The smaller one which I had is intended for an iPhone or similarly sized device, and there's also a larger one designed to fit an iPad or e-reader. Flat, the phone pouch's dimensions are 4 inches wide by 6¾ inches high. An area of about 1¼ inches by 2¾ inches is taken up by the one way check valve and cable connector, so that limits the width of the device at the bottom of the pouch. The kit comes with a Velcro-secured arm band and a string lanyard to help you to keep track of the case.

I don't have an iAnything, but since my primaryh interest was how well it worked with a handheld recorder, I loaded in my Zoom H2 for a trial run. It was a pretty tight squeeze due to the recorder's 1¼ inch thickness, and partly because the cable arrangement prevented it from fitting the bottom of the case. The cable was kind of tricky to manage given the tight quarters. It extends about 2 inches beyond the top of the case so it was easy to plug it into the recorder's headphone jack, but it took some stuffing and a pair of long tweezers to dress it back inside the case.



The case latches at the top with a pair of clamps, which took me a few tries for me to get the hang of operating. The two piece hard plastic top section is bonded to the

vinyl bag, with the two rotating thumbwheels mounted through one side. A slot in the thumbwheel mates with a post on the opposite side, clamping the two top pieces together when both thumbwheels are rotated toward the center of the case. A molded V (to the right in this photo) and a mating groove pinch the vinyl when the top is latched, effectively sealing the top of the bag.



The case material is transparent enough that Dry Case claims it's clear enough to take a photo, but with my little Nikon Coolpix camera I found it to be a bit hazy. Also, when the bag pulled was tight (necessary for photography), it actuated the rocker switch on the back of my camera.

In Use

But photography and telephony aren't why I looked at the Dry Case. One side of the case has a loop for inserting the arm band, so it's not conducive to operating controls from that side - and therein came the first test. Because of the stiffness of the material with the case evacuated, it was difficult to operate the slide switches for power and microphone sensitivity located on the sides of recorder's case. By letting a little air out, I was able to switch the power on, though with some difficulty. In practice, I turned the recorder on before bagging it. The

membrane switches worked fine through the vinyl, and the company claims that the touch screen of a phone also works normally.

I sucked as much air out as I could, made a test recording of myself talking, and played it back. It sounded awful, barely telephone quality. A note on the one page instruction sheet suggests leaving a little air in the bag “to allow for clearer sound.” OK, I tried that and it was a little better but still nothing I’d really want to use for anything other than perhaps audio notes to myself. This was quite a letdown, as the Zoom H2 is capable of making a pretty decent recording with its built-in mics.

Real Science

It’s one thing to say that it didn’t sound good, but another to evaluate why it didn’t. This is the sort of thing that I like to investigate when reviewing a product. I took the recorder and case back to the studio and hung it in front of a monitor, suspended from a mic stand boom for some measurements. This is hardly the ideal anechoic test chamber that I’d have liked to use, but at least it provided a



consistent sound source. I made test recordings of both music and pink noise played through the speaker with the recorder au naturel as a control, and in the Dry Case both with the air sucked out so it was pulled tight around the recorder (recommended for the best water seal) and with a little air (for better sound quality).

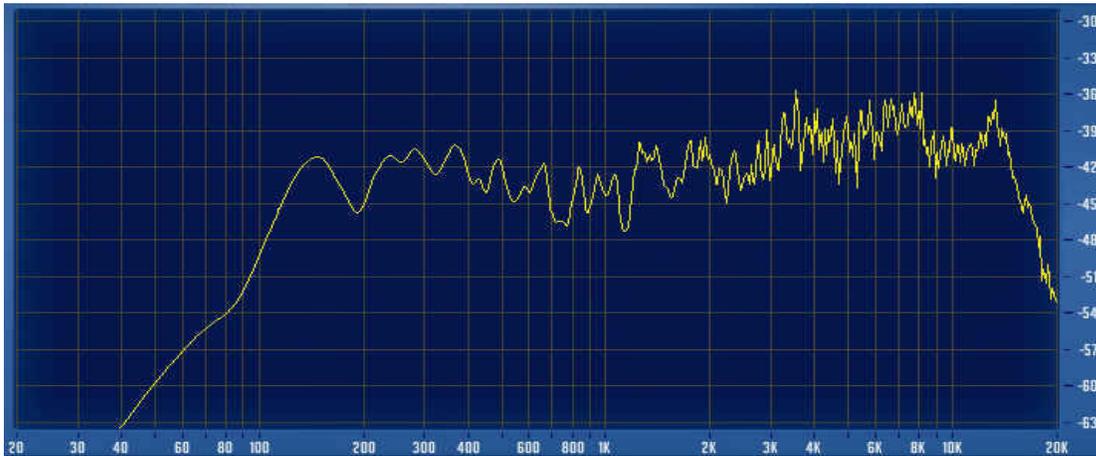
I expected there to be some attenuation due to the vinyl barrier between the sound source and the microphone, but I was surprised at how much it attenuated the sound. With a little air in the case, attenuation was about 9 dB, though but with the case evacuated and pulled snugly around the recorder, the sound was attenuated by just short of 25 dB!

There’s nothing about the design of the microphones that would cause them to lose that much sensitivity in a partial vacuum, so it’s likely that the case material, with some air inside, was acting like a flexible diaphragm in front of the mics and absorbed some energy by flexing, much like a bass trap in a studio. When evacuated, this became a stiff diaphragm very close to the mics which passed little energy.

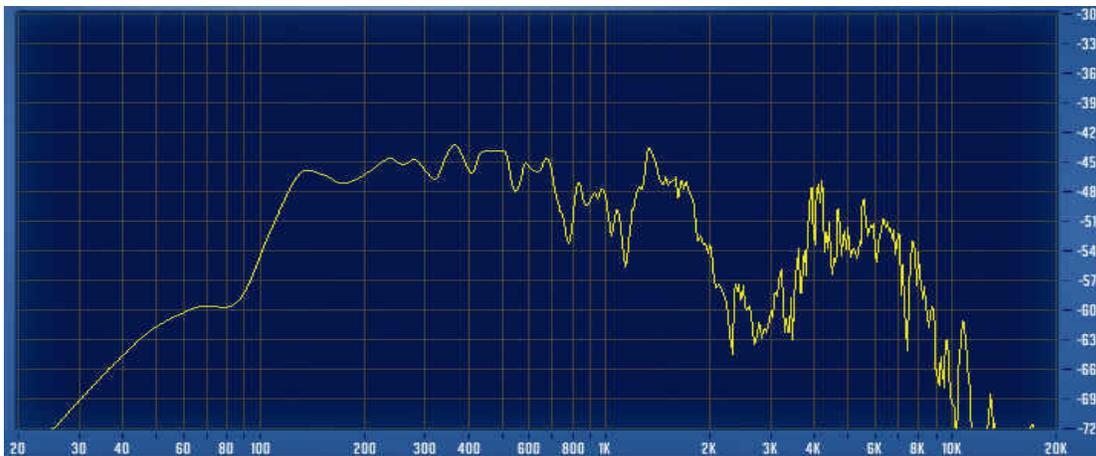
Initially I thought that internal reflections between the inside of the case and the recorder were causing cancellation at certain frequencies, but the distance between the inside surface of the case and the mic would put the cancelled frequencies up too high to be bothersome. I didn’t attempt to measure the polar pattern with this rig but I suspect that bagging the recorder caused it to change

considerably so the mics no longer had a cardioid pattern. If nothing else, this is a good demonstration of why the design of a microphone grill is really important.

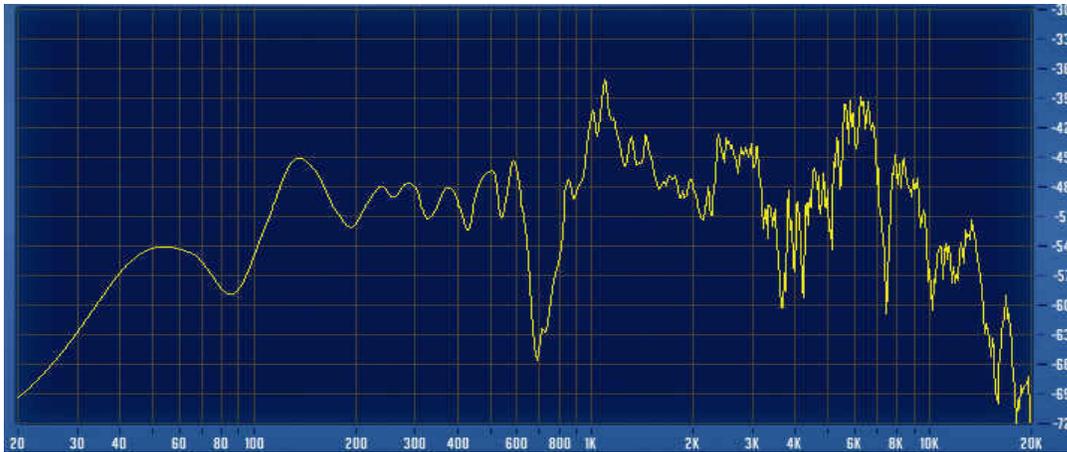
Here's an FFT spectrum analysis of the recorded pink noise: These graphs are all plotted with the same vertical scale, but in order to do that, the recording with the case pulled tight around the recorder was boosted by 20 dB to get its level into the same ballpark as the other two plots:



Zoom H2 without Dry Case



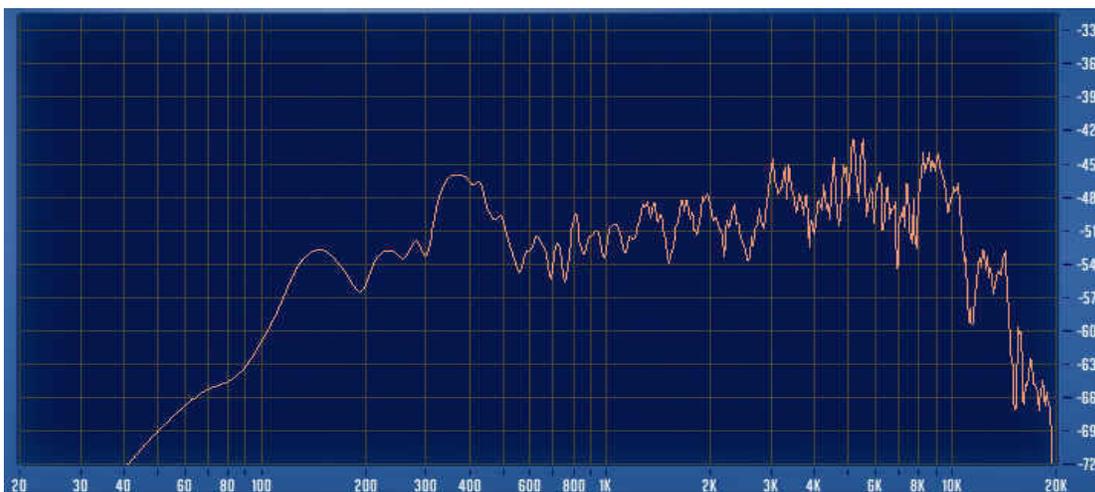
Zoom H2 in Dry Case with a little air



Zoom H2 in Dry Case with vacuum, boosted 20 dB

Note the steep high frequency rolloff, and the significant holes around 4 kHz and, with the case pulled tightly against the recorder, the deep notch around 700 Hz. Based on this experiment, I must conclude that a recorder enclosed in the Dry Case simply isn't going to make an accurate recording with its built-in microphones. Further, in a situation where you must keep the recorder dry, you'll not likely be using external microphones since you'll want to keep them dry as well, which is likely to affect their sound. You might be able to do an interview in the rain suitable for transcription, but I wouldn't want to broadcast or publish a Dry Case enclosed recording (except here, of course). It's possible that it could work better with another recorder, perhaps one with omnidirectional mics rather than the cardioids in the Zoom H2, but I have to be skeptical.

For a comparison, I put the H2 in a Ziploc™ sandwich bag and repeated the recording test. If you only need to keep your recorder protected from a drizzle, this is a better solution. The spectrum response shows a pretty sharp drop above 10 kHz, but no large peaks or dips like with the Dry Case.



Zoom H2 in a sandwich bag

Phone Phreaking

OK, so the Dry Case didn't work out for recording, but I didn't want to give it a bum rap without seeing how well it does its intended job of protecting a portable phone. I put my own phone in the case, called my answering machine, and used that as my test recording. With a little air in the case I was able to hear my machine's outgoing message fairly clearly, and the message I recorded using the encased phone was understandable – telephone quality of course, but too not much different from the naked phone.

As with the recorder, however, when I sucked the air out of the Dry Case, there was substantial attenuation both for speaking and listening, and that deep notch in the frequency response around 700 Hz was evident in my speaking voice. The attenuation also affects the ringer, making it difficult to hear with the case evacuated though the vibrator was easy to feel with the case strapped to my arm. Furthermore, with the case snugly evacuated, the mechanical buttons on my phone, like the switches on my camera, got squeezed into operation, which made the phone inoperative. This is phone-dependent of course.

The Kitchen Sink Diaries

While I didn't find the Dry Case usable for recording, it still has some potential for doing what it's intended. While I don't have the equipment to test it under pressure (it's not diving season yet), I could test it for water tightness in the kitchen sink. I also wanted to check out the buoyancy provided by the arm band. Not wanting to send my recorder to the bottom on the case's maiden voyage, I loaded the case with some used AA batteries. The Zoom H2 weighs 170 grams, a AA cell weighs 23 grams, so I dropped 8 batteries into the case, sealed it up, sucked out the air, dropped it into the sink, and left it on the bottom for an hour.

After fishing it out and drying off the outside, I was pleased to see that the vacuum was still intact and there was no water visible inside. However, after removing the batteries, I found a few tiny droplets of water inside, not enough to do any damage, but not perfect either. The inside of the clasp assembly was wet above the groove and V seal at the top of the bag, so it's possible that a bit of this water dribbled in while I was retrieving the batteries. In any case, at least at normal atmospheric pressure, water leakage isn't a problem.

I then attached the arm band to check its buoyancy. With 8 AA cells, it sank like, ummm, a bag full of batteries. Perhaps it was designed to float an iPhone, so checking the specs, I learned that an iPhone weighs 136 grams give or take a few depending on the vintage. That's 6 cells, and the rig sank with that load as

well. The arm band will do a fine job of securing the pouch, but if you lose it while riding a wave, your gear is as good as gone.

As there's no seal around the opening of external phone jack, even with a plug inserted, a little water seeped in. Fresh water won't usually affect a headphone connection, but if you take it to the beach, I'd suggest flushing the jack with fresh water before the salt water evaporates and leaves some salt behind.

The Wrap

It's unfortunate that the Dry Case didn't work out for use with a recorder. It would have been a good solution for some tough sound gathering situations. However, not to give it a total bum rap, it seems to work fine for its intended purpose, and as long as care is taken that buttons or switches are operable inside the case, and it'll be fine for taking your tunes or phone into the hot tub or to the beach. There's a 7-day return policy so you can try it with your own gear, and a 1 year replacement warranty (of the Dry Case, not of your phone if it gets wet).

You can download a mono 320 kbps MP3 file from the URL below and hear the recorded musical samples (it's fiddler Tex Logan) as well as run your own spectrum analysis of the pink noise if you wish.

http://dl.dropbox.com/u/48547976/DryCase_In_Action_mono.mp3

Fast Facts

Pros:

- Works as intended when used with a phone

Cons:

- Significant sound attenuation when the case is fully evacuated
- Frequency response is severely affected, essentially restricting it to telephone quality (which of course isn't a problem with a phone)
- Kind of pricey so it's going to be of limited application

Price (direct): Phone size - \$40, iPad size - \$60

For further information:

<http://www.drycase.com>

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