Review EDM-LCD-CS FM Transmitter

This transmitter is kind of an odd duck in the world of Part 15 FM transmitters. I first learned of the EDM transmitters when they were mentioned occasionally on some vintage stereo and audiophile forums I frequent. They were being raved about for their quality sound. I finally got around to looking at their website and so many questions came to mind I had to order one and investigate.

There are several different models, some offering RDS, some that are specifically marketed as the "audiophile" version as well. I ordered the EDM-LCD-CS FM transmitter. Enclosures are optional, as are power supplies. I got the matching metal enclosure and the recommended power supply.

Here are some of the weird things. These are sold as kits. They are NOT FCC Certified, so cannot be sold in the USA as a ready to use transmitter. I am not 100% certain of the FCC rules regarding the sales of FM broadcast band intentional radiators (transmitters) when they are sold as kits, and I'm not certain of the legal definition of "kit" in this situation. The online documentation for the transmitters indicates that assembly of the kit requires two steps – inserting an IC into a socket, and soldering the jack for the power supply to the PC board. Is this enough to make a "kit". I'm not certain. I also thought it odd that their website offers no physical location, no phone number, or any other contact information other than an email address that is a South African address! However, my email inquiries in reference to my order were answered promptly and in perfect English. So it remains a mystery to me.

To be honest I was expecting this to be a substandard device, some sort of cheap circuit board with an iffy design, etc. I'm glad to say I was quite wrong. My transmitter arrived about 14 days after ordering, not bad considering the order was placed right before Christmas so we had some holidays to contend with. It arrived in a small post office Priority Mail box. In the box were three things. The transmitter in it's metal enclosure, wrapped in thin foam, a small plastic bag containing the power jack and a 63 inch piece of wire with an RCA plug on the end (the included test antenna) and also in the box is what appeared to me to be the typical small 12V switching power supply, Chinese of course.

I did what anyone would do. Took it up to my studio for some quick testing. Simple matter to plug it in, turn it on, use the handy up/down buttons to choose my test frequency (101.5) and plug in some audio. I used the line output from my mixer normally used for feeding a digital recorder. I tuned a vintage Sherwood receiver to 101.5, cranked it up and fully expected to hear hum, buzz, or interference from the Chinese switching power supply. But no. I heard silence with the faint sound of an unmodulated carrier in the background. Just barely. I was impressed already. The metal enclosure is not a flimsy box, but a rugged solid box with cutouts for all the jacks and necessary adjustments. It has flanges that make it easy to mount on a wall, under a desk, etc. Well, lets put some music through this thing! I put on the Rolling Stones new album, and it sounded wonderful. I sat and listened through the entire first side. It really sounded to me as good as playing the vinyl right through the system without the FM radio link. Well, OK. I thought edgy blues sounds pretty good even if you're not to picky, so I grabbed an Erroll Garner jazz piano LP, and it sounded just as wonderful. Stereo separation was as expected, and again, the audio sounded just like I was playing the record direct from the turntable to the stereo. I was impressed. Definitely hi fi and no power supply interference, no hum or noise at all.

I took this opportunity to tune the EDM transmitter in on my Inovonics modulation monitor. Now, here's my beef with this and so many other FM transmitters. No modulation indicator. Just instructions to listen for distortion and back off. This transmitter sounded wonderful at 100% modulation peaks. But it also sounded wonderful at 110%. And 120%. And my meter only goes that high. Modulation had to

be well over 120% before I could detect audible distortion. I believe the typical person who doesn't have an actual modulation meter set up will probably be overmodulating this transmitter without too much trouble. If I went up to to where I could hear distortion and back down till it sounded good I was just about at 120%. This is going to put you outside the allowable envelope. And for those who keep track of these sorts of things, stereo pilot injection was right at 9%.

Next I brought it up on the spectrum analyzer. I was glad to discover that a careful scanning of the band found no harmonics or spurious emissions of any concern. The signal was nice and clean.

So, now we get down to the nitty gritty. Emissions are clean, modulation can be more than enough, and the sound is splendid. So, how do things stack up in the power output department? Is this transmitter Part 15 legal?

Well, like anything we have some variables to contend with. This transmitter contains a little switch for hi or lo power. In low it's supposed to be 1-10 mW output, and in high it's listed as 2-100 mW output, and there's a small trimmer pot next to the switch that you carefully adjust with a screwdriver to vary the output within the range for the switch position selected. As received the switch is in the low power position and the trimmer is set to max output. It is listed as being a 50 ohm output, so it was perfect for a power output meter test into a 50 ohm dummy load. As received power output was 8 mW with the switch in low, and 80 mW with the output switch in high. This read on a Coaxial Dynamics RF meter with a slug specifically designed and custom manufactured for me for Part 15 power testing. When using the adjustable trim pot, in low mode power it would adjust from a low that was too low to read, maybe a needles width on the meter – just enough to confirm that there was power output at the lowest setting. In high mode power adjusted from 1 mW to 80 mW.

Lets move on to the field strength readings. This is where the legal transmitters are separated from the illegal ones. Now, this transmitter comes with a “test antenna” which is a 63 inch long piece of wire with an RCA jack on the end, wire connected to the center pin. You can also order their “rubber duck” type antenna suggested on their website for “short distance use”. I did not purchase one because these amount to a piece of wire in a piece of plastic. Further, no where in the documentation are suitable antennas mentioned at all. ZERO documentation arrived with the transmitter, and I could not find any documentation on the website. However a search for the transmitter model number along with the words “manual pdf” took me right to the necessary documentation. But no talk about antennas at all. So I did testing with two antennas, the wire antenna supplied with the transmitter, and also a smaller stiff wire antenna the same length as that provided with the C. Crane FM 2 transmitter.

All field strength testing was done in my usual manner, in my usual setup, in my regular test field. Only variation was it was 4 degrees and a field of snow. I spoke with an engineer at Potomac about any effect the snow may have on my readings and he assured me that at these power levels, and over such a short distance (3 meters) the snow cover would amount to a nearly immeasurable difference. So, here we are:

As delivered the transmitter had a field strength on “low”, with the supplied wire antenna vertical, at a distance of 3 meters of 10.08 mV/m. On the high setting the field strength was 29.76 mV/m. This translates to 29,760 uV/m and 10,080 uV/m. Clearly not close to the FCC limit of 250 uV/m. With the supplied antenna horizontal (the same orientation a the receiving antenna) the readings jumped to 14.88 mV/m in low to 45.84 mV in high. This equals 14,880 uV/m and 45,840 uV/m. As expected with the supplied antenna and with the trimmer adjusted to full output this is not Part 15 legal with the supplied antenna. But we have other options available! What happens if we turn the power output

trimmer all the way down. Can we then make this transmitter Part 15 legal? Not quite. In the low switch setting and with the power output trimmer turned all the way down, our field strength with the supplied wire antenna drops to 3.6 mV with the wire antenna horizontal, and down to 1.68 mV with the antenna in vertical polarization. This gets us down to a low of 1680 uV/m with the supplied antenna.

Since the supplied wire antenna is for “testing” I thought I'd try an antenna more like other Part 15 transmitters use. Remember, the documentation provides zero information about antennas. Just that the supplied wire antenna is for testing, and the ordering page on the website lists a small “rubber duck” antenna advertised for short distance use. I made up a stiff wire antenna 10 inches high which is the same size as the whip antenna on the C. Crane Fm 2 transmitter. With this antenna vertical we got down to .24 mV or 240 uV/m which does in fact bring this transmitter into legal Part 15 compliance! So yes, with a short antenna and the power switch in low, and the power adjust trimmer turned all the way down, this IS a legal Part 15 transmitter!

So to summarize. To make this Part 15 legal you need to be in the low switch setting with power adjust all the way low, into a short 10” antenna and you're just under the Part 15 legal limit. Although I didn't test it I'll bet their optional “rubber duck” antenna will operate this transmitter at nearly the same output as my 10” test antenna. The sound is excellent. The included power supply causes no hum or interference. The signal was clean with no identifiable harmonics or spurious emissions. The transmitter is easy to tune and operate. Has RCA stereo input jacks with handy left and right trimmer pots for level adjust, all of which are accessible through the high quality metal enclosure. The LCD readout makes knowing your frequency easy. Oh, and it remembers the frequency so if the power goes out, it comes back on right on the frequency it was tuned to. Email response was fast and helpful. Delivery took about 2 weeks, but this was over the holidays. Lack of enclosed documentation and any information about antenna options are a drawback, but the info does exist online. And again, another transmitter with no modulation indicator. Even a simple blinking LED that flashes when overmodulating like the C. Crane would be all that is needed.

Is it really a kit? Although the online information indicated you would have to install an IC and solder the power input jack to the PC board, in reality, the IC was already in place when mine arrived. It took me about 3 minutes to install the power jack (and that included warming up the soldering iron). This is of course not certified and it's up to you to make sure it's operating legally. And the lack of a modulation indicator I believe will lead many to setting it to overmodulate. Darn good sound quality is the main attraction here!

I did not include any photos in this report as there are plenty on their website, including with the circuit board outside of the case.

Their information:

http://www.edmdesign.com/index.html

And the documentation/manual is at:

http://www.edmdesign.com/manuals/STEREO-TX-LCD.pdf