

F-S Electronics FSX-05B “Rangemaster” FM Transmitter

It all started when someone asked me what a used Hamilton Rangemaster AM Part 15 transmitter might be worth. I had no idea, so I did what everyone else does. I went to eBay. I typed in “Rangemaster Transmitter” I didn't find a used Hamilton Rangemaster listed, but I DID find the F-S Electronics X-treme Series FSX-05B Rangemaster *Certified* FM Part 15 Transmitter! Determining this has nothing whatsoever to do with the folks who bring us the Hamilton Rangemaster Part 15 AM transmitter, I was intrigued. I carefully read their description:

“Fail-Safe X-treme Series FCC Certified Long Range FM Transmitter FSX-05B from F-S Electronics will broadcast long ranges in crystal clear stereo sound. The FSX-05B is the best of the best FM Transmitter, the game changer, the new benchmark in the FM Transmitter Industry—to the X-treme is no longer just a phrase, it was our purpose in life for the past 4 years. Our goal was simple: make the unit Fail-Safe Compliant, but we wanted X-treme range, X-treme convenience, and X-treme durability, all while still focusing on getting FCC Certified—the X-treme Project. What resulted is the FSX-05B! It comes equipped with 3 Stereo ONLY Inputs—1-RCA Audio Input, 1-3.5 mm Audio Inputs, and 1-3.5 mm MIC Jack; user controlled volume knobs for fast sound optimization; and brilliantly engineered reverse-thread TNC Antenna Port. Unlike the “competition” that boast to be FCC Compliant with inconvenient small wire antennas, or offer crappy rig jobs to boost their abysmal units’ range at the expense of voiding their warranty or violates issues of compliance. This one actually was designed with a convenient rubber ducky/whip antenna that has been X-tremely successful in our FSCZH-05B model. Instead of something that fits in your hand and is lightweight, we took it to the X-treme and “super-sized” it—NO TRADEOFFS! That’s right, this unit is not lightweight and is quite a bit more for your money than what the competition offers because our goal is not profit or mass production—it is X-Treme Customer Satisfaction! F-S Electronics’ goal is to offer Fail-Safe Products and Fail-Safe Service, and the FSX-05B definitely fits the mold!”

This offered me the two mutually exclusive phrases in the world of Part 15 broadcasting. “Certified FM” and “Long Range”. It's not possible to have long range and be legal. I looked at their other offerings, I looked at their Facebook page, I checked out their Amazon store. They sell an awful lot of FM transmitters that are NOT legal in the USA, although they never mention this in their advertising. But since this was *certified* and they went to great lengths to brag about their certification on all their references to this transmitter, even pointing out their certification number on Facebook and Amazon. I thought I'd order one and check it out. So I did.

It arrived quickly via Priority Mail. It was in in nice custom packaging, came with the “rubber ducky” antenna, the transmitter, the switching type power supply, and a manual consisting of one sheet of paper, folded in half, printed on all four pages, in type so small I needed a magnifying glass to read it.

As I started checking it out on the bench in the shop I couldn't even decide where to start, as a look at the manual already told me it was not possible for this transmitter to be certified. I powered it up. When first connected to power and turned on it defaults to 76 MHz. Well, that alone makes it ineligible for certification. A certified FM transmitter cannot transmit outside the US FM broadcast band which is 88.1-107.9 MHz. So, we've already established certification is not possible for this specific transmitter.

Then I noticed an FCC ID number engraved on the back. That's odd. Where are the two required labels that certification demands? Oh, there it is. On the last page of the “manual” in tiny type. For a transmitter of this size the requirement is for a label permanently AFFIXED TO THE TRANSMITTER. You can only pass by having it in the manual if the device is too small to carry the label. I measured. This transmitter is far too large to get away with no certification labeling affixed to it. It is well over the FCC's minimum size to allow labeling only in the manual. Strike two. It cannot be certified as it is.

As I peruse the manual I see it has a section for changing power! Yes, you have a choice of $<100\text{mw}$ or $>500\text{mw}$. 500mw is the default setting (what it's set for when you power it up). Strike three. A certified Part 15 transmitter cannot emit a field strength over 250 uV/m at 3 meters. I can promise you $>500\text{mw}$ will be well over that. But the tests are coming up!

Time to fire it up and see what we have. I turn it on and follow the instructions to set it to the low power setting. I run some music into it from my iPhone. I grab my Tecsun EP-310 and tune in my test frequency across the room. Nothing. I hear nothing. No carrier. No music. I switch the transmitter to high power. I get TONS of signal and blasting music! OK, so it works. But why nothing on low power?

I decide to leave it at that for the evening, and I dash off a message to the eBay seller and the Facebook page of F-S electronics explaining that my new transmitter can't be heard 6 feet away on low power. I also emailed the "help" email address in the manual. Never got a reply from the email, but on Facebook and eBay I received messages. The gist of these messages was that in order to meet FCC certification, low power had to be extremely low, and that's why they designed the transmitter with a high power setting. For people who wanted to actually hear their transmissions. I insisted it wasn't transmitting on low, they insisted that if it worked on high, it would work on low. So back to the shop I went the next day. Fired it up again, and put the Tecsun on the table next to the transmitter, and sure enough I heard beautiful music. A quick test demonstrated that on the lower power setting it has a range of about an arms length. Get 4-5 feet away and the signal is gone. Ok then. As a "certified" transmitter it's already violated three requirements for certification and has basically 4 foot range on the legal power setting. And the company insisted this is how it's meant to be.

Well, fine. I decided to go ahead with bench tests. The antenna connects to the "*brilliantly engineered reverse-thread TNC Antenna Port*", as their listing says. This actually meets an FCC certification requirement as using a "non-standard" connector for the antenna is required so users can't easily switch to a better antenna and increase field strength. Non-standard or not, in less than two minutes I was able to order an adapter that adapted this to a normal BNC connection off the non-standard connector, so to heck with their attempts to foil connecting things to the antenna "port". And besides F-S Electronics sells optional antennas and cables to increase your range! I connected to a Coaxial Dynamics power meter, with an FM band 1 watt full scale slug installed, and into a 50 ohm dummy load (the manual actually says it's a 50 ohm output). On high power I got 580mw , although this varied depending on frequency chosen. I switched to low power and got a reading of zero, which is what I expected. I switched to an FM band slug that read 100mw full scale (I had this slug custom made for this purpose by Coaxial Dynamics). I could maybe see the needle move. Maybe. If it did it was moving about a needles width. Well, I guess they weren't lying. The manual did say low power was $<100\text{mw}$. It certainly was less than. Almost imperceptible. Were it anywhere near 100mw I would have seen a full scale reading.

Lets fire up the spectrum analyzer and see what we've got. I was using high power and reading off the air. Amazingly, a nice clean signal. While playing with it I noticed that output varies greatly based on frequency chosen. I didn't get real scientific about this but I noticed at least a 15 db improvement across the band with the most output at 101.4 (that's another thing about this transmitter, you can set it for "in between" frequencies. Another certification strike!). I'm guessing they've got it tuned for the center of the band with the included antenna. So I settled on 101.5 for the rest of my testing as it's a clear frequency in my area. I did notice a signal at the 203 mHz harmonic, but it was at least 65 db below the main signal and wasn't a factor in later tests.

Checked it on the Inovonics 531N modulation monitor. Getting 100% modulation is easy enough. And the transmitter audio was nice and clear. But here's a trouble spot. There is no indication of over-modulation on the transmitter. You just supposed to set the volume of the source and the transmitter until it sounds good. Even the budget priced (and legally certified) C. Crane FM Transmitter 2 has a blinking LED to let you know you're over-modulating. I could over modulate quite a bit and it still sounded pretty good. It had to be grossly over modulating before the audio sounded obviously distorted. So this is going to be tough for any user. It clearly has no processing or limiting in it, or if it does it's ineffective. Changes in input volume from the source easily changed the modulation dramatically. So if you were going to use one of these (to legally broadcast to yourself 3 feet away mind you) you'd be wanting an outboard processor of some sort, or at the least a compressor/limiter.

Lets get it into the field and check that field strength shall we? I don't want to go into ALL the testing parameters. Well, maybe I will. Using the Potomac FIM-71 field strength meter (which was calibrated by Potomac less than a year before this test – they suggest calibrating every 3 years, I do it every 2). I have a wide open field near me where testing can be done. This is to insure no signal reflections interfering with readings, although at these levels I don't think too much reflecting is going to happen, but just to be sure. Potomac has the meter calibrated, and the adjustment curves set up for the antennas to be 7 feet above ground (distance to ground is a factor in readings) so I mount test transmitters on a wood 1x2 that is help upright with a cement holder. Nothing of metal nearby. The meter's antenna is also elevated to the specified 7 feet. For this test I used a 12V gel-cell battery, reading 12.2 volts output on a digital volt meter to power the transmitter. I don't have AC available in the middle of a field, and external power is the only option for this transmitter. All my testing over the past two years has been done in this same field, with the meter and transmitter “stick” in the exact same places (I have markers in the ground). I tested with both the transmitter and receiving meter antennas in a horizontal position So that's the basics of the setup. Lets just get to the numbers.

I continued to use 101.5 MHz for testing. This was the frequency that gave the most output in earlier testing. I also had the battery located straight below the transmitter with the power cable going straight up to the transmitter. First reading. Plain ol' field strength reading. No modulation. High power. 171mV/m. Yes, that's 171mV/m. That's 171,000 uV/m. The legal limit is 250 uV/m. Well, we all knew on high power it would be coming in a little hot, right? There are two other test I usually do, and one is to move the battery away from the base of the transmitter, pulling it off to one side so the cable rises up to the transmitter at a 45 degree angle. How about that. Field strength drops to 56,350 uV/m. Still well over the limit (which we expected anyway). But this shows the difference in field strength caused just by moving wires and cable around that connect to the transmitter. In previous tests last year the Decade CM-10 and Whole House 3.0 dramatically showed the same effect. Now lets add some audio to the mix. This adds another cable to the transmitter. For this I use an ipod connected to an audio cable just long enough to reach from the ground to the input on the transmitter. HUGE jump in field strength. Brace yourselves. 416 mV/m! That's Or to put it into legal terms, that's 416,000 uV/m. Yes. I repeated this test several times. Pull the audio cable it drops back to 171 mV/m. Plug it back in it jumps to 416 mV/m. This is connecting it to an iPod that is running on it's internal battery and is connected to nothing else! It's easy to see why on the list of NOUO's on the FCC web site you see so many with crazy high field strength readings. 416,000 uV/m is quite a bit over the 250 uV/m limit! So, now I'm wondering what practical range is. I quickly grab the Tecsun portable and head off down the street. I was several blocks away with a solid signal. I jumped into the car and took off. I could get out to just shy of a mile in most directions. Even when it was getting a bit iffy I could find a place to stop where it was clear. This does give you some idea of what sort of field strength you need to get about a mile, and how far over legal that is!

Now, we may as well check it out the “legal low power setting” that the folks at F-S Electronics insist is required for certification (I still insist it's a defective transmitter). With the battery straight down, the audio connected, the conditions that gave me the highest field strength earlier, I got 61 uV/m at three meters. The legal limit is 250 uV/m at three meters. That explains why I thought it was broken!

So you probably want to be avoiding this one! They claim it's certified but it violates several requirements for a certified Part 15 FM transmitter. It only really transmits when using the highly illegal high power setting. The low power setting (assuming this transmitter is not defective) has a range of less than 6 feet.

They advertise “Buy American” on their Facebook page and this transmitter is clearly made in China. It is NOT marked “Made in China” as required anywhere on the transmitter, on it's packaging, or in the manual. The law requires:

“Prior to importing your goods into the United States, you should ensure the overseas supplier has marked the goods with the country of origin. For example, goods originating in China should be marked "Made in China". The marking must be legible and permanent enough for the ultimate purchaser to be made aware of the goods origin.

The ultimate purchaser is the person who will last purchase or receive the article in the condition in which it was imported. That could be a consumer (one who buys), processor (one who further processes materials or recipient (receiver of a gift).

There are exceptions to this requirement. For instance, for goods that are incapable of being marked (i.e. fruit), it is appropriate to mark the outer container with the country of origin.”

Buy American? The FCC ID number that they brag about – they often refer to how THEY have an actual certification with a number and everything, unlike their competition-- belongs to a Chinese company, that being: **Guangzhou HanTing BIO Technology Co., Ltd. Room1502, Huilange Building, No. 273 Huangpudadaoxi Road, Tianhe District, Guangzhou, N/A 510620 China.** It's all available in the FCC database. Buy American? Then they leave off the required country of origin? Further, if you read the certification paperwork on file with the FCC it in no way reflects this transmitter. The technical details simply do not match up. This transmitter, as I received it cannot be FCC certified. It doesn't even meet the most basic and obvious requirements.


From their Facebook page (above) and eBay listing (below) You can read the text of their ebay listing in the article above:



New from F-S Electronics!!! This transmitter is the only one of its kind certified by the FCC for home broadcast. Don't let others companies fool you with fancy word play, ask for their certification number. Ours is Z9V001.



Fail-Safe Long Range FM Transmitter--X-Treme Series
FSX-05B--FCC CERTIFIED



RANGEMASTER FCC CERTIFIED FM TRANSMITTER

★★★★★ Be the first to write a review.

Item condition: **New**

Quantity: More than 10 available / 1 sold

Price: **US \$159.99**

[Buy It Now](#)

[Add to cart](#)

Qualifies for: ☐ 3 yr warranty from SquareTrade - \$26.99

9 watching [Add to watch list](#)





[Add to collection](#)

Delivery in 2-4 days	60-day returns	New condition
-----------------------------	----------------	---------------

Bucks You'll earn **\$3.20** in eBay Bucks. [See conditions](#)

Shipping: **\$19.95** Expedited Shipping | [See details](#)
Item location: Fort Wayne, Indiana, United States
Ships to: United States and many other countries | [See details](#)

Delivery: Estimated between **Tue, Oct. 25** and **Thu, Oct. 27**
Use **Expedited Shipping** to get it by Oct. 25 📦

Payments: **PayPal**    

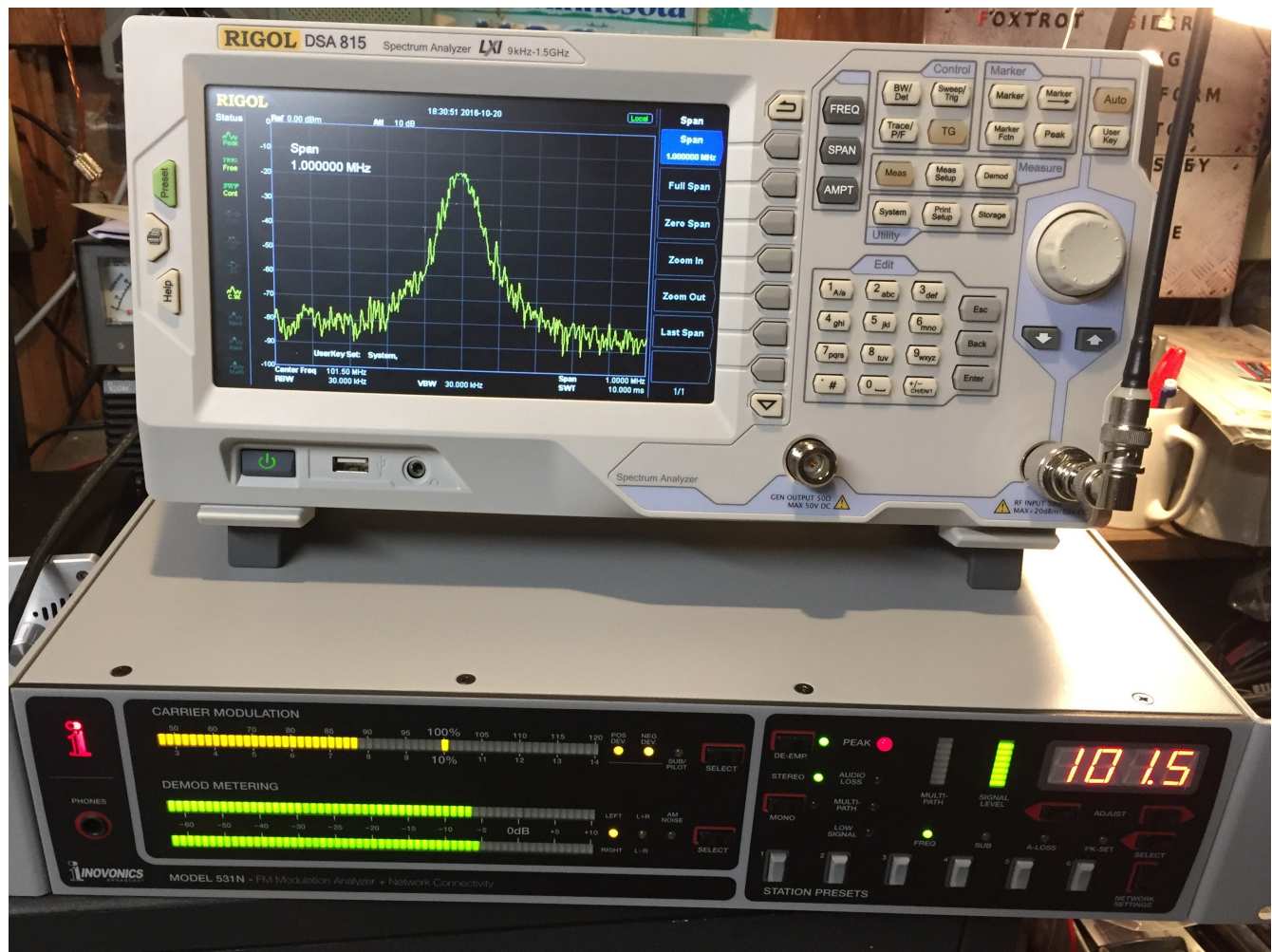
Credit Cards processed by PayPal

PayPal CREDIT
6 months to pay on \$99+. [Apply Now](#) | [See Terms](#)
[See details](#)

Returns: 60 days money back, buyer pays return shipping | [See details](#)

Guarantee: **ebay** MONEY BACK GUARANTEE | [See details](#)
Get the item you ordered or get your money back.
Covers your purchase price and original shipping.

On the spectrum analyzer and modulation monitor:



Checking power output on the Coaxial Dynamics wattmeter. About 565mw at 76.1. An illegal frequency for FM broadcasting in the USA, and a disqualification for certification. Of course this power level also far exceeds the legal limit and is also disqualification for certification in the USA. Their advertising and manual all state it's up to the USER to insure they are operating within the rules, which is true. However, in order to SELL a manufactured Part 15 transmitter in the USA it MUST be certified, and to be certified it MUST operate legally.

