

Subject: Re: [TowerTalk] XM240 element spacing

From: "Greg Ordy" <ordy@seed-solutions.com>

Date: 1/8/22, 7:54 PM

To: "Grant Saviers" <grants2@pacbell.net>, <leeson@earthlink.net>

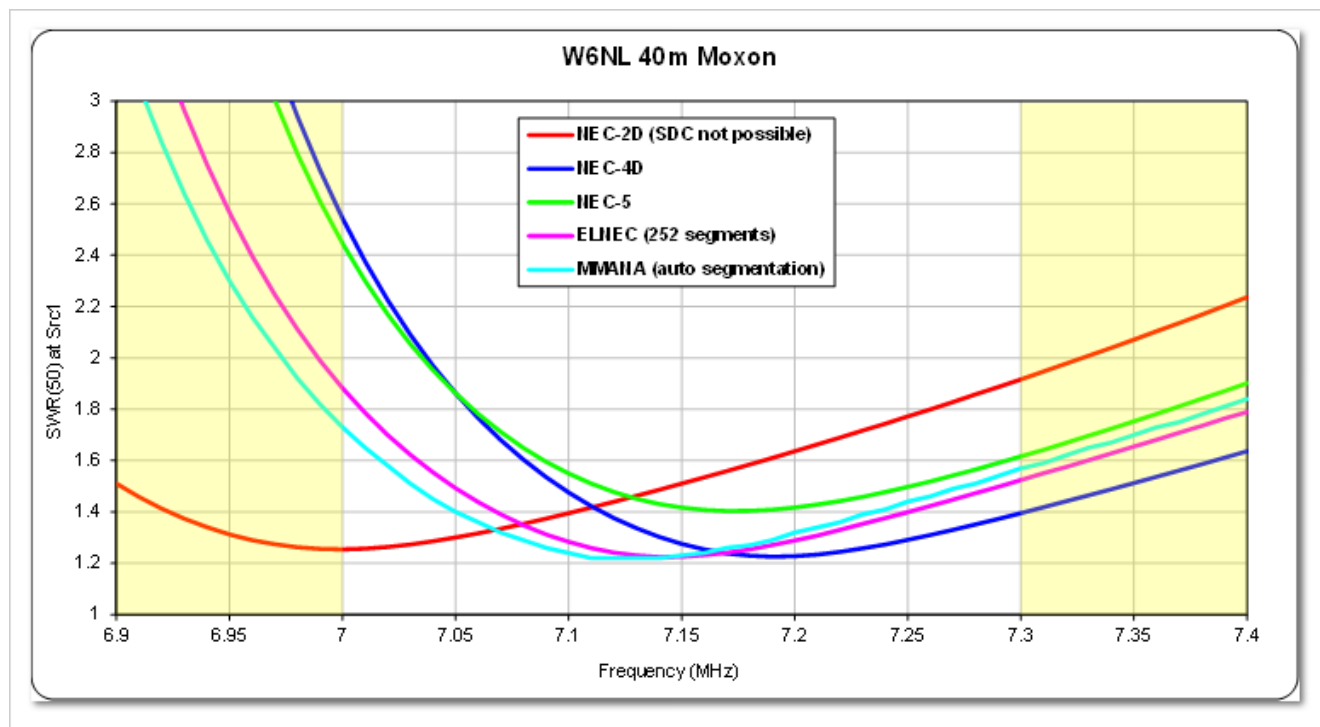
Hi Guys,

I've heard that the 40m Moxon has been a topic lately on TowerTalk.

I'm only indirectly aware of what's going on.

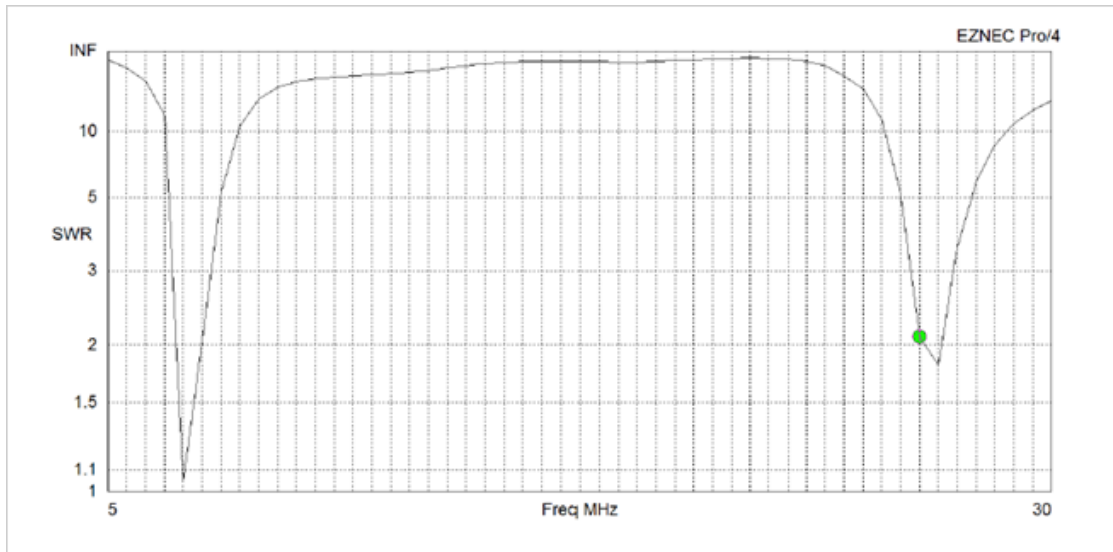
Just a few quick comments after reading through Grant's email.

First, Dan, AC6LA, who has been working feverously to test the upcoming last release of EZNEC, ran a Moxon model on a number of modeling engines, creating this comparison. Perhaps he posted this to TowerTalk, I don't know.

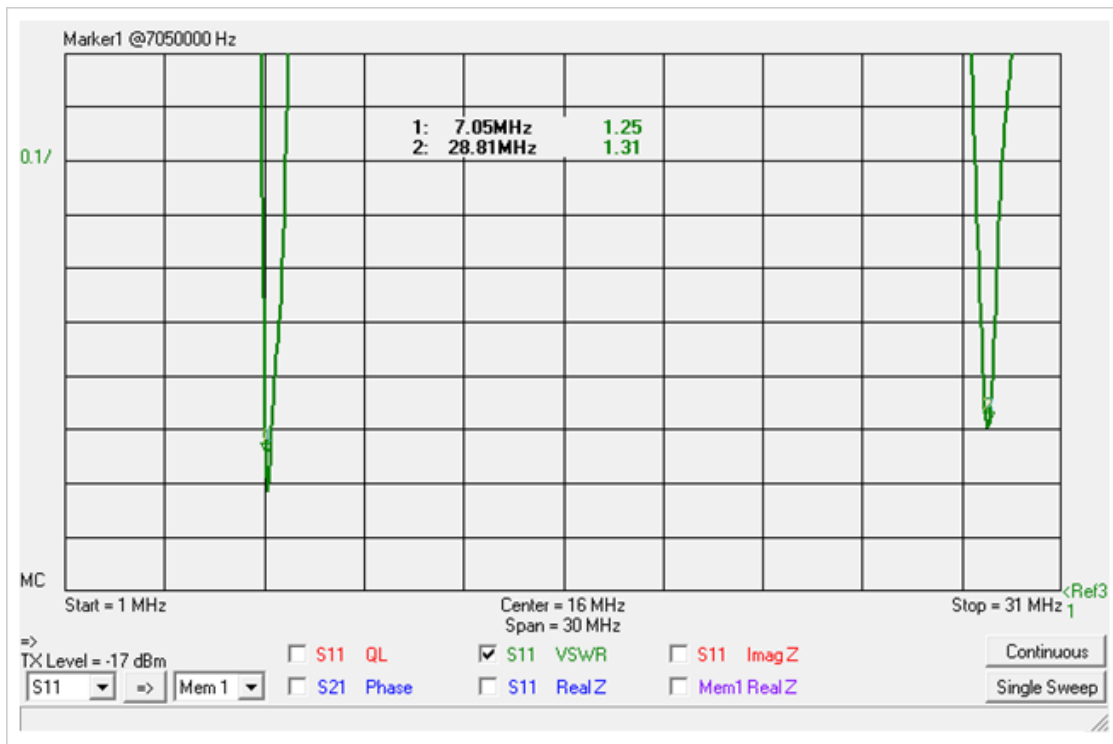


So the NEC-2D and NEC-4D and NEC-5 and ELNEC and MMANA engines all on the same model.

In the wide freq SWR plot file was this graph:

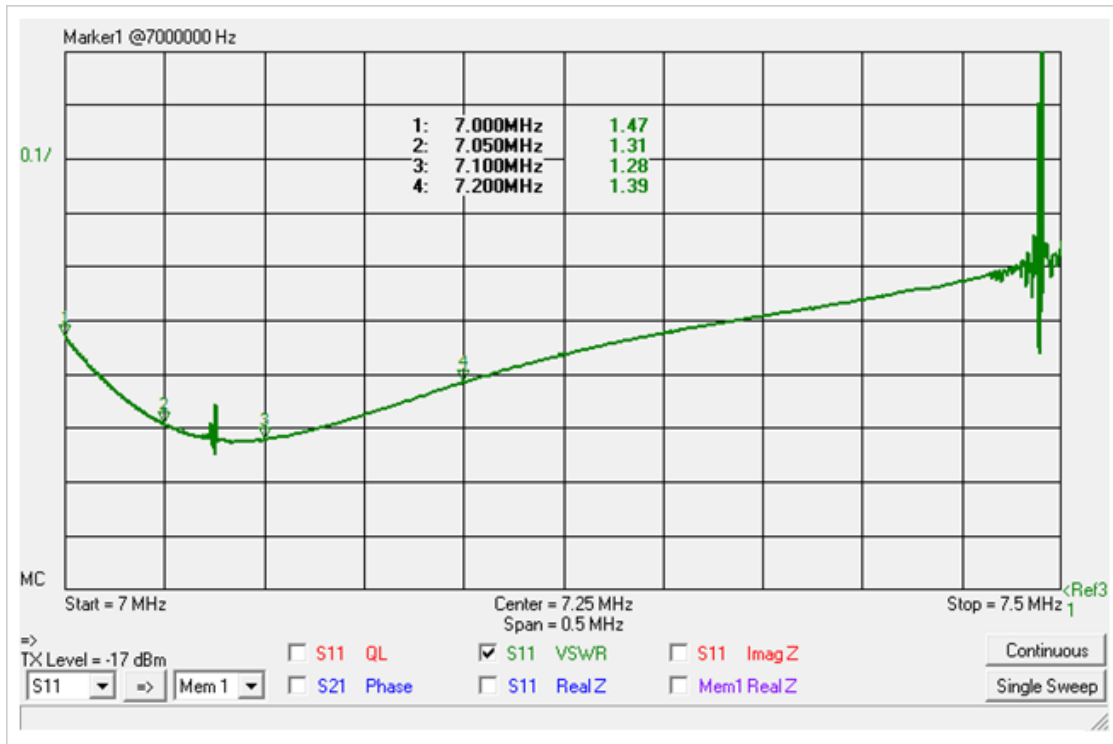


Obviously a modeled result. What is interesting is the SWR dip up near 28 MHz. That triggered a memory from measurements at K3LR. For the last few years Tim and I have made sweep measurements of all of the K3LR antennas before the start of the contest season to see if anything has changed when it was not expected to. Here is a wide SWR sweep of the 185' Moxon made in 2017:



I just found it interesting that both the model and measured showed a very similar set of widely spaced SWR dips. These sweeps are made inside the station at the radio which “tests” the entire path back to the antenna. That will color the SWR response due to the loss in the transmission lines. On the other hand, all of the long run lines at K3LR are large diameter hardline.

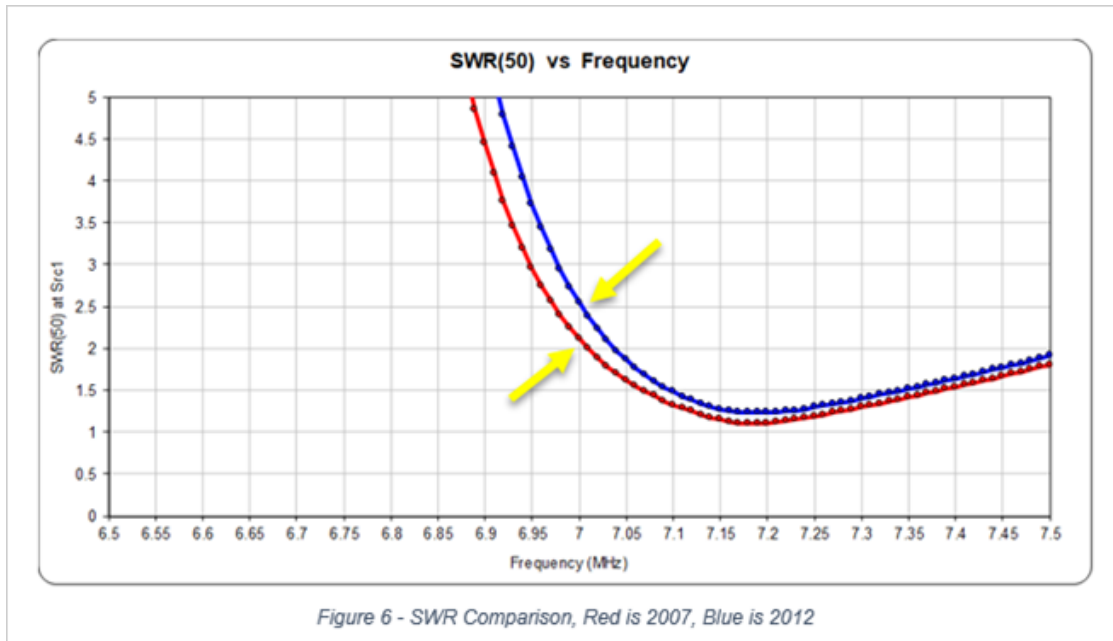
Finally, here is the 2019 measured SWR sweep of the 185' Moxon.



>>>>I was a bit surprised by Greg's comment in the 2018 update about modeled 7.00MHz swr being 2.0.

I'm not sure if the context of the 2018 note was obvious. K3LR originally had two of the first W6NL Moxons in the air. When it came time to take the antennas down, around 2018, the updated design for more mechanical strength was available. I modeled it to see how it looked compared to the original design. AutoEZ was now in the picture which opened up the door to tweak the design. My conclusion was that the design was about as good as it was going to get and about all you could do is shift the response in frequency and not really independently manipulate characteristics like impedance and gain and pattern – they are bound together.

If I'm reading what I wrote correctly, the 2007 design had a modeled SWR of 2.0 at 7.0 MHz. The 2012 design modeled SWR was up to 2.5 at 7.0 MHz. The actual measured antenna, the last VNWA sweep, is 1.47 at 7.0 MHz. Yes, that does include some very low loss transmission line. Here's the graph from the note:



For whatever reasons, the two 40m Moxons at K3LR have always measured a lower SWR than modeled. There are some possible explanations for that. Both the 2007 and 2012 designs start off at the bottom of the band with a measured SWR of ~ 1.5.

Greg