

## Frame Antenna

[John Vinther Nielsen](#)

Mar 16 [#35526](#)

Hi Gary, since you are antenna master, I have a question for you. I've built a frame antenna 1x1 meter and use Mike Electronics 384 pf Air Variable Capacitor, the antenna has 10 windings, but it's like the capitor starts way below the medium wave band and ends around 1400-1500 so I can't adjust the whole medium wave band, it might help to remove some windings like 8 instead of 10. I have used this calculator, and it seem to be right, what does Loop Inductance (mH) mean): should it be low or high.

Im still glad for my FSL, but the frame antenna hade more signal.

Kindness

John Vinther Nielsen

Herning, Denmark

	<b>Enter:</b>
<b>Loop Width (inches):</b>	<input type="text" value="39"/>
<b>Loop Height (inches):</b>	<input type="text" value="39"/>
<b>Wire Radius (inches):</b>	<input type="text" value="0.025"/>
<b>Number of Turns:</b>	<input type="text" value="10"/>
<b>Enter highest capacitance (pF) :</b>	<input type="text" value="384"/>
<b>Enter lowest capacitance (pF) :</b>	<input type="text" value="15"/>
	<input type="button" value="Results:"/>
<b>Loop Inductance (μH):</b>	<input type="text" value="521.3283251"/>
<b>Lowest tuned frequency (MHz) :</b>	<input type="text" value="0.355712280"/>
<b>Highest tuned frequency (MHz) :</b>	<input type="text" value="1.799777595"/>

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[Dirk](#)

Mar 16 [#35527](#)

I'm not Gary, but my 2 cent:

If your loop reaches resonance at 1500 kHz with the cap at 15 pF, then it has an inductance of about 750 uH.

That means, at the lower end (384 pF) it will reach about 297 kHz.

So it is a good idea to reduce the turns on your loop by one and test the resonance again.

Remember that the resonance is also dependant on the radios antenna input, because it adds some capacitance to the loop.

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[Robert Conboy](#)

Mar 16 [#35528](#)

First, address the capacitance.

Keep capacitor wires separated, and as short as possible. Your problem may be the lowest capacitance being somewhat above 15 pF due to parasitic capacitance among the windings and the leads to the capacitor. My guess is that you twisted the wires leading to the cap, and the added capacitance from the twisting is killing you.

If that does not help enough, try taking one turn off the coil and check again.

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[Gary DeBock](#)

Mar 16 [#35529](#)

On Sat, Mar 16, 2024 at 02:09 AM, John Vinther Nielsen wrote:

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Im still glad for my FSL, but the frame antenna hade more signal.

Kindness

John Vinther Nielsen

Herning, Denmark

Hi John (and Dirk, and Robert),

A one meter square loop (39 inches on each side) should be able to include the entire 530-1700 kHz range when the loop's wire length is adjusted properly. If you don't have the full frequency coverage on the high band, that means your loop is tuning too "low," and you need to either subtract a turn of wire or slightly reduce the size of each side (by changing where the wires are connected to the frame, and cutting off a length of wire to get your coverage up to 1700 kHz). For reference, you can start with the PVC Loop article published in 2009, and compare your wire length and dimensions to loops that were actually built and tested here

<https://dreamcrafts.box.com/s/28nwynjlvtrtr00nwzkr27x4ek9ha7w5>

For example, a 40 inch loop is listed with a coverage of 510-1710 kHz, although your coil turn spacing, frame material and wire type are probably different from what I used (and all these can influence the end result). In any case your wire length needs to be shortened in order to get coverage up to 1700 kHz, and if subtracting one turn of wire turns out to be too much subtraction (resulting in 630-1800 kHz, for example), then try cutting a shorter lengths of wire by moving your wire attachment points closer together on the frame (so that you end up with something like a 38 inch loop). Eventually you will get the full 530-1700 kHz band coverage with the construction materials and "384P" variable cap you are using.

73, Gary DeBock (in Puyallup, WA, USA)

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[Todd](#)

Mar 17 [#35531](#)

My four-legged square PVC loop (39.5 inches on each side) tunes the entire 522 - 1700 kHz range with 9 turns of wire at 1 cm spacing. The high quality Mike Electronics 384 pf Air Variable Capacitor is used.

I built my first 40" side length box loop on a wooden frame back in 1984. To obtain 531 to 1610 KHz coverage, 9 turns was used. It is ok to cut the loop tank coil wire too long (e.g. 10 turns), but if it is cut too short (e.g. 8 turns), the wire has been wasted and needs to be replaced.

Increasing the size of the loop beyond around 40 inches side length doesn't noticeably increase weak signal SNR. Noise and signal tend to increase in similar amounts. In practice in higher RF noise suburban monitoring locations like mine, weak signal SNR will be similar to that obtained with an FSL.

These 40 inch side length square loops have been used since approximately the 1930s. The MW signal pickup is huge compared to a portable radio's internal ferrite rod.

Regards,

Todd Emslie (Sydney, Australia)

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[John Vinther Nielsen](#)

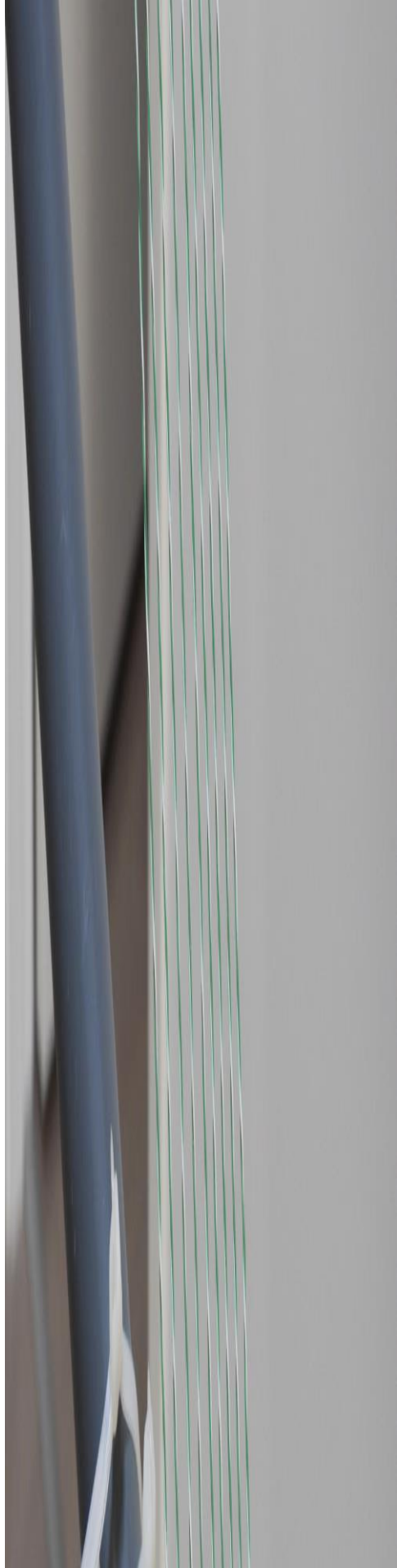
Mar 17 [#35532](#)

Thank you very much for your input Dirk, Robert, Gary and Todd it was very useful, I tried to take a winding off, saw now 9 and moved the capacitor closer to the side and that helped a lot. I have used a wifi cable that I have split up, and it works just as well as regular cable, and not so heavy, see photo

73\*s

John Vinther Nielsen

[DSCN0148.JPG](#)



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[Furtuna Mircea](#)

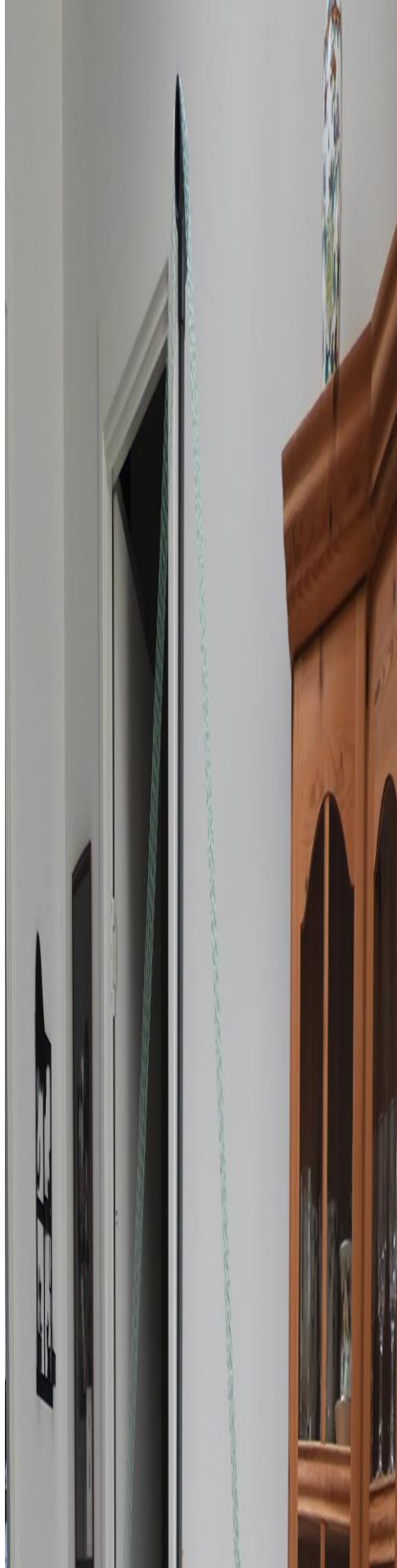
Mar 17 [#35533](#)

Everything is done by groping. It would be good to have a capacitor to measure both the loop capacitance and the inserted value of the variable capacitor. There will be values somewhat different from the already known capacitance, with approx. 20-30pf more. Only then analyzing the values from the computer online you will know exactly what changes are to be made.

On Sunday, March 17, 2024 at 12:31:43 PM GMT+2, John Vinther Nielsen <j.vinther@...> wrote:

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73\*s  
John Vinther Nielsen



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[Mikek](#)

Mar 17 [#35534](#)

It would be nice to have a capacitance/inductance meter to measure with but, his options to receive the whole AM Band with the cap he has are limited.

He could try wider turn spacing, but he has cut slots to hold the wire in place. So that leaves removing a turn.

I added 12pf for self capacitance for a total of  $384 + 12 = 396$ pf. Running the numbers, 396pf and 230uH, I get a resonant frequency of 527kHz.

For the high end  $15\text{pf} + 12\text{pf} = 27\text{pf}$ , 320uh and 27pf gets me 1712kHz.

So, remove one turn, test it, If that is not enough, make a best estimate if to will get you there without going to far.

He needs to run his calculator again and adjust turns to see if he can get closer to 320uH. Then reduce the turns on his loop to that number.

Here is one Resonant Frequency Calculator I use. <https://goodcalculators.com/resonant-frequency-calculator/>

Also if anyone wants to calculate the Self Capacitance of a loop antenna, there is this calculator. [https://electronbunker.ca/eb/Extras/Spreadsheets/LoopSelfCap\\_r1c.ods](https://electronbunker.ca/eb/Extras/Spreadsheets/LoopSelfCap_r1c.ods)

To use it, you need to measure the capacitance at each frequency you choose.

I used a Q meter with an accurate readout of frequency and capacitance.

It could be done with known station frequencies and a capacitance meter.

Mikek

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[K7DWI Art](#)

Mar 17 [#35535](#)

On Sun, Mar 17, 2024 at 05:05 AM, Furtuna Mircea wrote:

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73\*s

John Vinther Nielsen

Nice work John.

Definitely cleaner and better than my two I have built and owned.

In reference to the original post, when you put together a large box loop make it with too many turns so that you can remove them one by one to center it to the Medium Wave Band.

It is better to remove rather than patching and re-stringing more wire.

Both Loops were based on a design from Shawn Axelrod (NRC).

Pics attached.

The Wooden one (4-Foot) had a Duplex Variable Capacitor. Single covered the upper part, bridged together covered the lower.

The PVC one (3-Foot) was designed originally for the 160 Meter Ham Band. After gifting the Wooden one to a fellow DX'er, I have had to add more windings to the PVC one to lower the frequency coverage. I should re-do it, but I have other great loops to play with. I also Ham a lot.

Also, both loops have an internal inductance loop and a 50 ohm Feed to work with radios that have external antenna connections. This always works best for radios that can do this.

In addition they are strapped to a Rubbermaid Lazy Susan with a 1"X3" board screwed on to it so that it can be rotated easily.

Thumbs up on your work.

73 Art K7DWI N. Texas



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[John Vinther Nielsen](#)

Mar 17 [#35536](#)

Thanks all for input, I ending with 8 turn now I can tune the hole Mediumwave band  
73\*s John Vinther Nielsen