Method for determining the frequencies of core resonances.

Hello gentlemen. I am receiving many questions about the method for determining the frequencies of the resonances of the ferrite cores. There are many types of resonances: magnetostriction, acoustic resonance, magnetic nuclear resonance. There are other varieties as well. We are interested in the resonance where the transmission coefficient of the core is most effective - it can be any of the listed resonances or their combination, without special equipment, we practically cannot determine what type of resonance we use exactly, but we can tune in. For this we need the following devices:
1. generator of signals of rectangular pulses for the frequency range of interest to us. Well, if the duty cycle is allowed, there should still be a smooth adjustment over the range.
2. oscilloscope for visual control, it is desirable that it could be used to determine the frequency.
3. frequency counter if the oscilloscope cannot measure the frequency or if you need high accuracy.

If the signal generator is of high quality, there is no need for a frequency counter. In amateur radio practice, two methods are available, it is better to use both. Suppose we have a core with a closed magnetic flux, for example, a ferrite ring or U-shaped halves from a TV assembly or another type of core, by and large there is no difference. First you need to decide on the frequency range that is suitable for our purposes. It is desirable that it be wide enough.

Method 1. We wind several turns on the core with any wire and connect it to the generator of rectangular pulses. The generator should produce a fairly high signal amplitude, we need from 5 volts and above. We put the oscilloscope probe on the same coil and observe the picture. Most likely we will not see a beautiful rectangular pulse, then we need to play with the duty cycle, if there is no such adjustment, it does not matter. We are not interested in the impulse itself, but in a small ringing (damped oscillations) behind the trailing edge. We enlarge the picture and measure the frequency of this ringing. Then we change the frequency of the generator and again measure the ringing frequency. If the measurements match, everything is fine. Let's change the number of turns and repeat the procedure. If the measurements coincide again, then everything is fine. We measure this frequency and make a LC tank for it. If the device does not allow such measurements, there is another way. It is also quite accurate and allows you to identify harmonics that can also be worked on.
Method number 2. At opposite ends of the core, we wind two identical windings. On one we connect to signal generator, here the signal quality is not particularly critical. We connect an oscilloscope to the other winding and observe the signal amplitude, changing the frequency, we find the one at which the amplitude will be greatest. We measure this frequency. We change the number of turns of both windings and repeat the operation. If the frequency measurements coincide, that's it, we have found the frequency we need. Changing the number of turns of the windings guarantees against errors. You can accidentally measure the resonance of a wound coil. This method excludes this. There may be several frequencies (harmonics) we need. So you can choose the most suitable one.

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