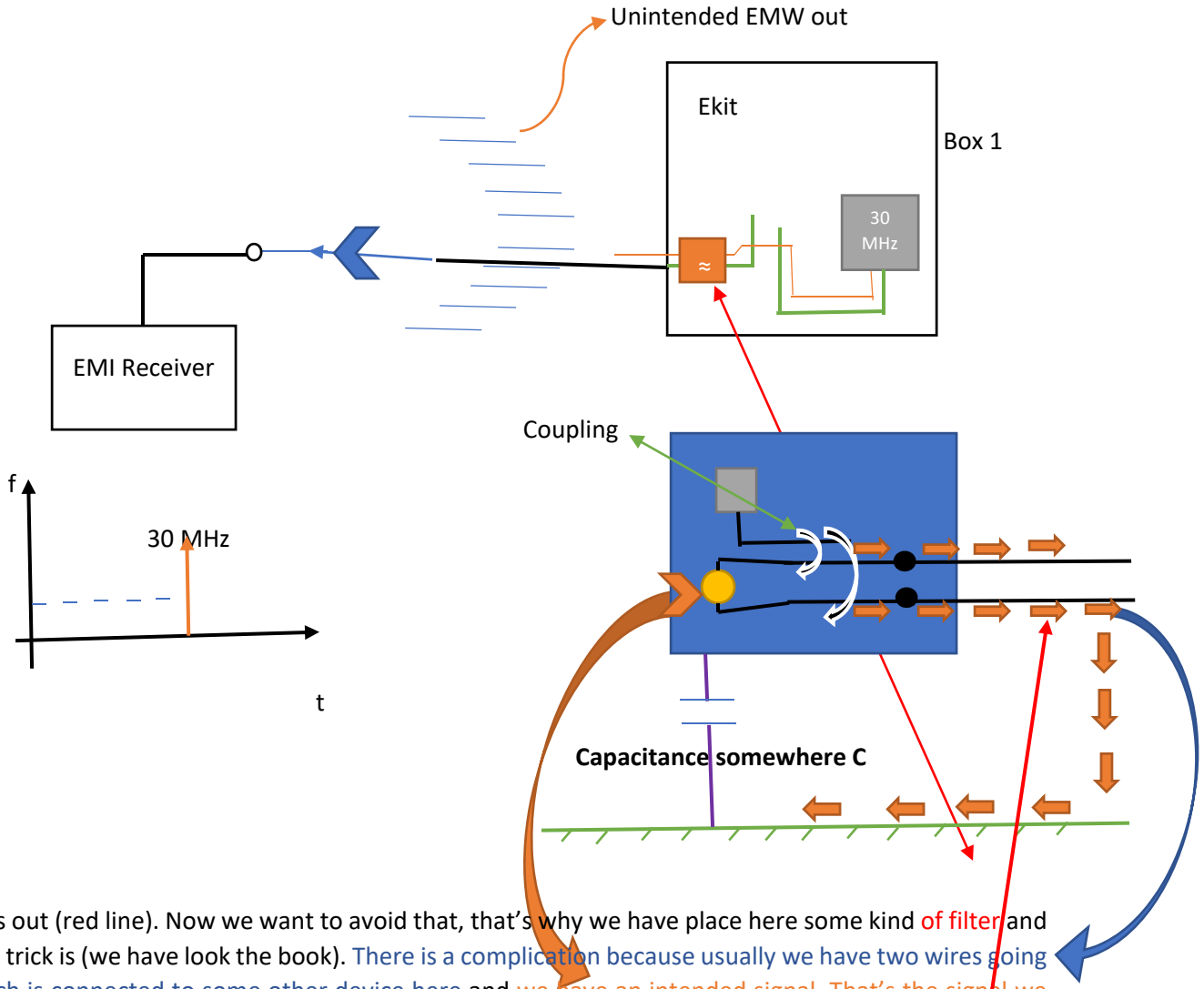
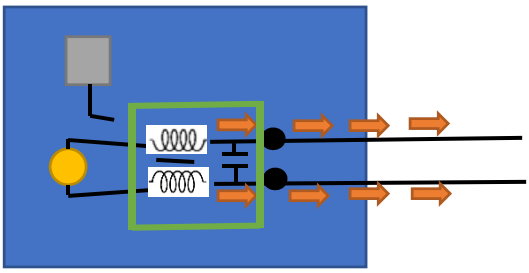
Systematic analysis

We have device on the test (electric kit). There are some cable attached to it. This cable radiates electromagnetic waves out (unintended). We pick up these waves, measure them and we have an EMI receiver here which shows us what the disturbances here. So we are looking in frequency domain for example, the pick is 30 MHz. We don't want that because there is a limit here you should not go. So what happens is in the inside (of box 1) there are something that produces 30 MHz. For some reason which is coupled with the line near together, whatever this is coupled generated here through the line



And gets out (red line). Now we want to avoid that, that's why we have place here some kind of filter and now the trick is (we have look the book). There is a complication because usually we have two wires going out which is connected to some other device here and we have an intended signal. That's the signal we want to gets to the other device here however we get from somewhere else (it's some coupling into this and this coupling is so called common mode) so we create a current in this line and also in the other line and they both are in the same direction then the two wire together adjacent an antenna something that's not wanted. This current is end here in somewhere and the main point is we always have some ground somewhere and there is a tiny capacitance here to ground. Also there is a **capacitance somewhere**. That means in that direction what physically happens it goes through this capacitance and can go back to the

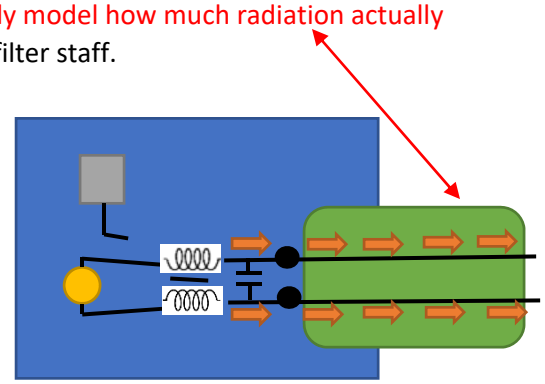
capacitance somewhere C. so it starts a loop of current and that is something that we want. That's why a filter comes in and basically the point is here (for systematically) that happens we can measure this 30 MHz pick (a lot of people go and adjust an inductor here and see that works, they put another inductor, another capacitor, another filter but that is not systematic). The means of systematic is that we first identify what is our problem let's say that is a 30 MHz signal and then create a 30 MHz signal in Microwave office then we can select proper filter which does it filtering first. At the end of the day what Professor want is, to measure some disturbance. We synthesizes the disturbances so we can get it somehow in Microwave office and that's the second part. Let's think about it later, first understand how we do filtering and on the PC we can select different filters, different inductors, chocks and so on in order to get filtering effect. Professor gave some references of devices (ref 8). We can get also a lot of information. In the video the guy mentioned some chock filter. First I have to just look the capacitors, inductors, chocks, see examples in the video. He gave another link of example and try to model that example (that is actually filtering without). If it works then go to the devices and the cool thing is that actually S parameters models for Microwave office. We can import S perimeters to AWR and simulate this actual device. The first point is to model whatever is done in the examples model in AWR. There we have to understand these common and differential model staff.



The equipment under test will be fixed or not will depend on the device now whatever my equipment under device is in order to do this but first it is fixed, examples from videos for example. Say we have a disturbance at 30 MHz or 50 MHz or 3 MHz also sometime we have broadband and there's a lot of disturbances. That's gonna be the second part of our simulation problem.

Software defined radio is not something to look into deep inside. We have a receiver here. From the receiver we got spectrum and this part is not need to stress about it's just a side note and it's not our topic. We can recall the signal and then we have it and somehow we have model the signal here as a source and Microwave office. That's gonna be tricky because professor doesn't know how to do that. Because we cannot brought just one or just 2 picks, we can just define the signal in microwave office but here we have signal like broadband which cannot be easily modeled in microwave office. It's a problem but it is beyond this thesis. Just assume we have signals and professor will give the signal such that we can implement that in microwave office but before we do real signal Professor suggest to create a signal of 30 MHz and we have a circuit board, we can connect it to generator that creates the exact signal then we can test whatever we have modeled. So no need to be worried about SDR.

Professor also included the things that radiates out something we can also model in microwave office so remember when we simulate we can model that and we can actually model how much radiation actually produced, that could be nice side effect tool. But first focus on the filter staff.



Electromagnetic interference design which is another topic using microwave office. As we have a half way verification so we have do staff both in microwave office and we build it and see does it work properly or not. Its half text book and half extended guide.