

Did you ever think about connection between the antenna connector and the radio card? If do not, you should.

Please consider the following chain:

antenna (usually SMA or N) connector - pigtail - the ufl socket in the wireless mini PCI card (radio).

the 100% SMA_to UFL cable ("pigtail") I have ever seen and tested was described as "made of very loss coaxial cable", so you can consider it as a very low loss element of the chain. It is not the case, and I will describe you and show why not.

As an typical example take the right_angle_SMA to UFL "pigtail". It is made of a tiny UFL plug then 15-20cm coax then right angle SMA connector.

All of elements are connected together. Is it a good coaxial cable with connectors for microwave frequency (2-6 GHz)? It depends on quality of the right-angle SMA connector and quality of connections inside it.

A few dollars pigtailed can ruin the VSWR of the antenna, because the "pigtail" has extremely bad VSWR.

Please see the FIG.3A and 3B



FIG.3A - A pigtail connects lab grade load to the VNA. Reference plane is at the SMA. Please note lab grade UFL_to_SMA

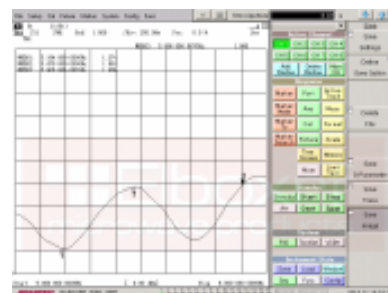


FIG.3B - Ideal VSWR affected by a low-cost pigtail

In this case the pigtail connects the laboratory grade 50 OHM load (that has close to ideal 1.0 VSWR itself) to the RF Component Analyzer. The tested frequency of the VNA (span) was set up to 5 - 6 GHz. And the measurement shows that "pigtail" ruins the excellent VSWR of the 50 OHM load - so will ruin the VSWR of antenna, and the realized gain of that tandem (antenna+pigtail) will be lower than only the losses of cable.

At figure 4 you can see the typical VSWR of that antenna (marketed usually as a "client stations" or "Integrated outdoor box" and so on) at the UFL reference plane. Not a very good VSWR isn't it ?

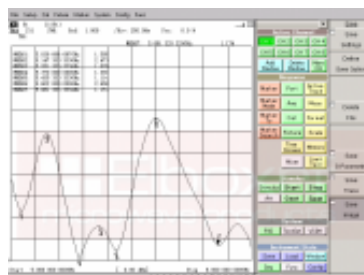


FIG.4 - VSWR more than 2.6 at 5.6 GHz

The problem was solved in Emctest new EMC WF-18 in that way, that we have designed the microstrip antenna, looking for the low VSWR at the UFL reference plane not at the SMA or N connector of the antenna. The impedance locus at the smith chart and VSWR (FIG.5) shows good VSWR at the whole antenna's frequency range. We have called this feature as an "controlled Impedance".

Please see good VSWR of EMC WF-18 measured - what is important - at the UFL reference plane. FIG. 5

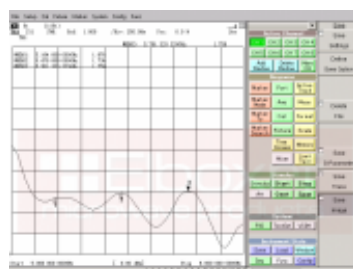


FIG. 5 - VSWR of the EMC WF-18 measured on the UFL side of the 20cm pigtail.