Antenna Analyzers / Vector Network Analyzers

Overview of antenna analyzers and inexpensive VNA's

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Overview

- We will be discussing one type of antenna analyzer and two types of Vector network analyzers (single and dual port)
- Due to time constraints we will only discuss The advantages and disadvantage of a few representative examples of these instrument. Due to recent Technical advances VNAs have gone from six figure cost lab instruments to very low-cost instruments that work in conjunction with a PC under software control.

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Antenna Analyzers

- An example of a typical antenna analyzer is the MFJ 259D. Cost $289.00 depending on source.
- The main advantage of this type of instrument is ease of use; however it does not always give correct information.
- The main reason for this is it measures at the end of a piece of transmission line. Transmission line transforms the impedance (resistance and reactance) of it's connection to the antenna to different value at the input of the line.

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Single Port Vector Network analyzers

- AIM 4300 is a typical exaomple of this type of instrument. Retail price $899.00
- This insturment can be calibrated to remove the effect of the feedline.
- It requires a USB comection to a PC and an installed program to operate it.
- For work on antennas this will give better results without the errors caused bly the feedline.

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Two port VNA's

- About 10 years ago Professor Dr Tom Baer in Germany invented a low-cost solution. Commercial unit of this type were in the 6-figure price range before this.
- His instrument was the VNWA 2. It is a full functional VNA that covers from 1 Khz to 1.2 GHz. Cost for this in kit form was about $300.00 depending on exchange rate from the QRP labs in England. This was discontinued due to problems with assembly of the small surface mount parts.
- As a result this was replaced with Version 3 which only comes assembled.

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VNWA 3/3E

- This costs $485.00 from Amazon.
- It includes a very compete software package that allow S peramiters, Time domain reflectometer, and spectrum analyzer functions.
- It also allows calibartion to remove feed line effects and test fixture effects.
- You can also measure filters, capacitors ane inductors with this tool.

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Nano VNA

- About the first of the year the Nano VNA was introduced. Ther are many chinese clones of this instrument for sale on the internet. I would only recommend the NANO VNA H4 from R & L. This is the current version from the original designer. Not a clone.
- This instrument has an internal rechargeable battery and a 4-inch display screen. It also can be operated with free software on a PC USB port. It is hard to use with the internal screen.

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Nano VNA

- It is much easier to use with the larger screen of a PC or windows tablet.
- The original version comes with the required calibration standards.
- It will display in graph and smith chart format.
- There are youtube vidios on how to use a smith chart that are accesble from the SIM Smith web site. Sim smith is also a very good free program to help understand transmission lines and matching networks

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NANO VNA

- The main limitation of this instrument is it will only collect 101 data point suring a frequency sweep so it is important to only sweep an small frequency range at a time.
- There is a learning curve to use the NANO VNA however there are many youtube vidios to to help with this.
- Questions

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