

Spectrum Analyzer Frequency Expansion

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Getting good equipment that functions above 10GHz can be expensive and difficult. Here are some ways of expanding the frequency range of a relatively low frequency spectrum analyzer by using external mixers. Using this approach allows a person to invest in a very capable lower frequency analyzer and use it on 10GHz and above with only a modest increase in expense and a modest reduction in function.

I have been using a number of lower frequency analyzers to good advantage such as the Ultra, RF Explorer, Anritsu MS2712E, and others and increasing their range up to 47GHz.

Modifying LNB's

The first project was to use a Norsat LNB for 10GHz as the heart of a front end. I used an input variable attenuator, the LNB, a bias T and an output attenuator. I was able to get -30dbm input to be the same on the output.



The second project was to take an L104 type of LNB and solder a piece of .085 onto the board and remove the small wire that acts as a monopole probe into the waveguide. With a very small coupling capacitor, it makes a good way to feed a coax signal into the LNB and makes a good frequency converter. It is desirable to change the crystal to a TCXO for greater stability.



The series of RF Explorer spectrum analyzers make a good low cost spectrum analyzer. Recently the Tiny SA Ultra has run in first place. It features a 200Hz RBW filter, is very inexpensive and has an excellent frequency range.



Higher Bands

You can also make your analyzer receive on 24 and 47GHz.

I used the RF Explorer Signal Generator to provide an LO signal at the same frequency as my HP8563AC and at the same level. I then hooked up one of the standard HP 11970 mixers to provide the down-converted signal. It worked extremely well. The limitations are that there is no input attenuator, and the IF bandwidth is a little limited at an IF of 315MHz. However, you end up with a hand held, battery operated spectrum analyzer at 24 or 47GHz. Alternate sourced of mixers are the "Phillips" boxes that were around surplus and a home brew mixer

using a Qualcomm diode designed by Kerry Banke, N6IZW. The plans are on the San Diego Microwave Society website.



Phillips mixer.

This method seems to work fine and may even have some advantages. You may also find some interesting methods.

Here is one that may seem obvious. Use a broad band mixer and a broadband LO. Here I have the HP5764A with an SG-1 15GHz signal generator. The 64A is good from 2-18GHz and the IF can be as high as 500MHz.

