DSA Spectrum Analyzer Tutorial: Optimizing Peak Markers

Date: 12.30.2014

Solution: Spectrum analyzers are extremely helpful tools for visualizing signals in frequency space. This note will describe how to use settings to minimize error when performing peak measurements using a Rigol DSA Spectrum analyzer.

Radio Frequency signals, especially continuous wave (CW) signals, have a finite frequency width. Spectrum analyzers, like the Rigol DSA series, use the Resolution Bandwidth Setting (RBW) to determine the bandwidth of the filter used analyze each resolution. For a fixed span, smaller RBW settings will equate to smaller frequency "steps" and finer frequency resolution measurement capabilities.

If the bandwidth of the source is less than the RBW setting of the spectrum analyzer, the resultant spectrum analyzer trace will have a finite width and a shape very much like a Gaussian or Bell curve as shown in Figure 1.

In Figures 1through 4, the input is a fixed 10MHz Sine wave. The only difference is the RBW setting on the DSA. As you can see, the width of the trace decreases as the RBW decreases. This is because the width of the RF input is less than the RBW value. We are effectively viewing the width of the RBW filter.

It's also important to point out that the shape of the peak of the trace also changes. It goes from a "bubbled" shape with no real "peak" to a more pointed shape. Traces with "bubbled" shapes may have peak readings that vary because there is not a singular point that is has the highest amplitude.

To achieve high accuracy peak measurements, you should use the smallest RBW
setting that you can. If you have varying peak values, try lowering the RBW value
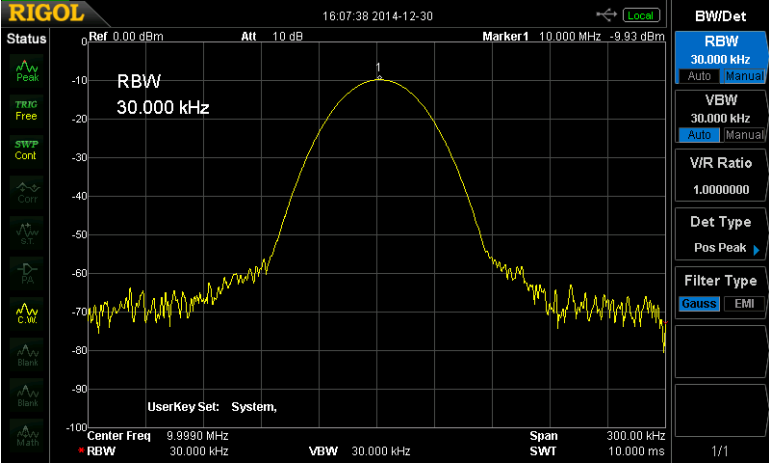and retest.
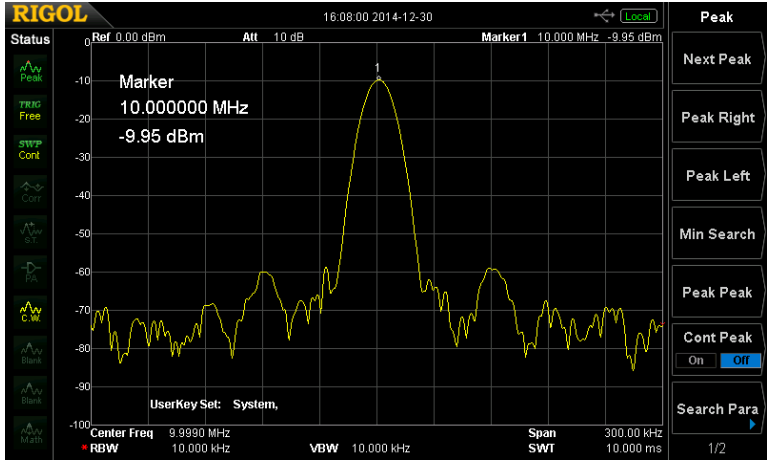

Figure 1: 10MHz input, 300kHz span, RBW = 30kHz

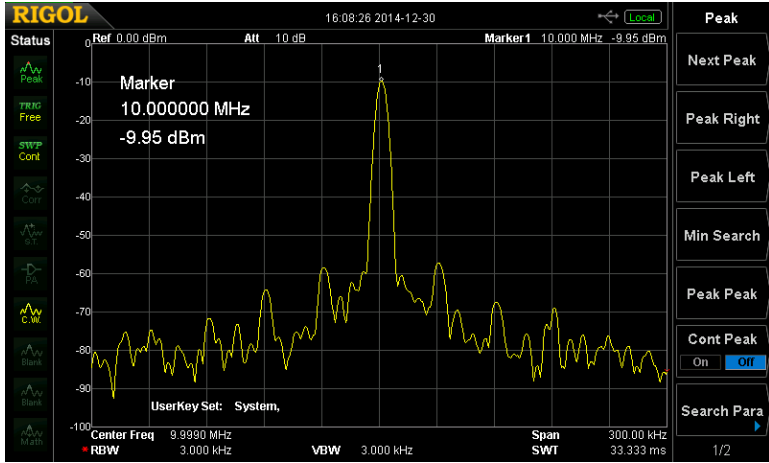*Figure 2:* 10MHz input, 300kHz span, RBW = 10kHz

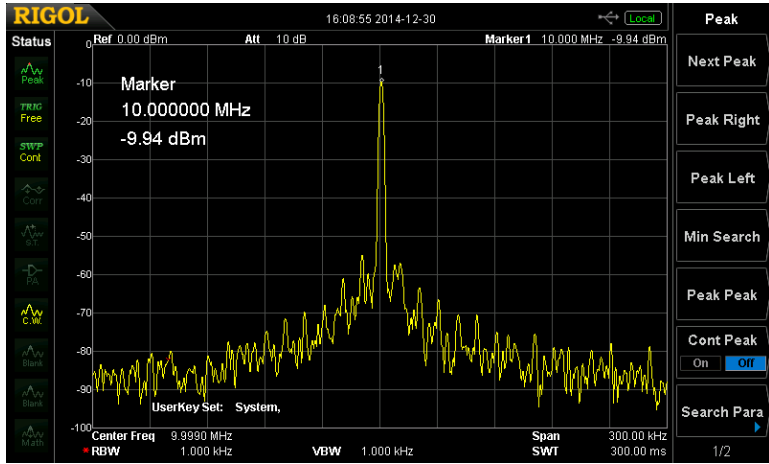*Figure 3:* 10MHz input, 300kHz span, RBW = 3kHz

Figure 4: 10MHz input, 300kHz span, RBW = 1kHz

Headquarters

RIGOL TECHNOLOGIES, INC.

No.156,Cai He Village,

Sha He Town,

Chang Ping District, Beijing,

102206 P.R.China

Tel:+86-10-80706688

Fax:+86-10-80705070

Email: support@rigol.com

USA

RIGOL TECHNOLOGIES,USA INC.

102000 SW Allen Blvd, Suite C

Beaverton

OR 97005, USA

Toll free: 877-4-RIGOL-1

Office: (440) 232-4488

Fax: (216)-754-8107

Email: info@rigol.com

EUROPE

RIGOL TECHNOLOGIES GmbH

Lindbergh str. 4

82178 Puchheim

Germany

Tel: 0049- 89/89418950

Email: info-europe@rigoltech.com