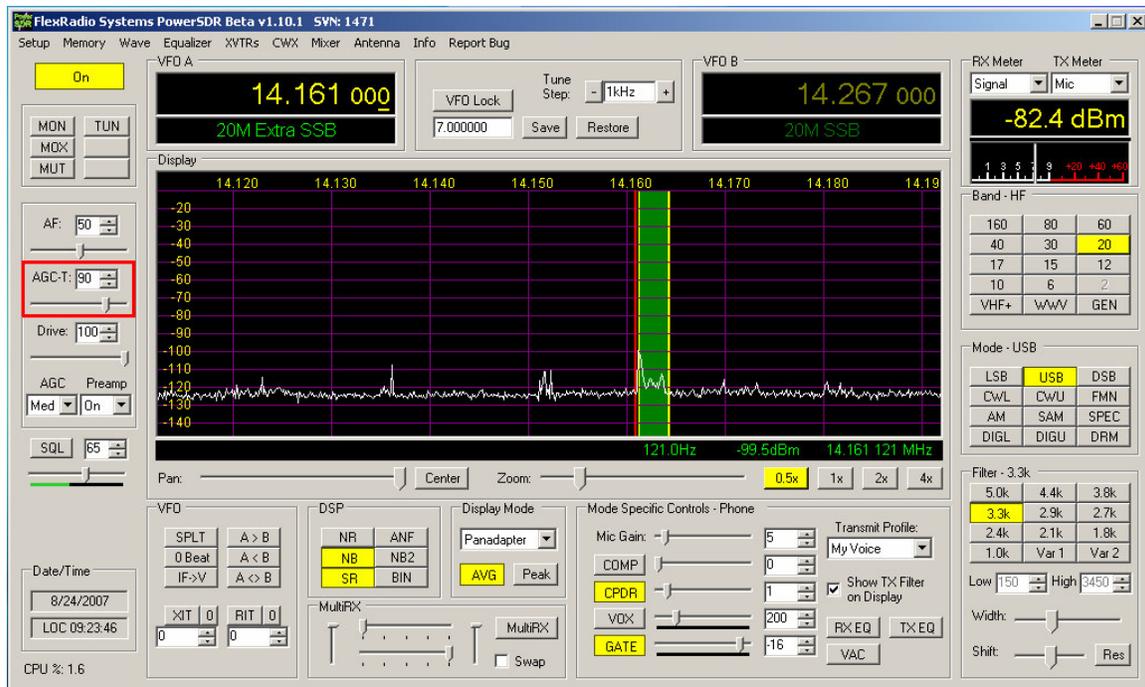


How to Effectively Use the PowerSDR 1.x AF [Gain] and AGC-T (AGC Threshold) Controls

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There have been numerous questions asked related to the use of the AGC-T (AGC threshold) control on the PowerSDR 1.x console. As compared to a traditional radio, the AGC-T control *acts* like a RF gain control. To effectively describe what the AGC control really is, how it works and how best to use it, you must also include the interaction with the AF [gain] control as well.

Both the AF and AGC-T controls are found on the left side of the PowerSDR 1.x console. See the red box in the graphic below.



In a traditional radio, the RF gain is controlling the gain of one or more IF stages in the receiver. A software defined radio does not have an IF amplifier stage, so the PowerSDR AGC-T control is not exactly equivalent to the RF gain control on a traditional radio, but the resulting behavior is similar.

Quoting from the PowerSDR Operations Manual

"[The AGC] control sets the maximum gain of the AGC. [..snip..] Although strictly speaking this control does not set the RF gain, it is denoted as such on the front console as its operational use is identical to that of a true RF gain control."

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So what is the most effective way to use the AGC-T control in PowerSDR?

The AGC-T control is used to maximize the signal to noise ratio (S/N) based on band conditions (QRN). As you reduce the AGC-T, there is a "sweet spot" where weak signals will appear to "jump out" of the noise. This enhances the reception of weak signals.

The customary technique with traditional radios is to utilize the RF gain *instead* of the AF gain to set your listening level. With software defined radios, as the AGC-T is reduced, you will notice a greater difference in volume level between stronger and weaker signals since the gain is not being increased for the weaker signals. This increase in dynamic range can help to reduce listening fatigue since the lower-level background noise tends to be reduced even further relative to other signals.

This may not always be desirable however. For example, consider participation in a roundtable. You may find that this large difference between signal volume levels causes you to keep adjusting your AF [gain] constantly, in order to compensate for the very quiet (yet very readable) stations, and the louder stations. In that case, you may want to increase the AGC-T and back off on the AF [gain] so that the volume levels of all signals will be much more uniform – although with a higher background level on the weaker stations.

In practice, you want to set the AGC-T control as low as possible to comfortably hear the signal of interest. But be careful, if you reduce the AGC-T too much, you lose sensitivity

Step-by-Step Procedure

- 1.) Set the AGC-T control to 90 (default setting)
- 2.) Set the AF [gain] control until you have a little more volume than you normally use to listen to the radio.
- 3.) Leave the AF [gain] setting as is and decrease the AGC-T until you achieve a comfortable listening volume.
- 4.) For weak signal reception, you may have to increase the AF [gain] a little bit if you have to decrease the AGC-T more than usual so that you can hear the signal in question

This is a great technique for working CW and narrow bandwidth digital modes, such as PSK31 when using a very narrow RX filter (less than 100 Hz). Selecting a small filter can increase the power within the passband of the filter. Reducing the AGC-T will significantly improve the S/N ratio making the filter more effective for weak signal reception, and will greatly reduce the psycho-acoustic perception of ringing that naturally occurs when using extremely narrow filters. Careful adjustment of the RF Gain level while using very narrow filters, in conjunction with the DSP NR function, can allow copy of signals that are virtually at the noise floor.

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