Calibration of the FFT Spectrum Analyzer.

This example applies to 8 bands but for other bands, the procedure is the same.

1. Enable the calibration log by changing the following setting in the settings.h
   a. #define CalibratieLog 0 → change to 1
2. Compile and upload to your ESP32
3. Open the Serial monitor to see what going on.
4. Make sure the Analyzer is running with settings FILTER: NONE. You can change it by fast double clicking the mode button.
5. Hook up a audio source to the line in that is able to play noise. You could use your computer for that. However, keep in mind that ground loops can be a buzz killer here. If your computer is already hooked up with the usb cable then you might consider hooking up the audio without ground. Try what gives you the best result.
6. Set the volume to what you think is acceptable, you can always change it later. I set the volume of my pc to max while using the line out of the computer.
7. Now, play the noise pattern you want to calibrate. For example white noise.
8. Wait a few runs, then clear your serial monitor window and wait for the next calibration output. It should look like this:
   a. BandCalibration_XXXX[8]= { 1.00, 2.77, 3.09, 3.37, 3.96, 4.01, 4.02, 4.52};
      If your analyzer is using more channels, the more numbers this line will have. (8,16,24,32 or 64)
9. In the FFT.h tab in your sketch, find the following lines
   static double BandCalibration_Pink[8]=
   { 4.08, 1.56, 1.00, 2.80, 3.23, 3.63, 6.19, 1.65 };
   static double BandCalibration_White[8]=
   { 25.84, 3.43, 1.10, 2.95, 3.37, 3.39, 5.46, 1.00 };
   static double BandCalibration_Brown[8]=
   { 2.72, 1.17, 1.00, 3.34, 4.83, 5.57, 11.18, 3.08 };
10. As we calibrated with white noise, these calibration values should be applied to the White values:
    a. static double BandCalibration_White[8]= { 25.84, 3.43, 1.10, 2.95, 3.37, 3.39, 5.46, 1.00 };
    b. Now replace this line with the line you copied from the serial window
    c. BandCalibration_XXXX[8]= { 1.00, 2.77, 3.09, 3.37, 3.96, 4.01, 4.02, 4.52};
    d. Rename it to: BandCalibration_White[8]= { 1.00, 2.77, 3.09, 3.37, 3.96, 4.01, 4.02, 4.52};
11. This concludes the calibration. Don't forget to change the CalibratieLog to 0 because the calculation of the calibration value and printing them comes at the price of speed. Now compile and upload.
12. Now, with the noise source still hooked up to your system, after the upload is done and the unit is playing, double press the mode button until you see FILTER: WHITE. It will now use your calibrated values.
13. Do the same for all the other filters if you like.