Calibration Analysis with a new amplitude, $\mathrm{A}_{in} = 850mV$

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Contents

1 Introduction

The amplitude of the input and output voltage should be 850mV. However, in our case, it was 650 mV. Therefore, we applied this change and re-run for 19 different frequencies.

In the this document, we are going to analyze which orders of memory and polynomial are required to match minimum THD requirmenet (-80 dB).

2 Calibration: memXpoly9

From the figure below, we observe that higher frequencies lead to a greater number of harmonics. This implies that the polynomial order should be at least 9.

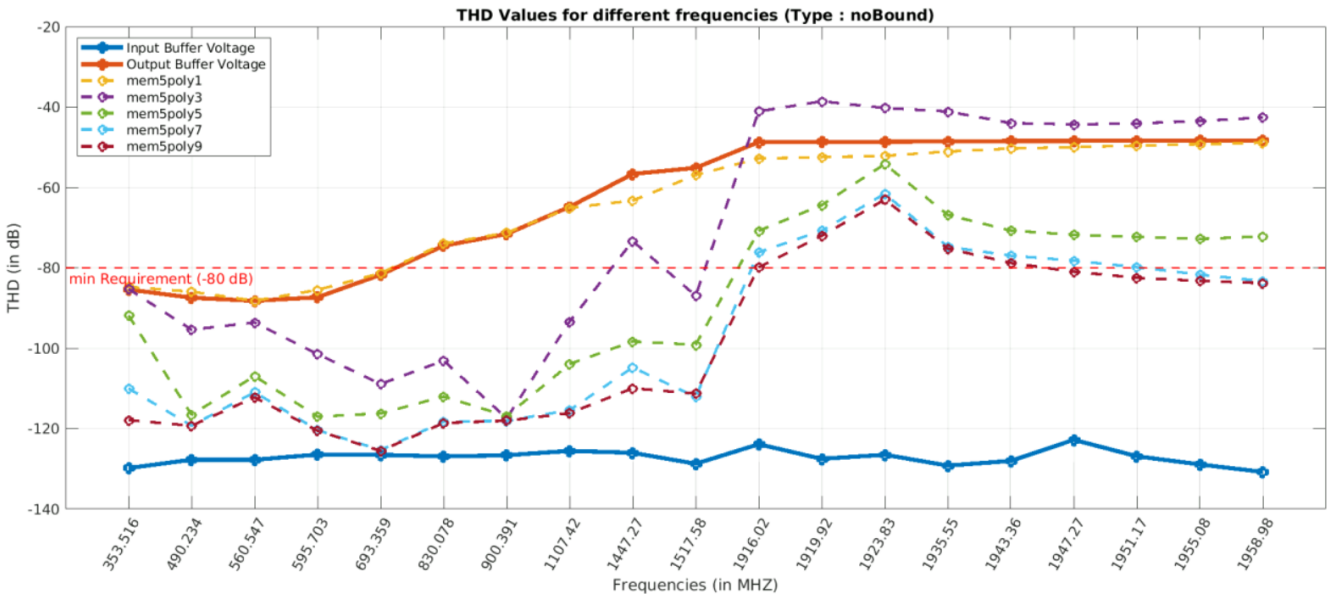

Figure 1: THD values for polynomial orders 1-9

To determine the required memory order, we will analyze the optimal value for calibration by plotting different memory orders on a single graph, while keeping the polynomial order fixed at 9.

2.1 Memory Order 0-5

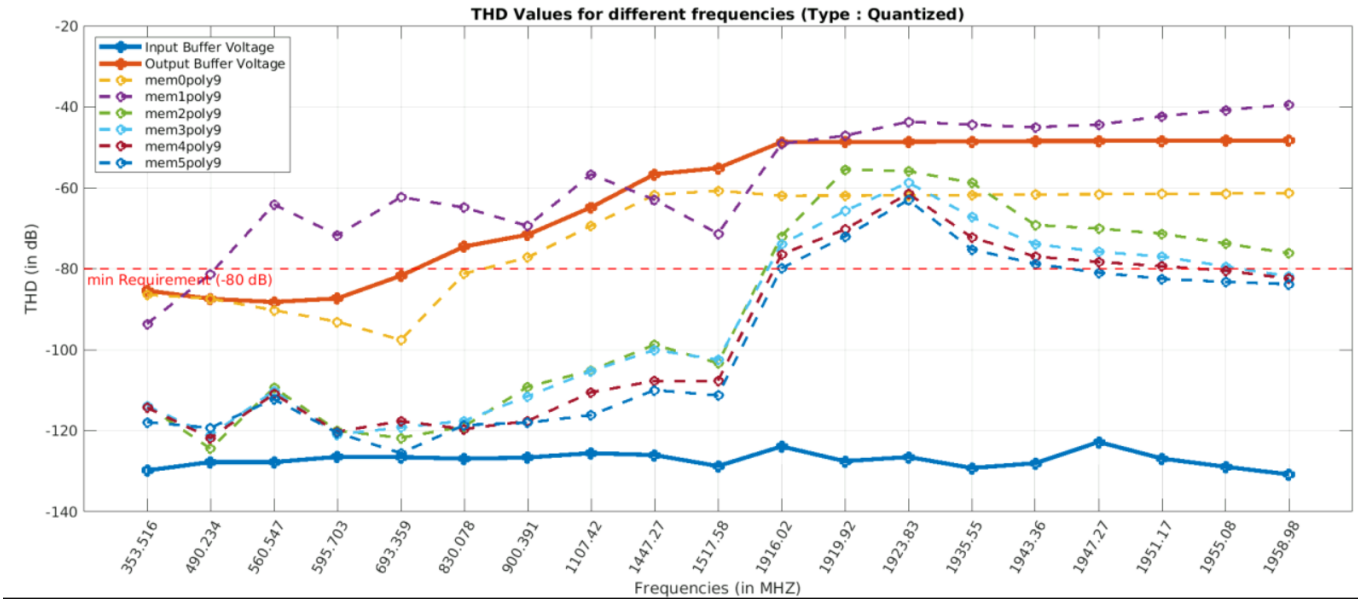

Figure 2: THD values for memory order 0-5

2.2 Memory Order 4-9

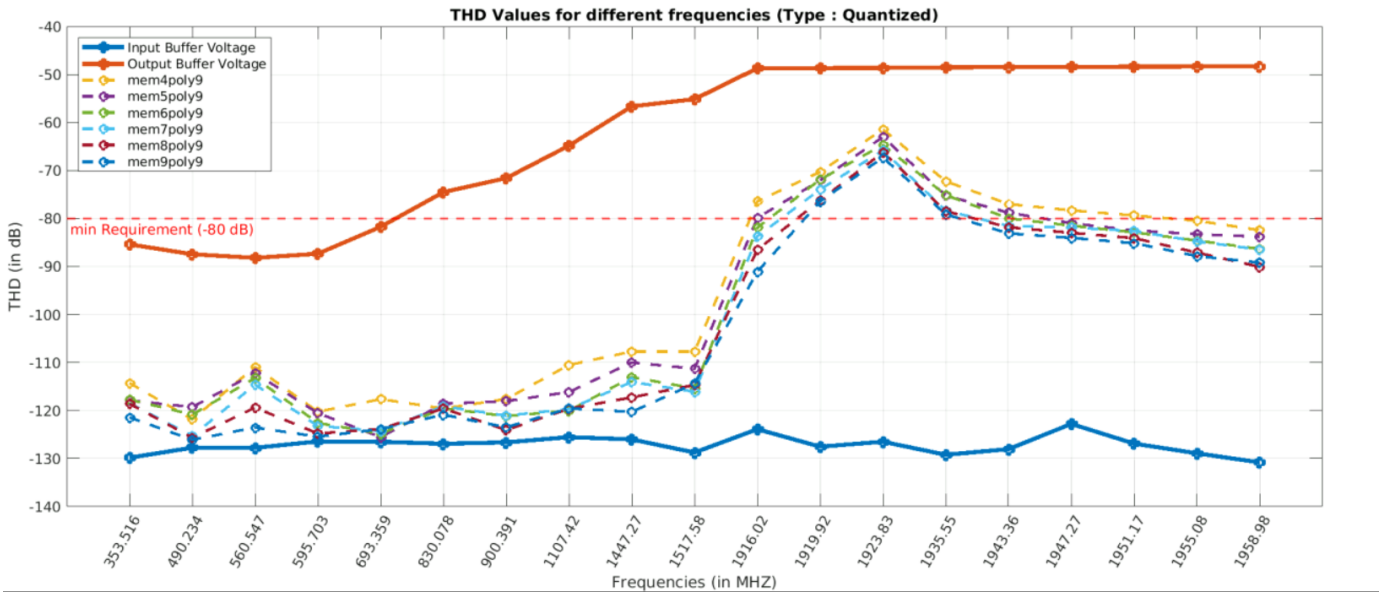

Figure 3: THD values for memory order 4-9

As you can see from these two graphs, there are three main problematic frequencies that need to be studied.

2.3 Three critical frequencies

The critical three main frequencies are as follows : 1.919 GHz 1.923 GHz and 1.935 GHz.

2.3.1 Input Singal Spectrums

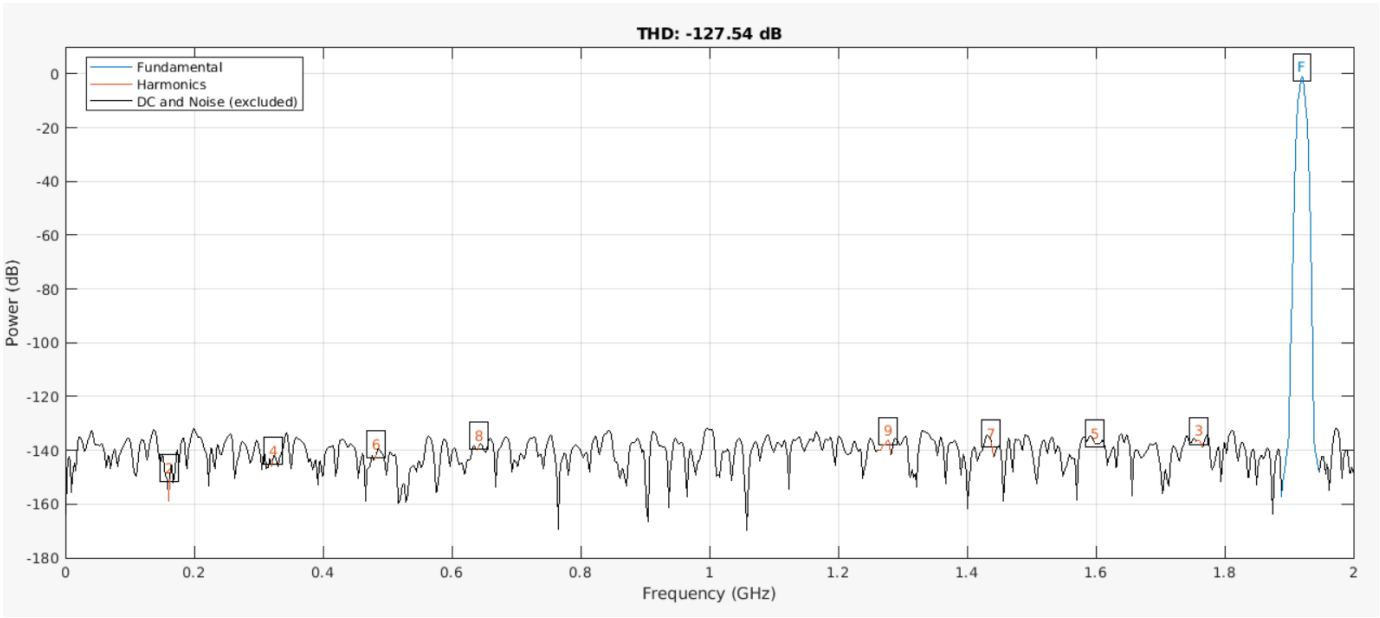

Figure 4: Input Voltage Spectrum @ 1.919 GHz

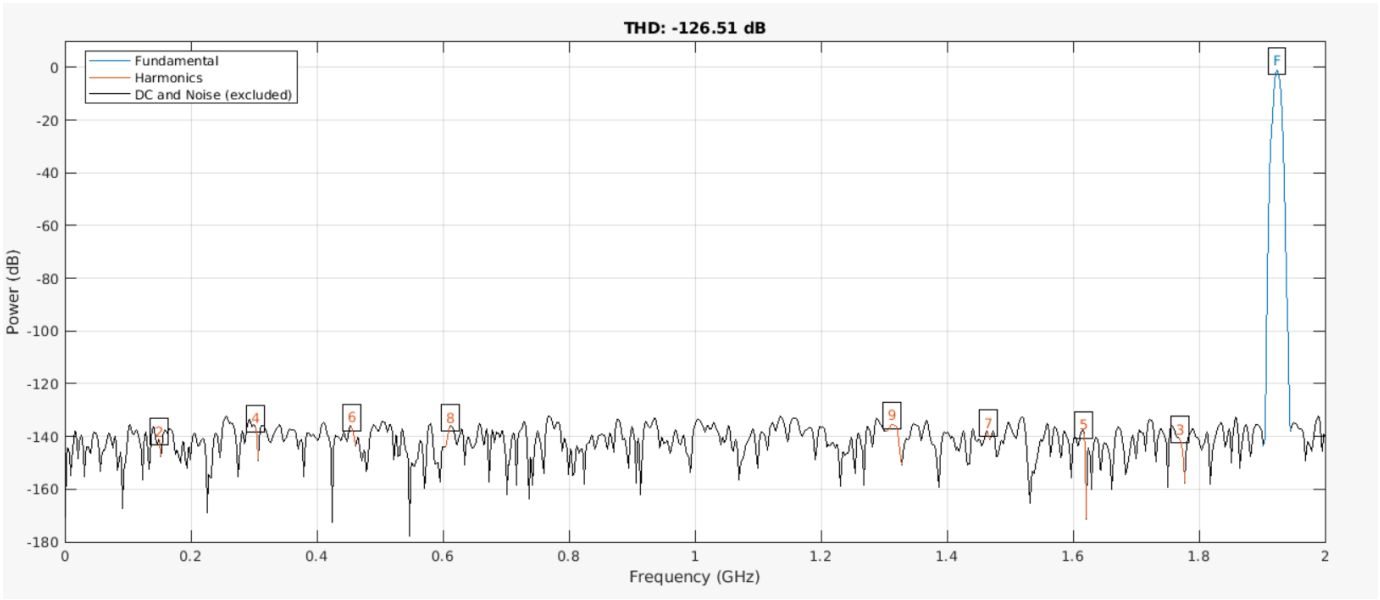

Figure 5: Input Voltage Spectrum @ 1.923 GHz

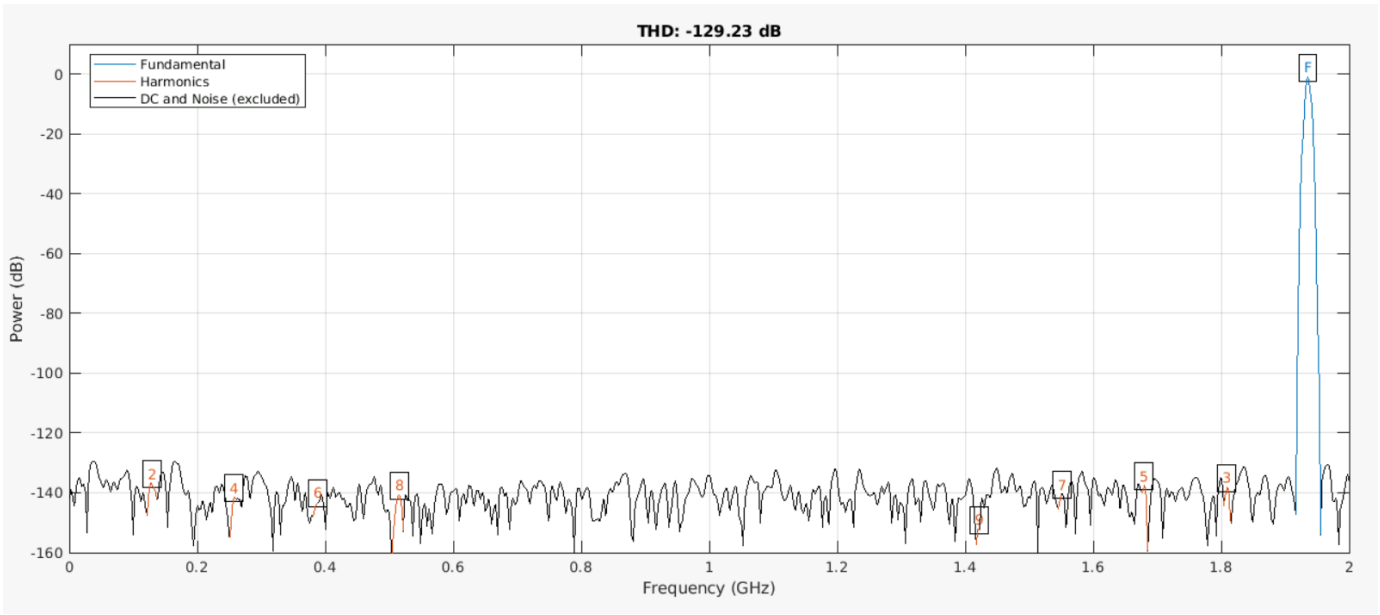

Figure 6: Input Voltage Spectrum @ 1.935 GHz

From these graphs, the input spectrums look fine.

2.3.2 Output Singal Spectrums

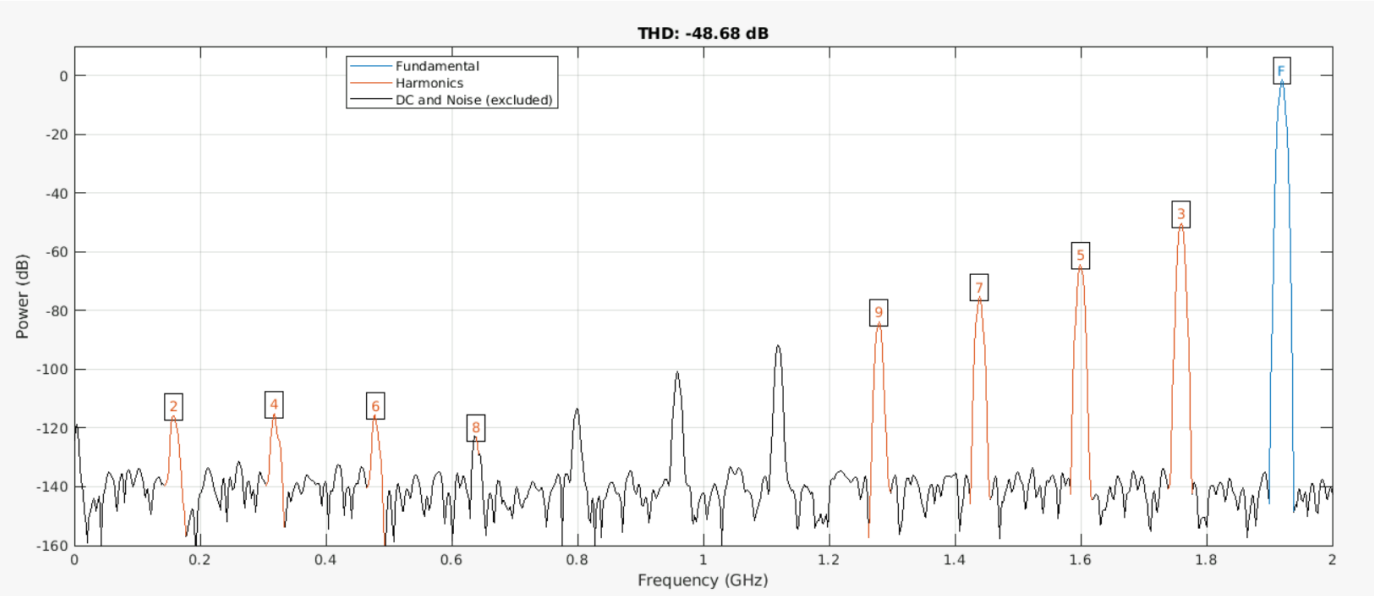

Figure 7: Output Voltage Spectrum @ 1.919 GHz

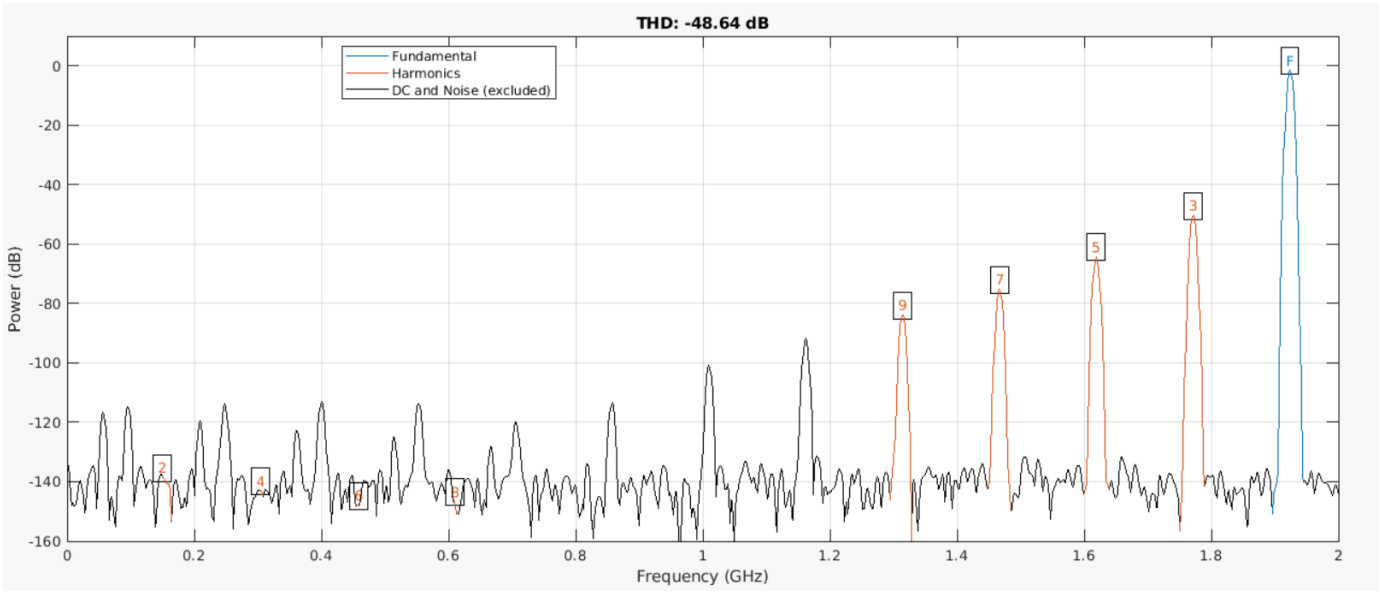

Figure 8: Output Voltage Spectrum @ 1.923 GHz

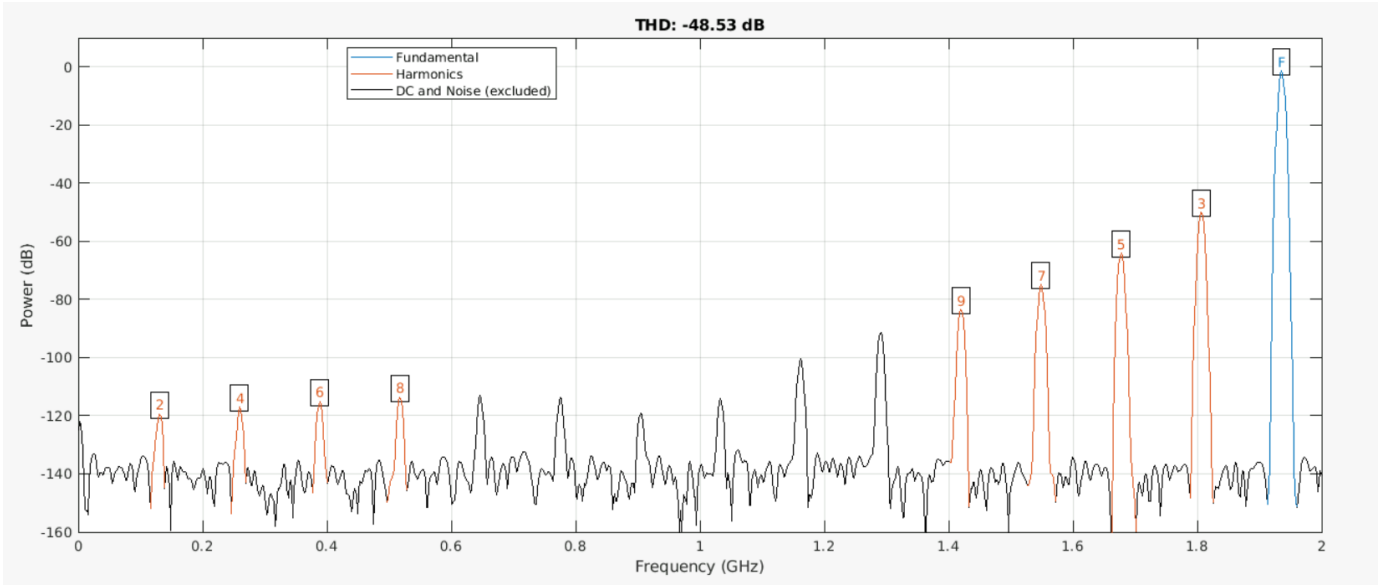

Figure 9: Output Voltage Spectrum @ 1.935 GHz

From these graphs, the output spectrums are looking what we expect.

2.3.3 Calibrated Singal Spectrums

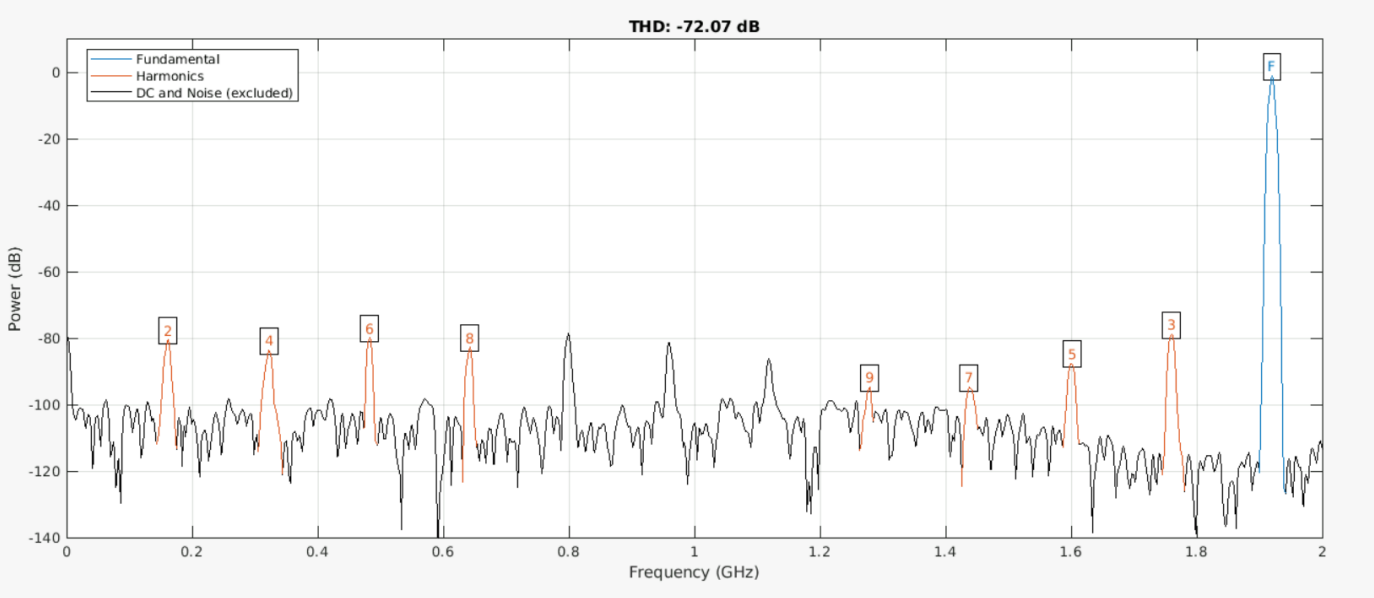

Figure 10: Calibrated Voltage Spectrum @ 1.919 GHz

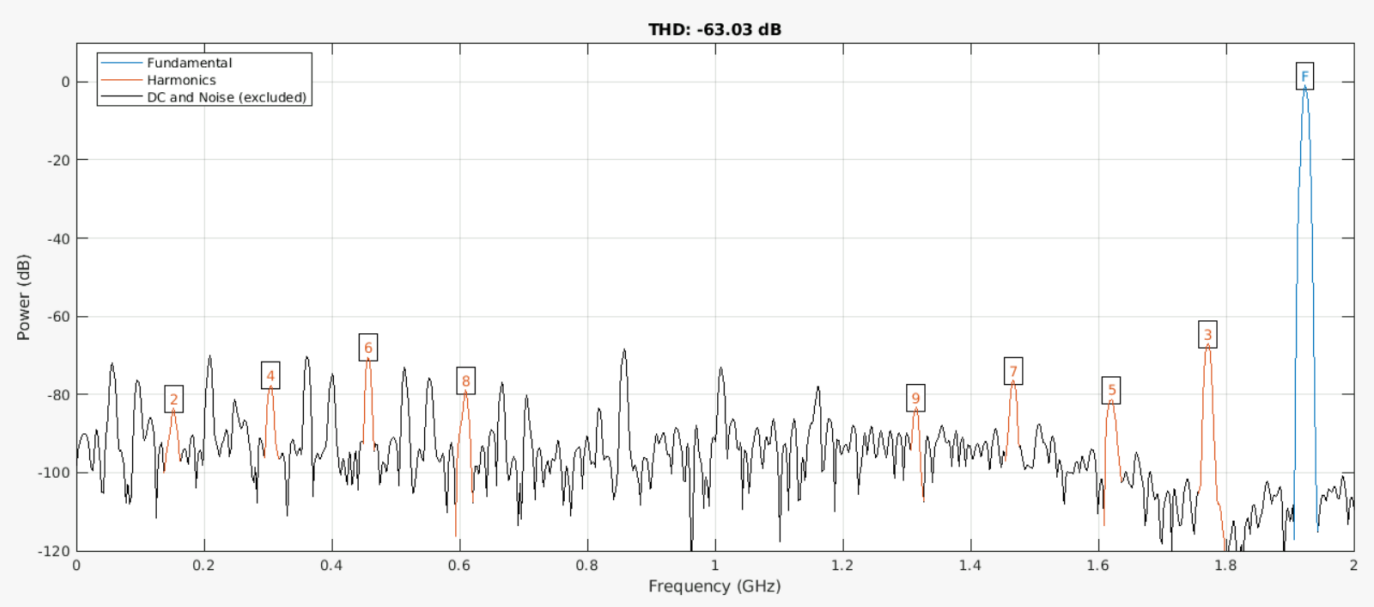

Figure 11: Calibrated Voltage Spectrum @ 1.923 GHz

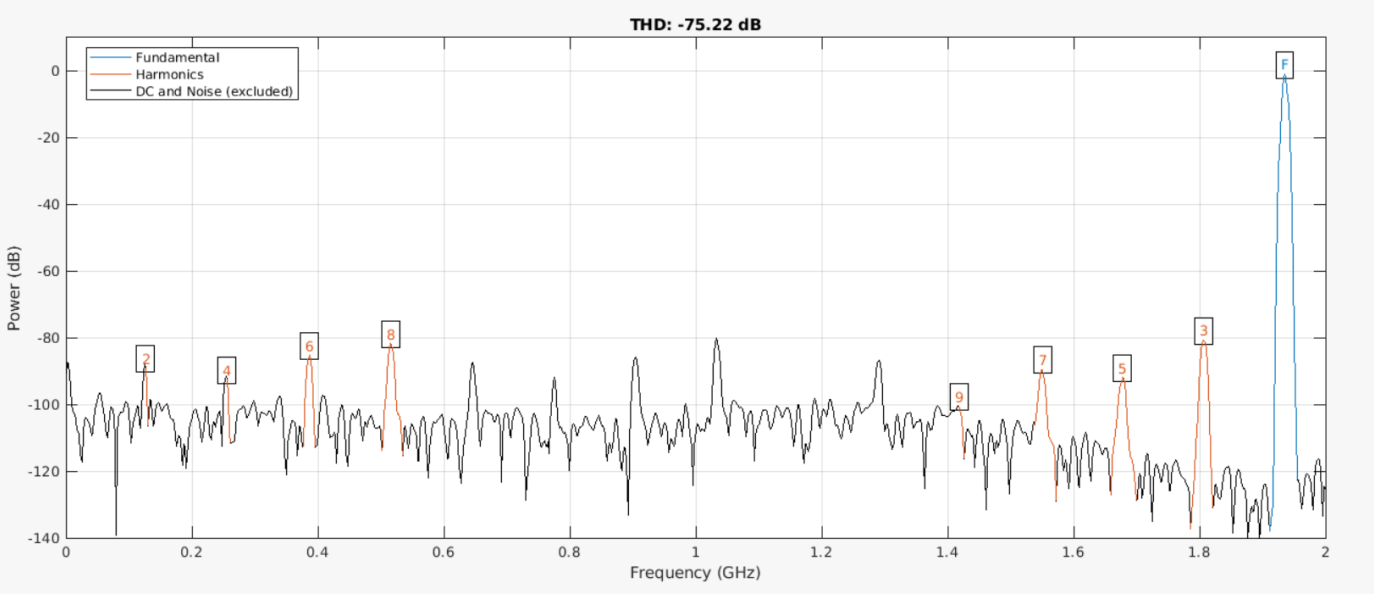

Figure 12: Calibrated Voltage Spectrum @ 1.935 GHz

From these graphs, the problem might be the even harmonics or dominant 3rd harmonic.