

# TRF3704 Baseband Characterization

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## ABSTRACT

Large input bandwidth of an IQ modulator is one of many key concerns for certain wideband applications. The TRF3704 can support an input bandwidth up to 1 GHz. This app note characterizes the baseband bandwidth performance of the TRF3704.

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## 1 Introduction

The TRF3704 is a complex modulator that takes in two baseband signals (I and Q) and converts them to a single RF output frequency. Characterizing the baseband response of the modulator requires measuring the RF output power while sweeping the input frequency across the desired band. To measure the baseband response independent of the RF output response, the Local Oscillator (LO) must be adjusted for every measurement to keep the output frequency constant.

## 2 Measurement Setup

Figure 1 shows the functional block diagram for the TRF3704 and the test setup. The LO input is driven single-ended. Even though the I and Q inputs are differential, for this test only one port is driven single-ended; the effective loss in gain due to this approach is inconsequential to the measurement. 50-Ω terminators are placed on the BBQP, BBQN, LON, and BBIN inputs. Throughout the experiment, the power of the LO and the input frequency remain a constant 8 dBm and -8 dBm, respectively. The 1.7-V common mode is supplied externally to each pin. The baseband inputs are all AC coupled.

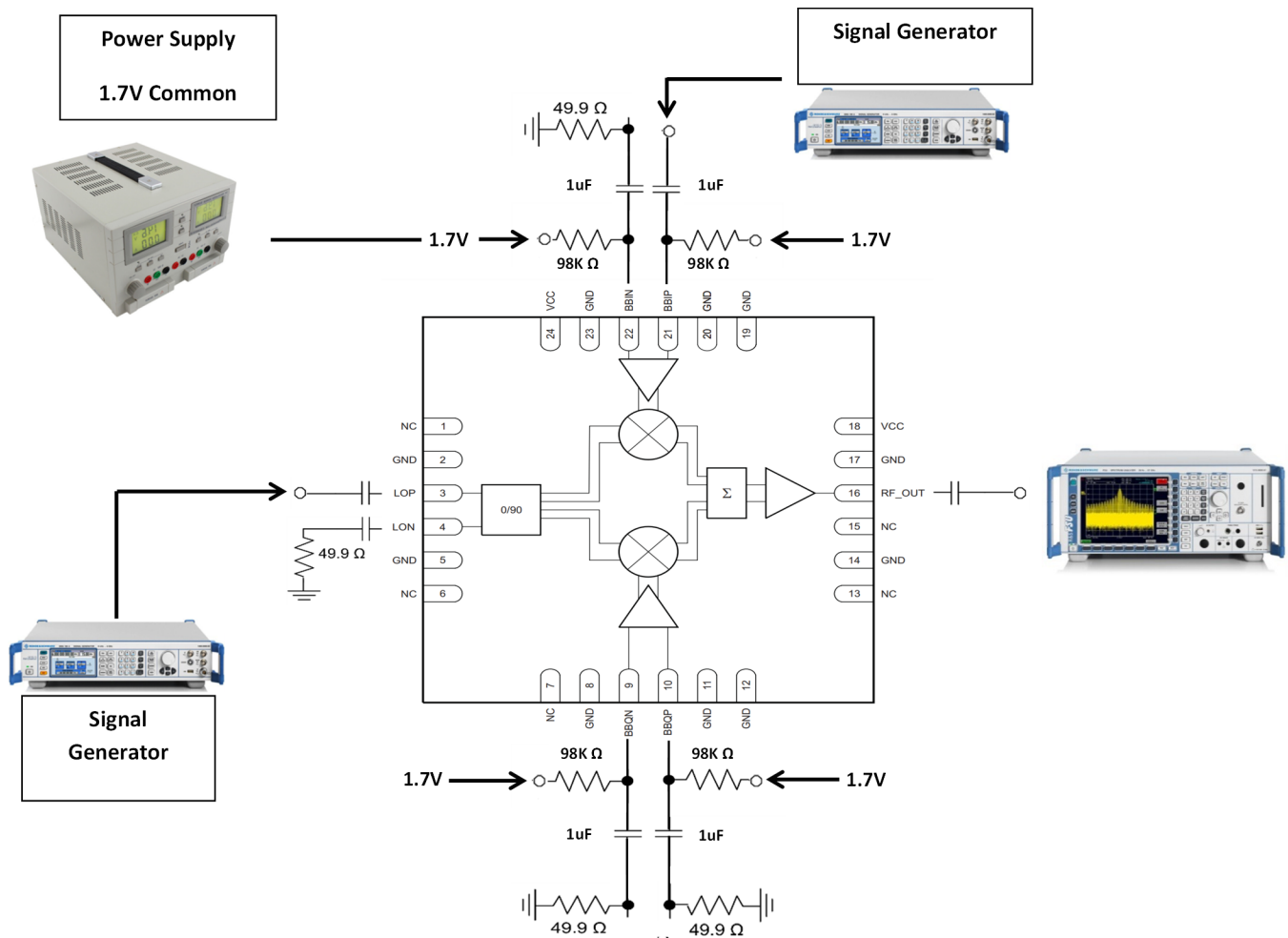


Figure 1. Functional Block Diagram and Experiment Setup

### 3 Results

Figure 2 shows the baseband bandwidth performance results.

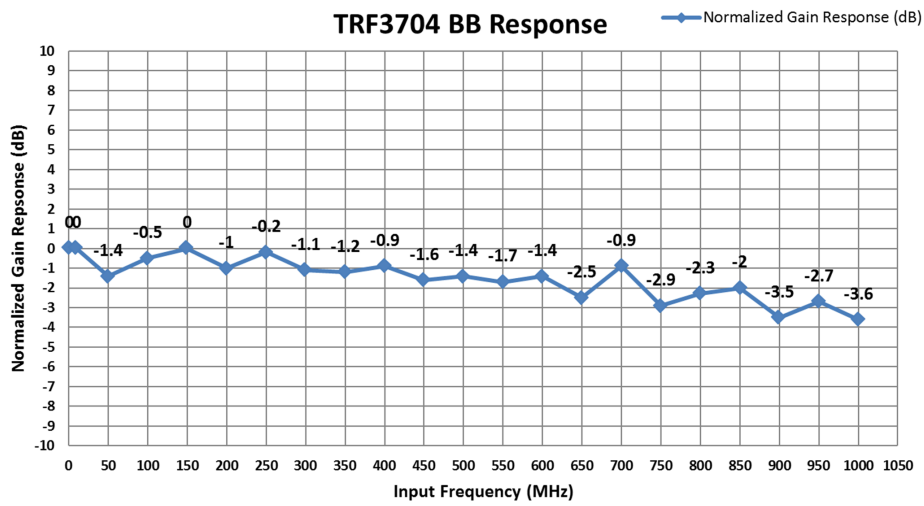


Figure 2. Normalized Gain vs BB Frequency

### 4 Analysis

The input frequency is swept from 10 MHz to 1.1 GHz and the LO is adjusted for every measurement to keep the RF output frequency at a constant 3 GHz. The maximum gain slope is 3.6 dB over 1 GHz.

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