

Half_IF_Mixer

Where To Find This Example

Select **Help > Open Examples...** from the menus and type either the example name listed above or one of the keywords below.

Or in Version 13 or higher you can open the project directly from this page using this button. Make sure to select the **Enable Guided Help** before clicking this button.

Open Install Example

Design Notes

Half IF Mixer

This project illustrates the half IF heterodyne receiver problem described in chapter 5 of Behzad Razavi's book "RF Microelectronics":

If there is an interferer at $(wIn+wLO)/2$ and both the blocker and the LO experience significant IM2 distortion, the blocker will appear at $|2*(wIn+wLO)/2 - 2*wLO| = wIF$ ($wIF=wLO-wIn$)

This project uses MIXER_F to set the dBc of the 2,2 mixer product, which represents $2*wRF +/- 2*wLO$.

In this example we have:

- $wIn = 30$ GHz, which is the QAM modulated signal.
- $wLO = 40$ GHz
- $(wIn+wLO)/2 = 35$ GHz, which is a tone with tunable power INTF_dBm.
- $wIF = 10$ GHz

The P1dB and IP3 of the mixer have been set artificially high to remove the compression effects from the output.

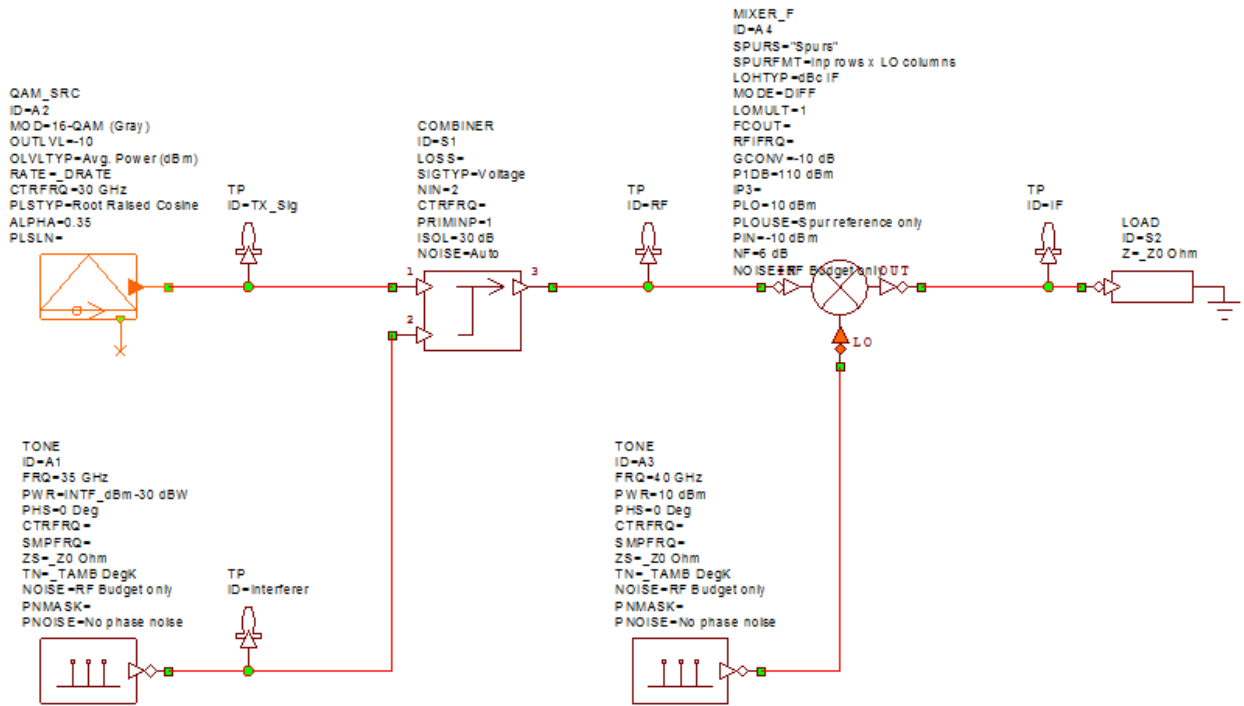
In the "Spectrum" graph the interferer appears as expected at IF = 10 GHz along with the downconverted modulated signal. It also appears at IF/2 = 5 GHz as a result of the downconversion.

The band centered at 15 GHz is the result of the 2,-2 product, where we have:

$$|2*wLO - (wIn + (wIn+wLO)/2)| = 15 \text{ GHz.}$$

System Diagram - System Diagram 1

INTF_dBm-1



Graph - Spectrum

