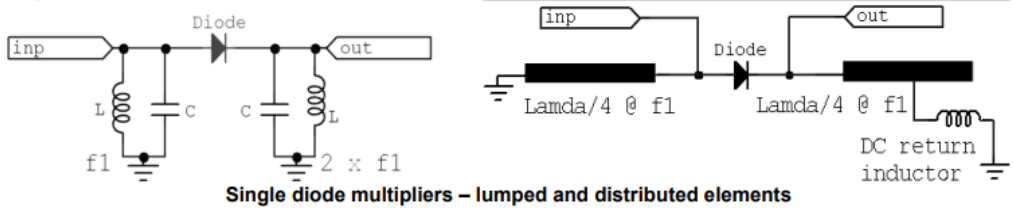
Configuration 1

https://docs.ampnuts.ru/eevblog.docs/_Materials/Frequency_multiplier_circuits_survey_and_theory_ROSU.pdf

The additional diode results in the suppression of even order products, the enhancement of odd order products, and the elimination of the bias resistor.

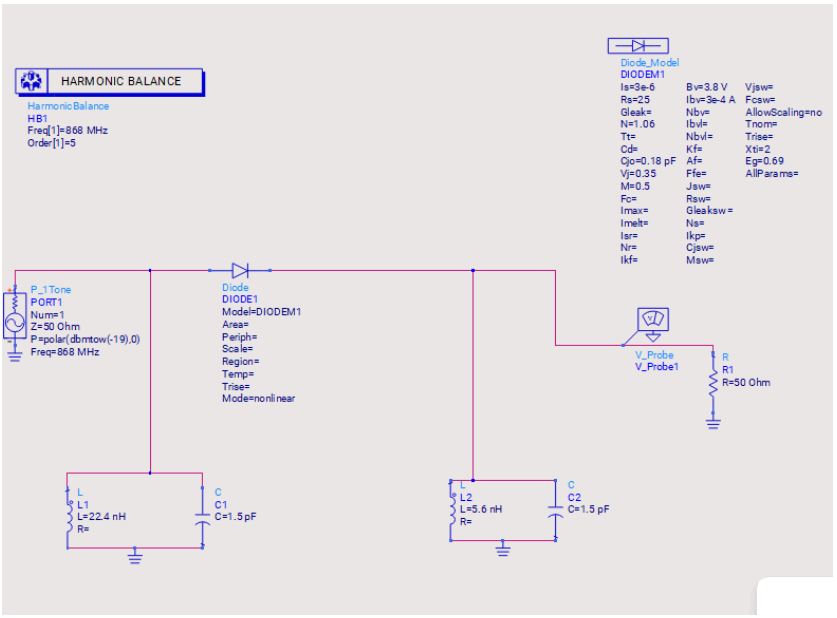


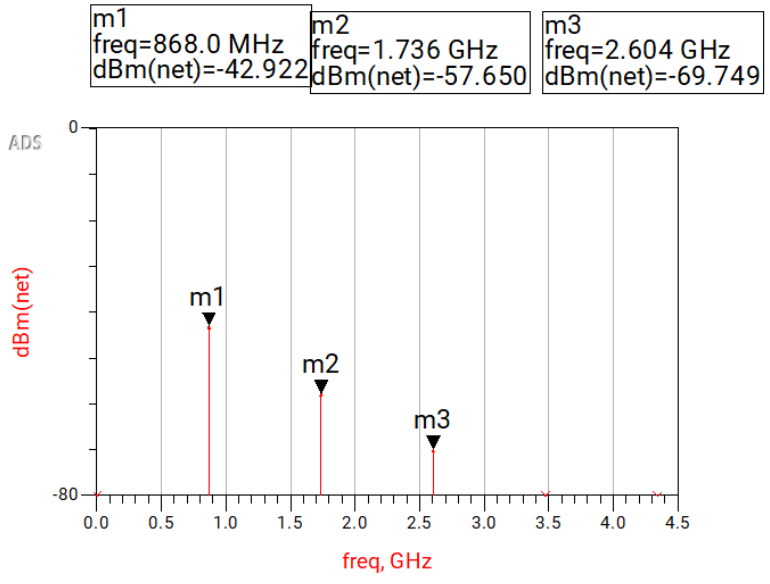
Single diode multipliers – lumped and distributed elements

The stub at the left is a quarter-wave transformer. It transforms the short to open and decreases the f0 reflecting from the diode.

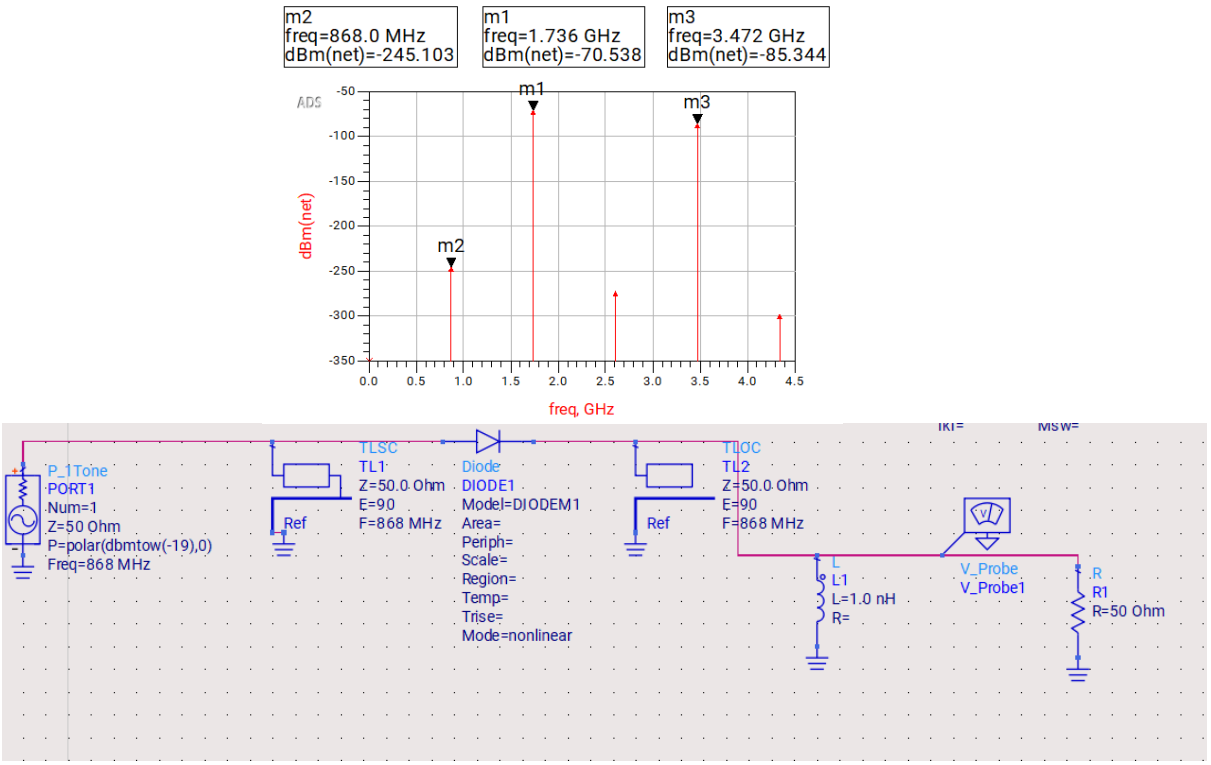
The stub at the right is a quarter-wave transformer. It transforms the open to short and sens f0 signals to ground to enhance the dominance of the second harmonic.

Simulation of Lumped Configuration



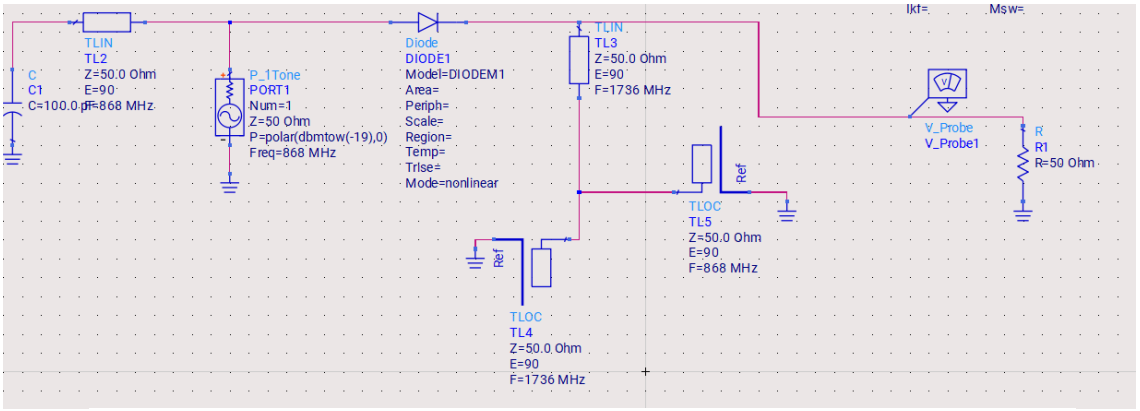


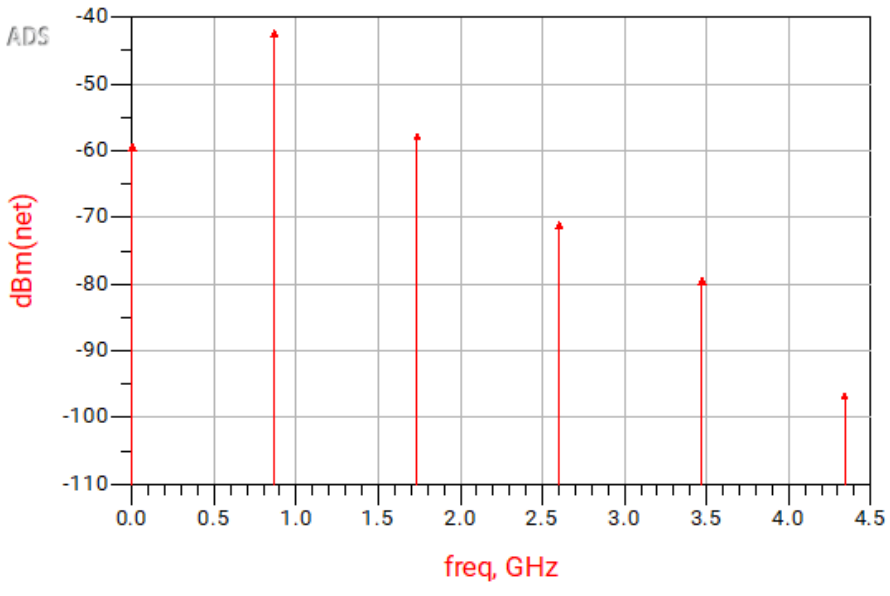
Simulation of Distributed Configuration



Configuration 2

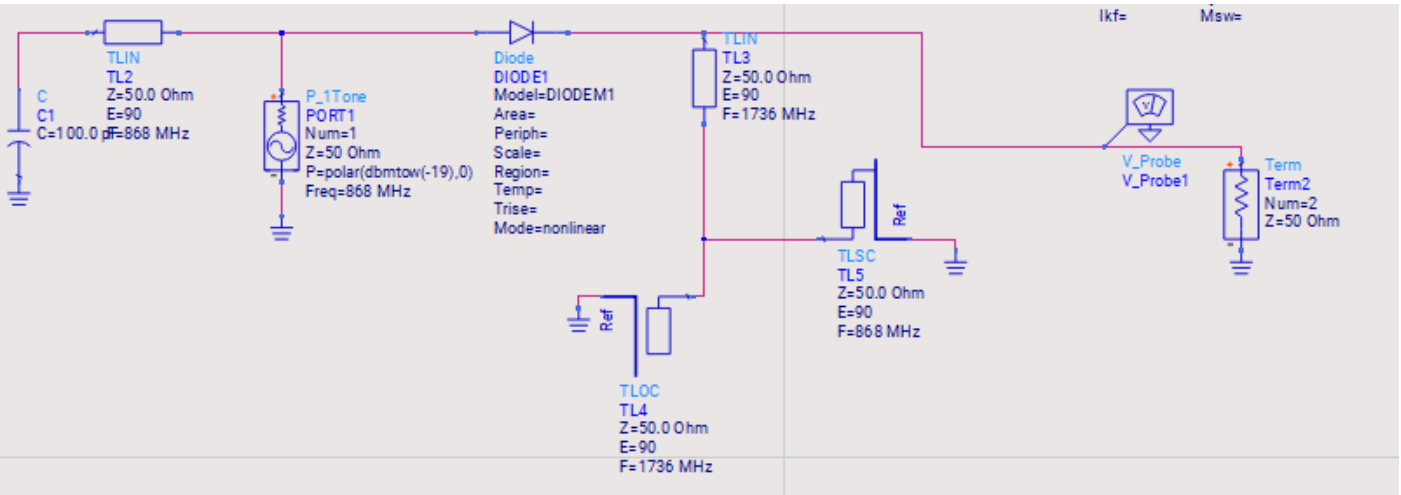
This is the exact configuration of the frequency doubler described in Figure 2 in the article.

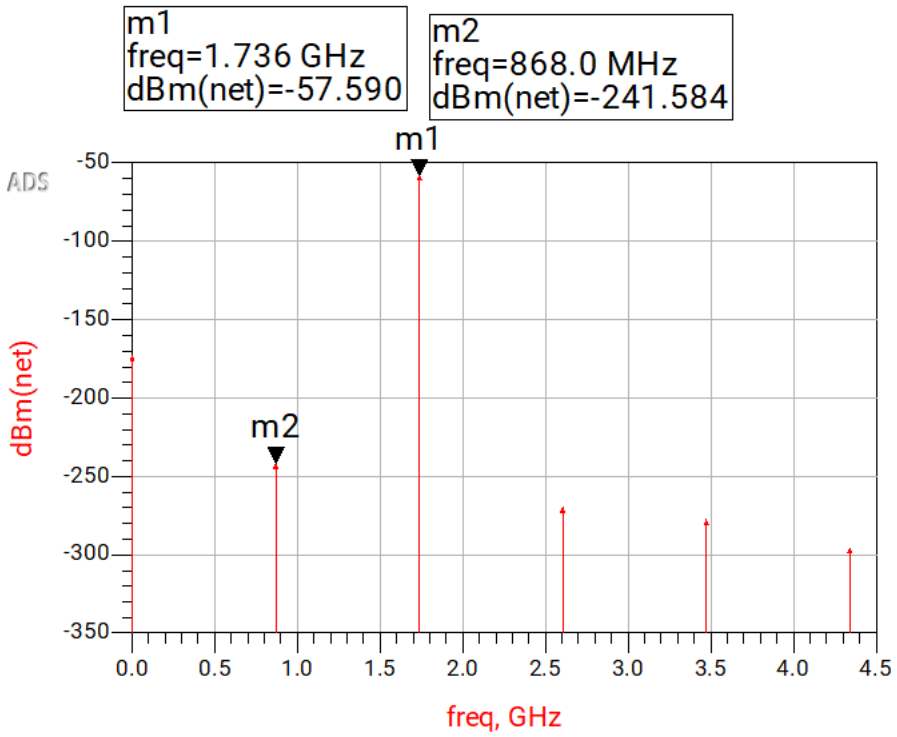




Configuration 3

There is a ambiguity about the one of the stubs in article. In the article, in Figure 3 stub is connected to ground whereas in Figure 2 it is indicated at it is left open. When I change Configuration 2 by connecting that ambiguous stub to ground, output changes.

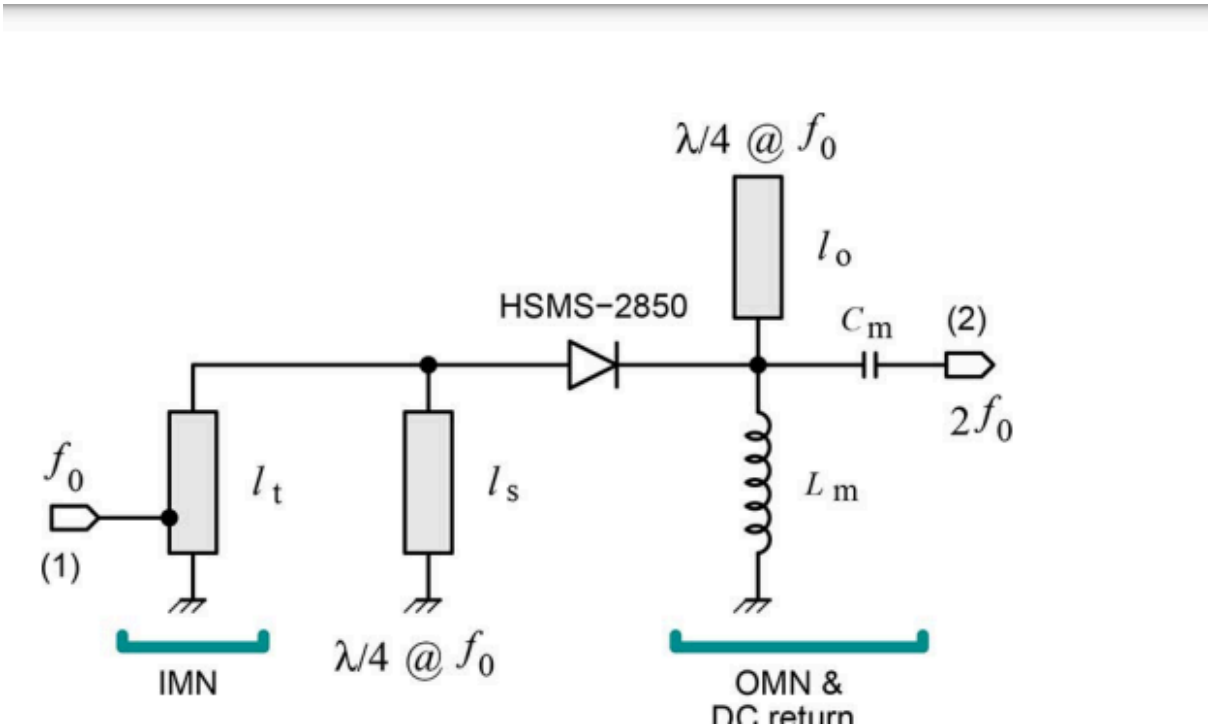


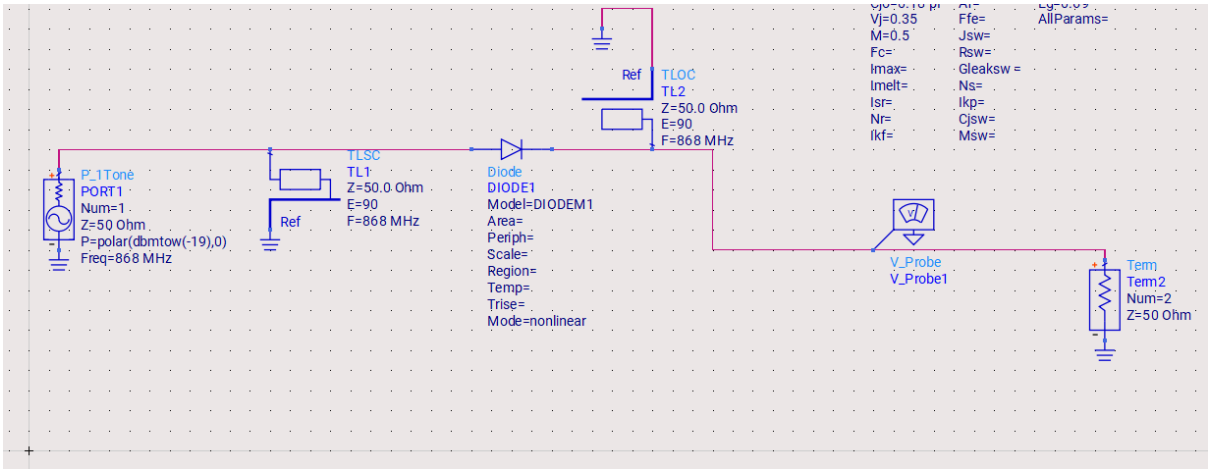


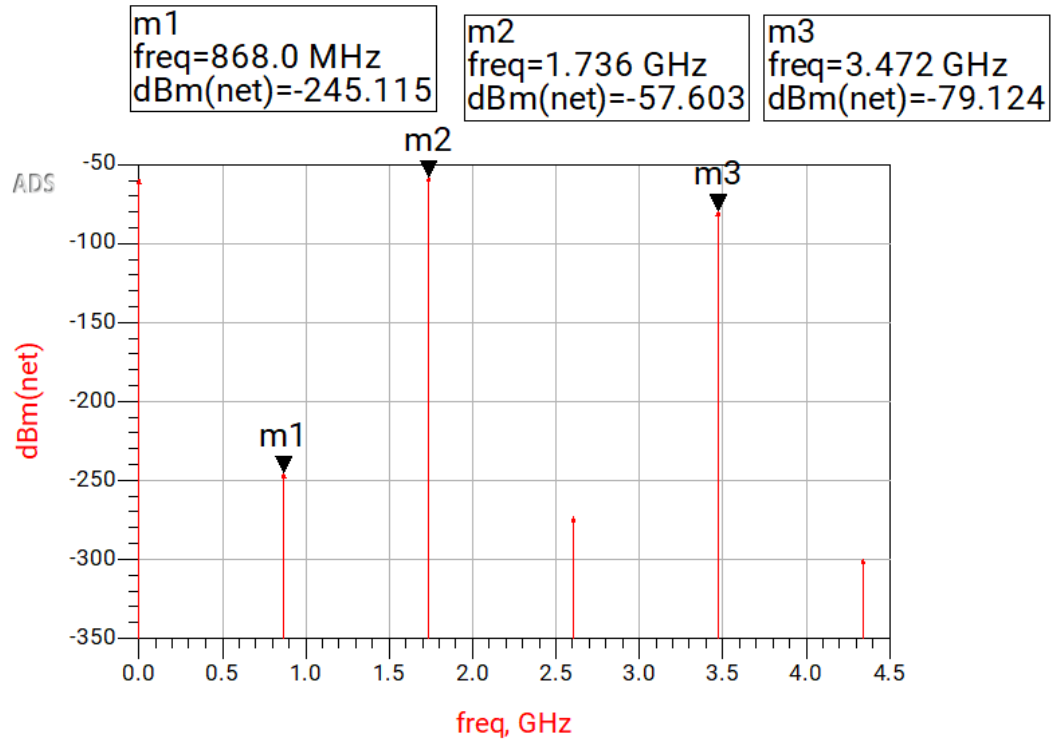
It can be observed that 2nd harmonic is very dominant among all harmonics that occur at the output.

Configuration 4

https://www.researchgate.net/publication/273396192_Low-Power_Frequency_Doubler_in_Cellulose-Based_Materials_for_Harmonic_RFID_Applications

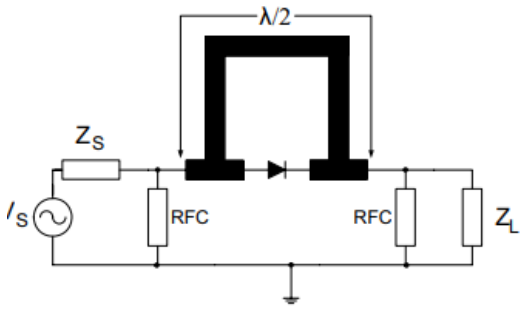




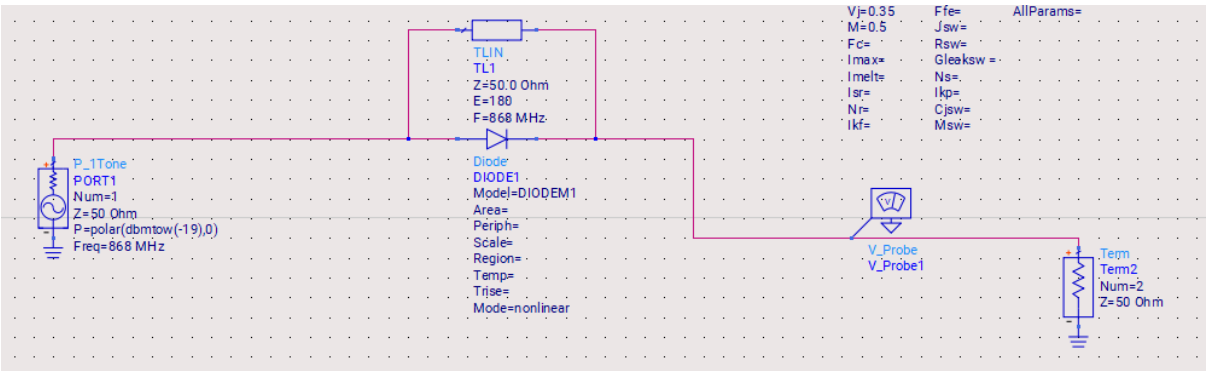


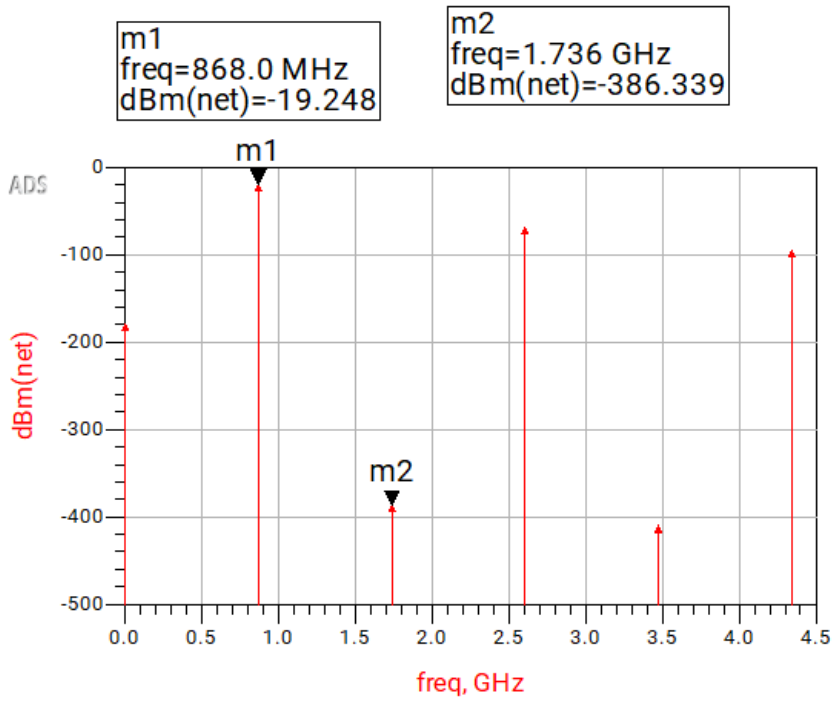
Configuration 5

https://www.researchgate.net/publication/224302687_A_single-diode_frequency_doubler_using_a_feed-forward_technique



g. 1. Simplified feed-forward microstrip design




m1
freq=868.0 MHz
dBm(net)=-19.248
m2
freq=1.736 GHz
dBm(net)=-386.339
m1
m2
ADS
dBm(net)
freq, GHz
0
-100
-200
-300
-400
-500
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5