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c2_demodulation.m

```
%{
Description:
  Demodulates the dual-band signal at the output of the PA, using the
  resampled data from Cadence. The script recovers the baseband
 signals
  transmitted on two RF carriers.

Input:
  - pa_resampled.mat

Output:
  - pa_data.mat
%}
clear; clc; close all;
tic
```

Parameters

```
freq_carrier_1 = 1.8e9;
bandwidth_1 = 8*20e6;
freq_carrier_2 = 5.4e9;
bandwidth_2 = 8*20e6;
```

Functions

```
current_folder = fileparts(mfilename('fullpath'));
root_folder = fileparts(current_folder);
functions_folder = fullfile(root_folder, 'f0_functions');
addpath(functions_folder);
```

Load PA data

```
resampled_file = fullfile(current_folder, 'pa_resampled.mat')
load(resampled_file);
```

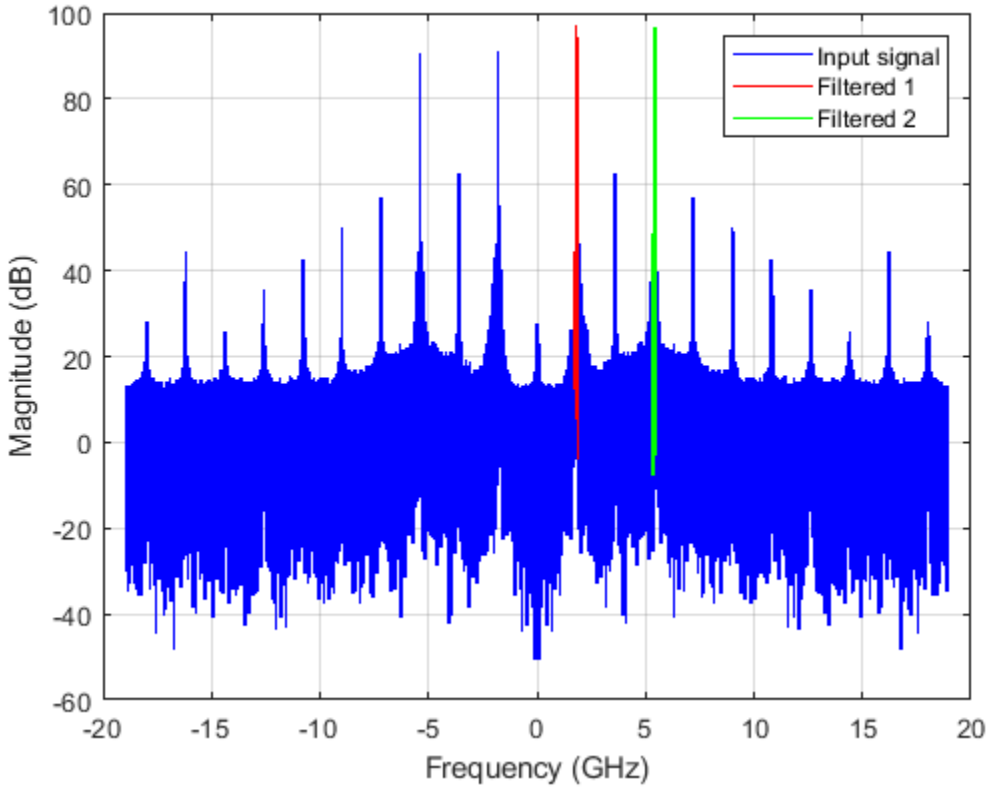
```
output_pa = signal_out_resampled;
N = length(output_pa);
fs = N / time_uniform(end);


resampled_file =

    'C:\Users\Shoit\Desktop\pa_db_1p8_5p4\f3_pa_demod
\pa_resampled.mat'
```

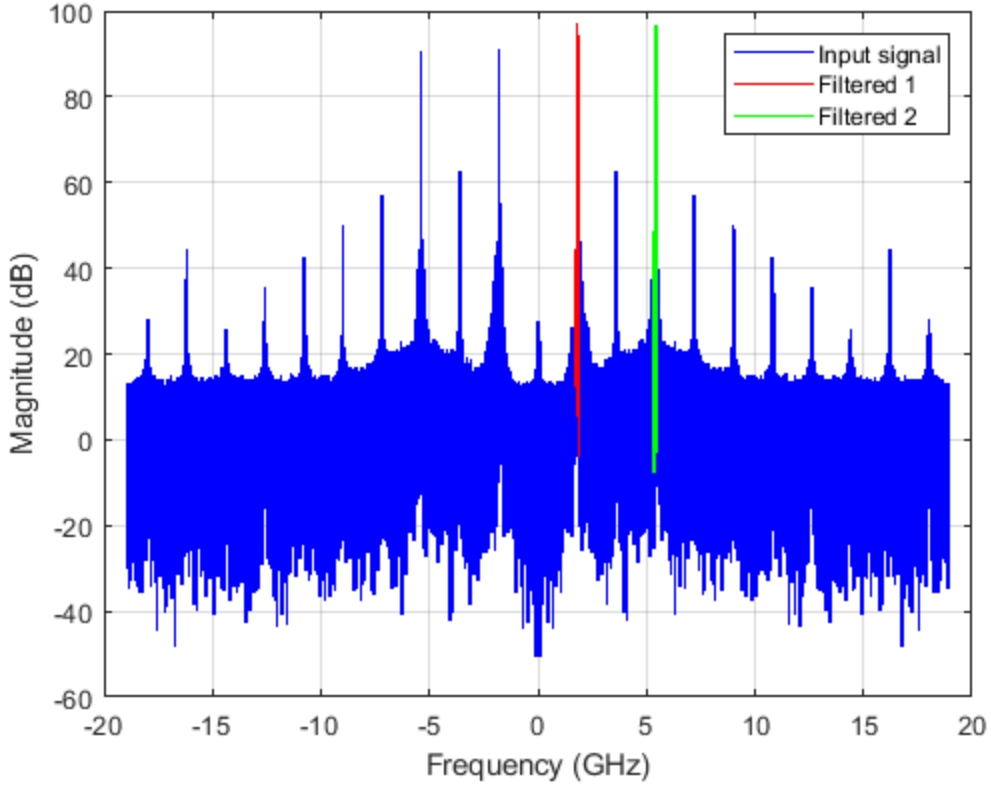
Call demodulation function for PA output

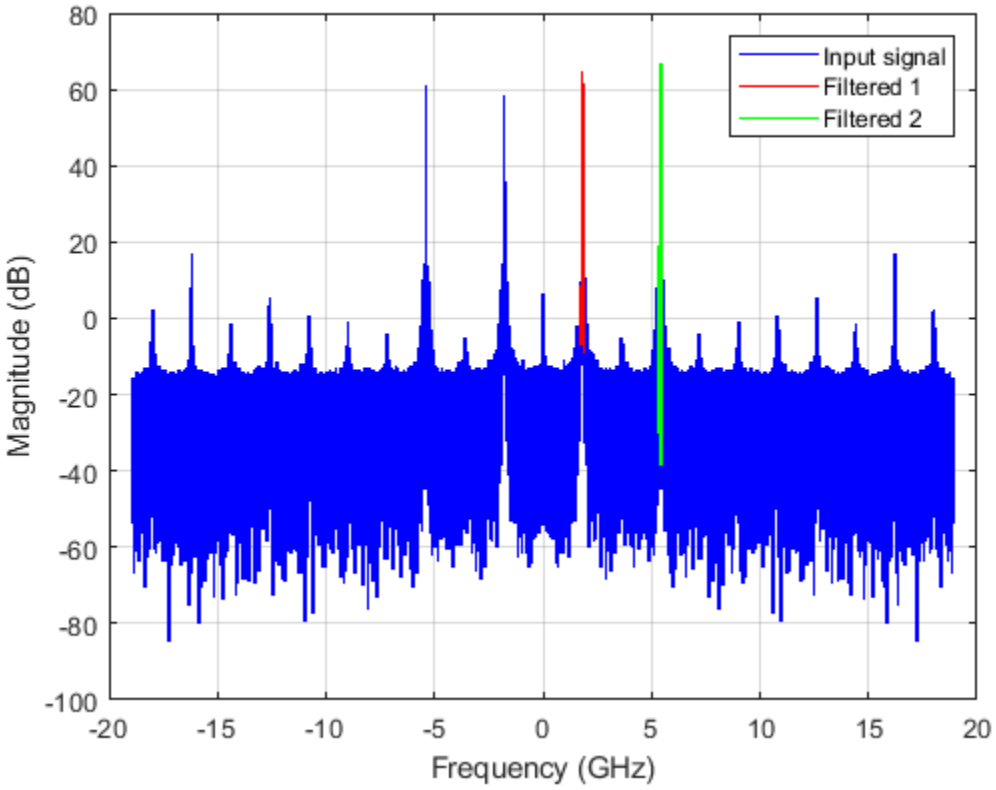
```
[signal_1_out, signal_2_out, ~] = demodulate(signal_out_resampled, ...
    time_uniform, freq_carrier_1, freq_carrier_2, bandwidth_1,
 bandwidth_2, true);
```



Call demodulation function for PA input

```
[signal_1_in, signal_2_in, time_baseband] =
 demodulate(signal_in_resampled, ...
    time_uniform, freq_carrier_1, freq_carrier_2, bandwidth_1,
 bandwidth_2, true);
```


Input signal
Filtered 1
Filtered 2
Magnitude (dB)
Frequency (GHz)
100
80
60
40
20
0
-20
-40
-60
-20
-15
-10
-5
0
5
10
15
20


Input signal
Filtered 1
Filtered 2
Magnitude (dB)
Frequency (GHz)
80
60
40
20
0
-20
-40
-60
-80
-100
-20
-15
-10
-5
0
5
10
15
20

Print

```
max_s1_in = max(abs(signal_1_in))
max_s2_in = max(abs(signal_2_in))
max_s1_out = max(abs(signal_1_out))
max_s2_out = max(abs(signal_2_out))
```

```
max_s1_in =

    0.0236


max_s2_in =

    0.0232


max_s1_out =

    0.9905


max_s2_out =

    0.7229
```

Save results

```
script_folder = fileparts(mfilename('fullpath'));
mat_filename = fullfile(script_folder, 'pa_data.mat');

save(mat_filename, 'time_baseband', ...
    'signal_1_in', 'signal_2_in', ...
    'signal_1_out', 'signal_2_out', '-v7.3');

toc
```

```
Elapsed time is 5.636088 seconds.
```

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