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c1_split_data.m

```
%{
Description:
  Reads source data collected in Cadende, resamples them at a constant
  frequency, splits into 3 segments and saves them to .mat files.

Input:
  - lte_real.csv
  - lte_imag.csv
  - wlan11n_real.csv
  - wlan11n_imag.csv

Output:
  - source_signal_1.mat
  - source_signal_2.mat
  - source_signal_3.mat
  - source_signal_complete.mat
%}
clear; clc; close all;
tic
```

Parameters

```
freq_baseband = 123e6;
num_of_points = 5000;
```

Functions

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

Importing data

```
[s1_time, s1_amp] = read_complex_csv('lte_real.csv', 'lte_imag.csv');
```

```
[s2_time, s2_amp] =
 read_complex_csv('wlan11n_real.csv', 'wlan11n_imag.csv');
```

Data parameters

Number of points

```
s1_N = length(s1_amp)
s2_N = length(s2_amp)

% Time duration
s1_duration = s1_time(end)
s2_duration = s2_time(end)
resample_duration = min(s1_duration, s2_duration)

% Average sampling frequency
freq_sampling_1 = s1_N/s1_duration
freq_sampling_2 = s2_N/s2_duration
```

```
s1_N =

      122881
```

```
s2_N =

       80001
```

```
s1_duration =

    0.0010
```

```
s2_duration =

    0.0010
```

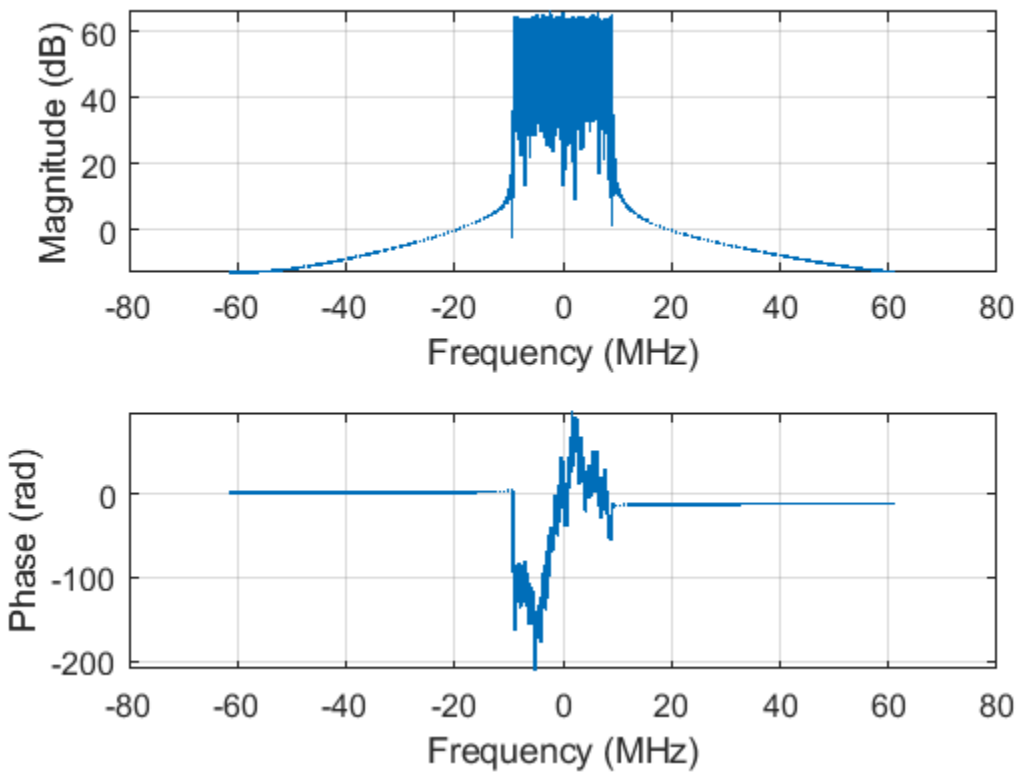
```
resample_duration =

    0.0010
```

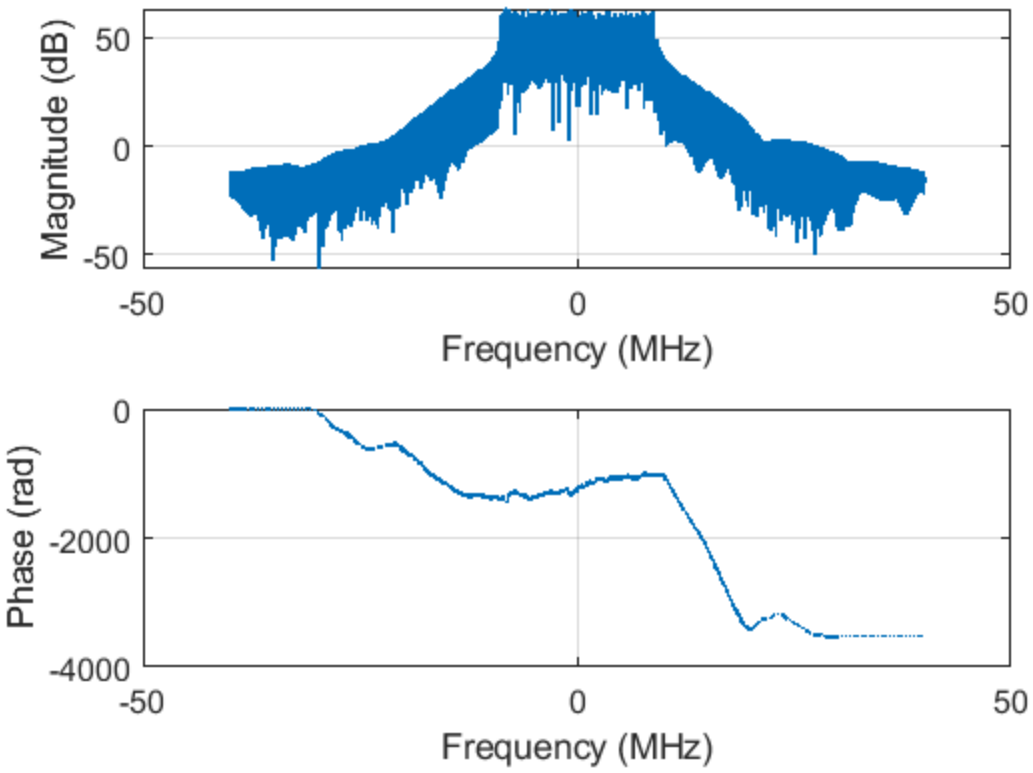
```
freq_sampling_1 =

   1.2288e+08
```

```
freq_sampling_2 =

   8.0001e+07
```

Plot

```
plot_spectrum(s1_amp, freq_sampling_1, 'Signal 1')
plot_spectrum(s2_amp, freq_sampling_2, 'Signal 2')
```





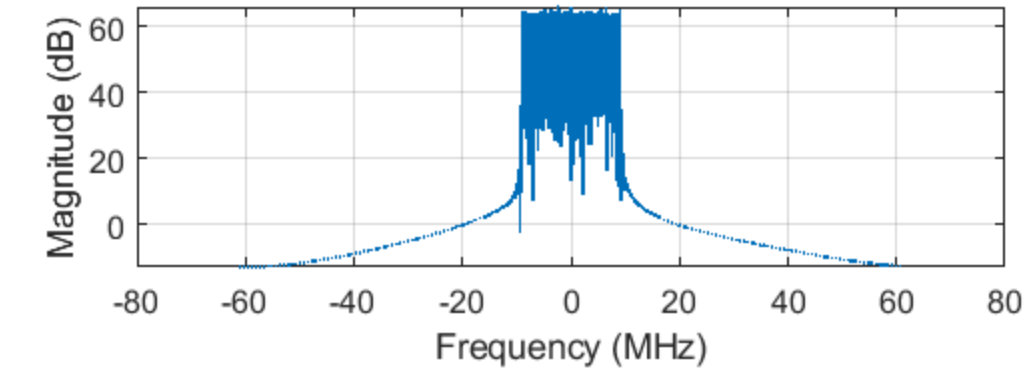
Resample

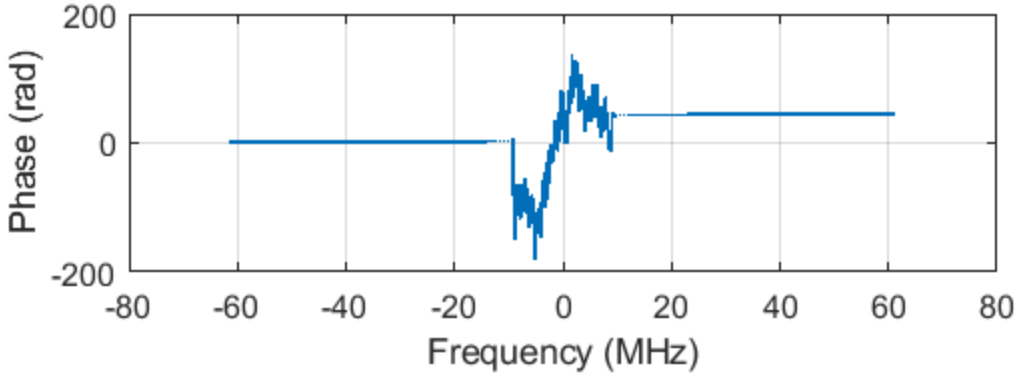
Creating baseband time vector

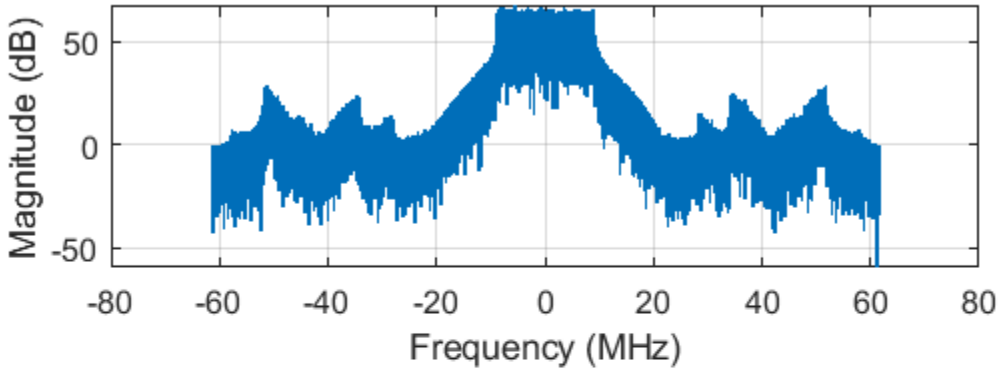
```
time_baseband_complete = (0: freq_baseband*resample_duration).' /
 freq_baseband;

% Computing interpolation
s1_baseband_complete = interp1(s1_time, s1_amp,
 time_baseband_complete);
s2_baseband_complete = interp1(s2_time, s2_amp,
 time_baseband_complete);
```

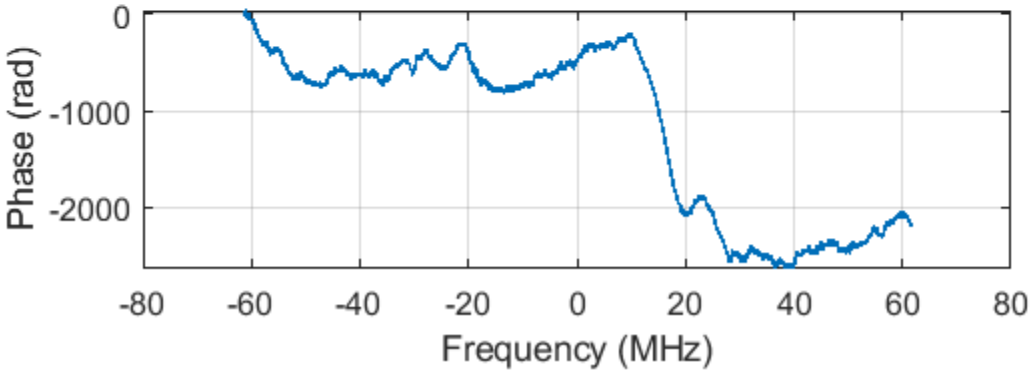
Plot

```
plot_spectrum(s1_baseband_complete, freq_baseband, 'Signal 1')
plot_spectrum(s2_baseband_complete, freq_baseband, 'Signal 2')
```


Magnitude (dB)
60
40
20
0
-80
-60
-40
-20
0
20
40
60
80
Frequency (MHz)


Phase (rad)
200
0
-200
-80
-60
-40
-20
0
20
40
60
80
Frequency (MHz)


Magnitude (dB)
50
0
-50
-80
-60
-40
-20
0
20
40
60
80
Frequency (MHz)


Phase (rad)
0
-1000
-2000
-80
-60
-40
-20
0
20
40
60
80
Frequency (MHz)

Save complete baseband data

```
complete_file =
 fullfile(current_folder, 'source_signal_complete.mat');
save(complete_file, 'time_baseband_complete', 's1_baseband_complete', 's2_baseband
v7.3');
fprintf('Saved: %s (%d samples)\n', complete_file,
 length(time_baseband_complete));
```

```
Saved: C:\Users\Shoit\Desktop\pa_db_1p8_5p4\f1_source_data
\source_signal_complete.mat (123001 samples)
```

Split

```
for k = 1:3
    start_idx = (k - 1) * num_of_points + 1;
    end_idx = k * num_of_points;

    if end_idx > length(time_baseband_complete)
        warning('Not enough samples for segment %d, stopping.', k);
        break;
    end

    % Extract chunk
    s1_baseband = s1_baseband_complete(start_idx:end_idx);
    s2_baseband = s2_baseband_complete(start_idx:end_idx);

    % Reset time to start at zero
    time_baseband  = time_baseband_complete(start_idx:end_idx) -
 time_baseband_complete(start_idx);

    % Save as MAT file in the same directory as this script
    save_file = fullfile(current_folder, sprintf('source_signal_
%d.mat', k));
    save(save_file, 'time_baseband', 's1_baseband', 's2_baseband', '-
v7.3');
    fprintf('Saved: %s (%d samples)\n', save_file, num_of_points);
end

toc
```

```
Saved: C:\Users\Shoit\Desktop\pa_db_1p8_5p4\f1_source_data
\source_signal_1.mat (5000 samples)
Saved: C:\Users\Shoit\Desktop\pa_db_1p8_5p4\f1_source_data
\source_signal_2.mat (5000 samples)
Saved: C:\Users\Shoit\Desktop\pa_db_1p8_5p4\f1_source_data
\source_signal_3.mat (5000 samples)
Elapsed time is 4.726932 seconds.
```

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