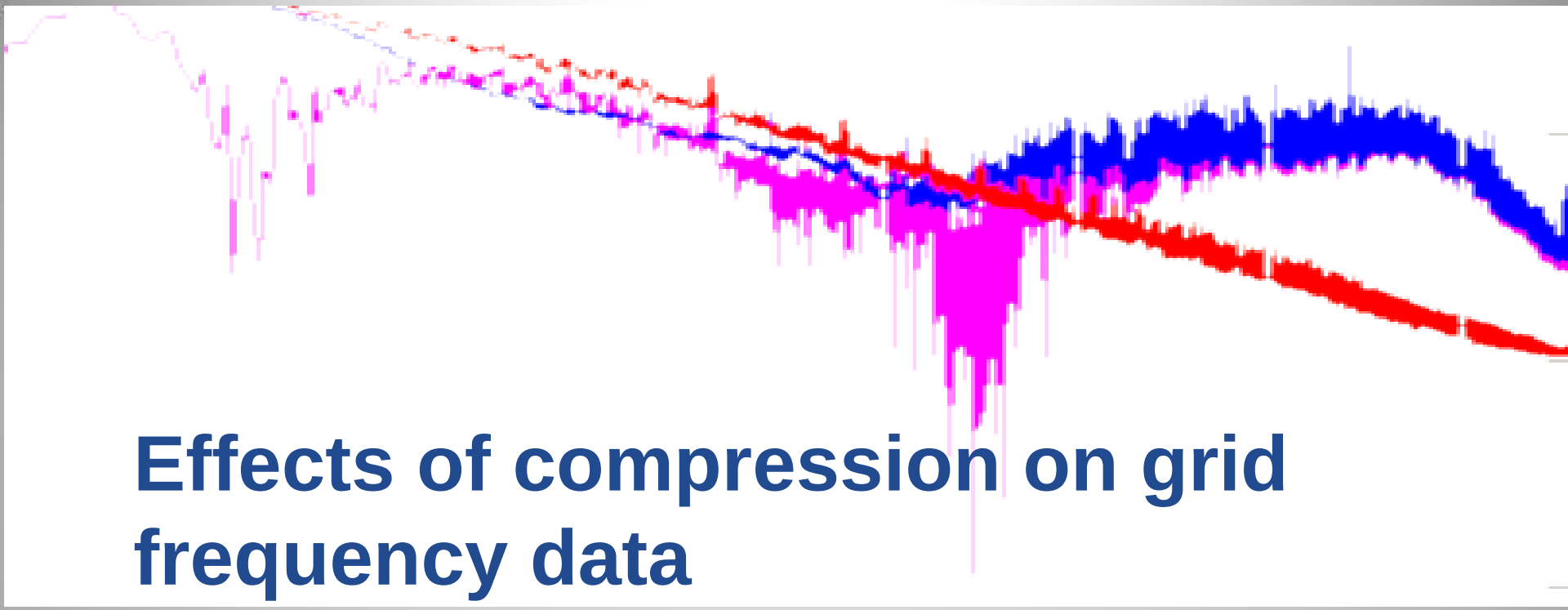

Effects of compression on grid frequency data

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5/21/14 CASIS meeting

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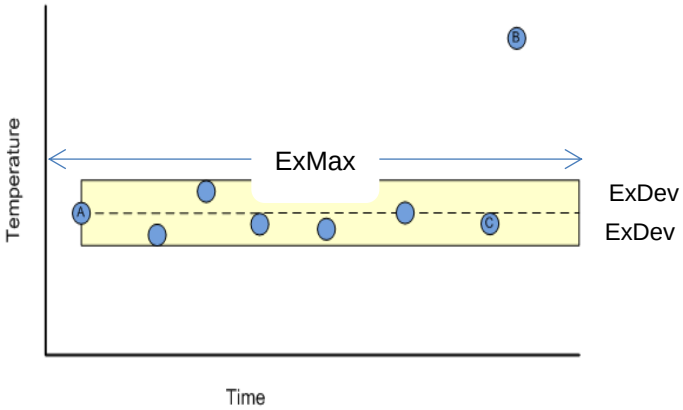
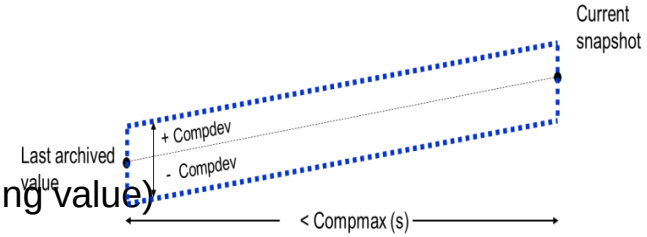
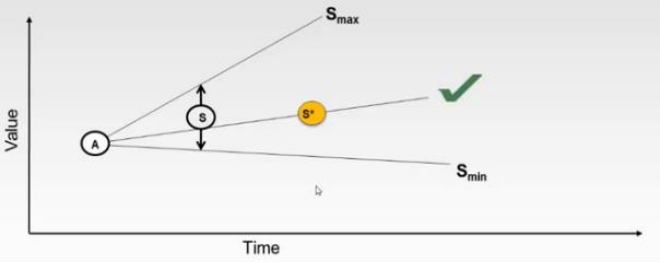
Compression in PI

- Why compression?
  - Disk space, network traffic, Performance
- Exception test
  - Filter obvious noise (within instrument precision)
    - Define a dead band (ExMax & ExDev)
- Compression test
  - Compression can have a slope
  - Swings to match the slope of the data (swinging door)
  - Using three values (most recent, current snapshot, incoming value)
  - Keep the new incoming value if within the angle between the min & max slope
  - Recalculate the slope.
  - The dropped values are within the parallelogram created b
    parameters.







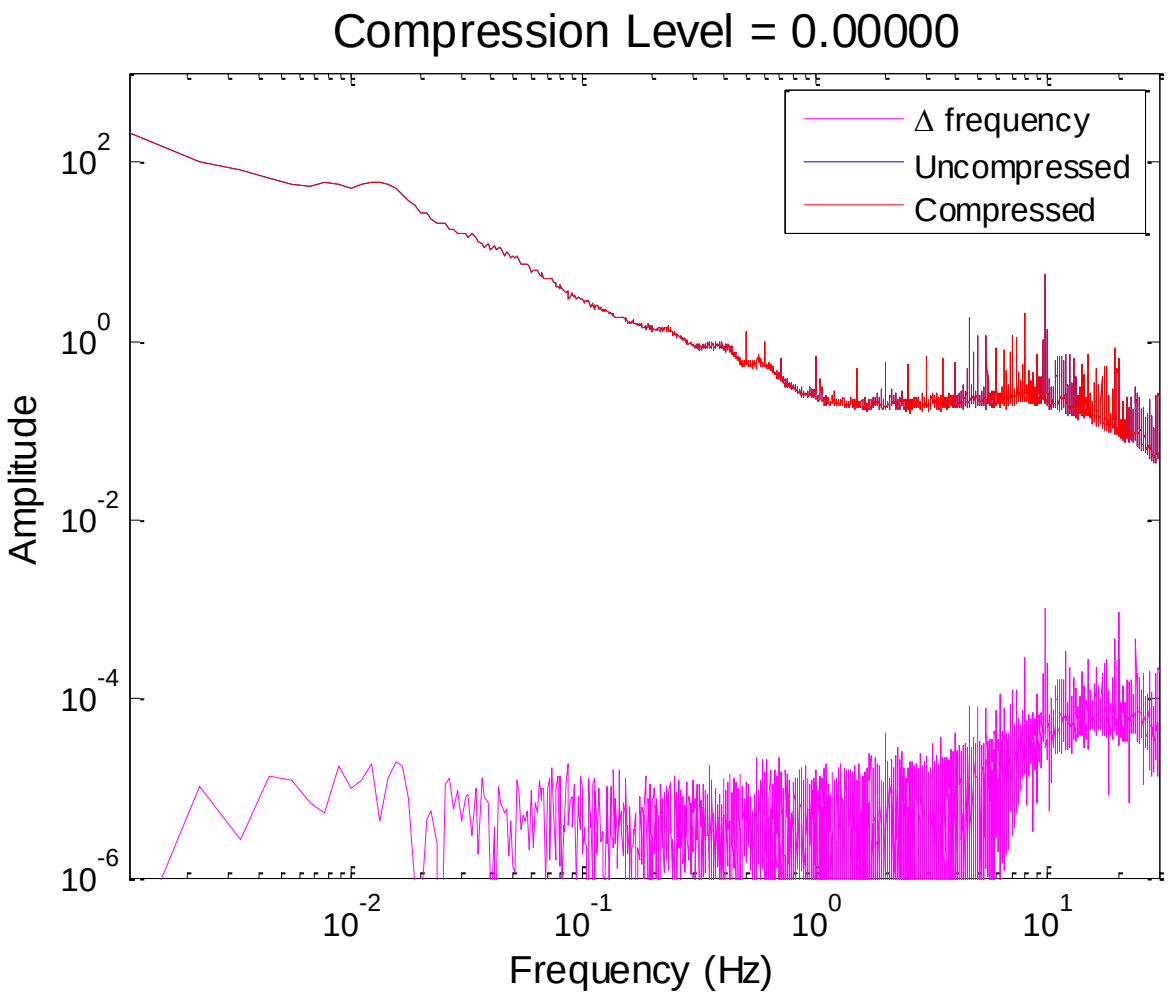
The question

- How does compression change the characteristics of the signal?
  - Frequency data from PMU device
    - Arbiter Systems, model 1133A power Sentinel
- Applications:
  - Fault localization
  - Network analysis
  - Event recognition

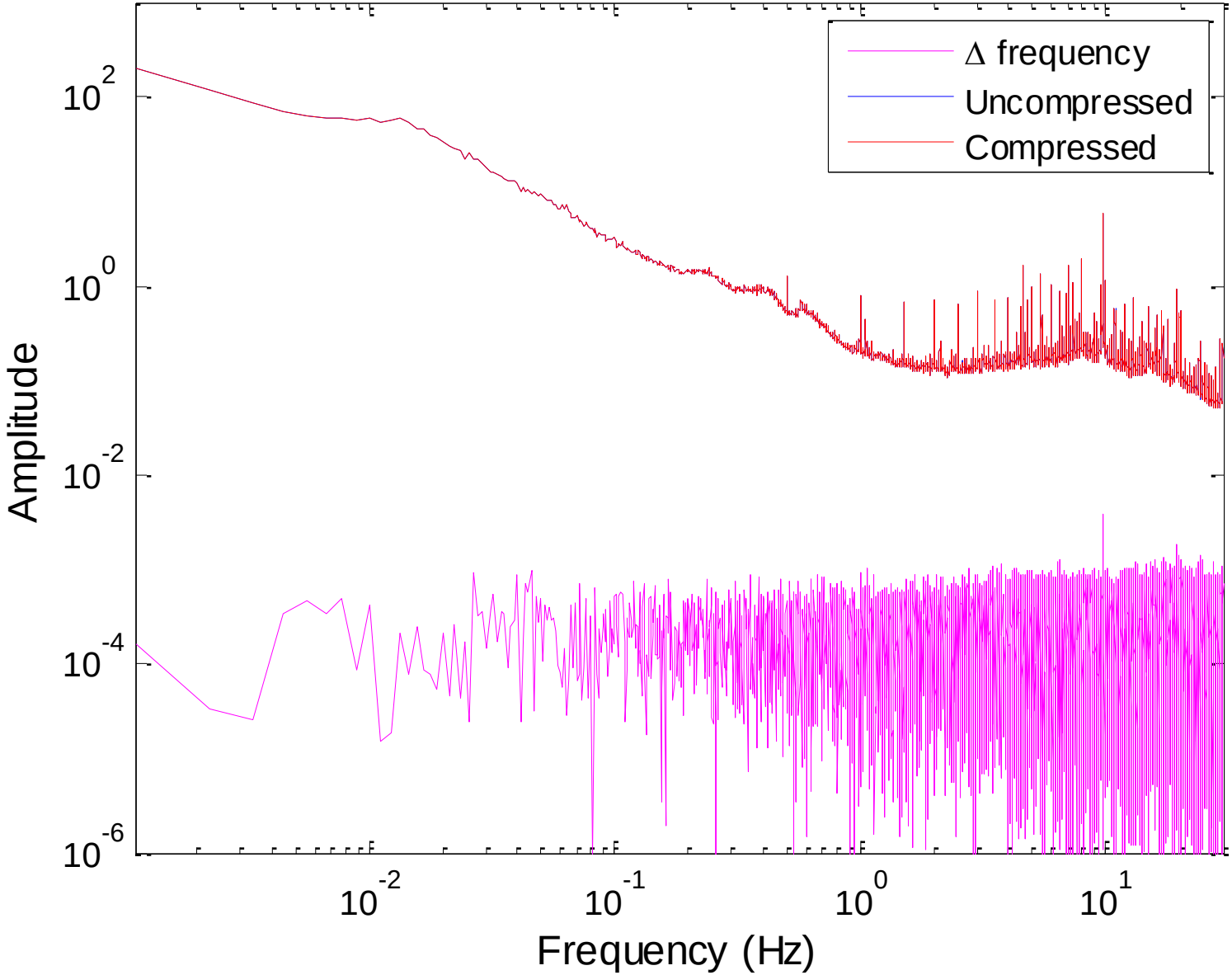
Experiment

- Collect raw data and store it in binary format on the file system
- Collect data into PI with different levels of compression
- Use FFT analysis to compare the signal with no compression and different levels of compression
  - Averaging 6 hours over 15 minute window

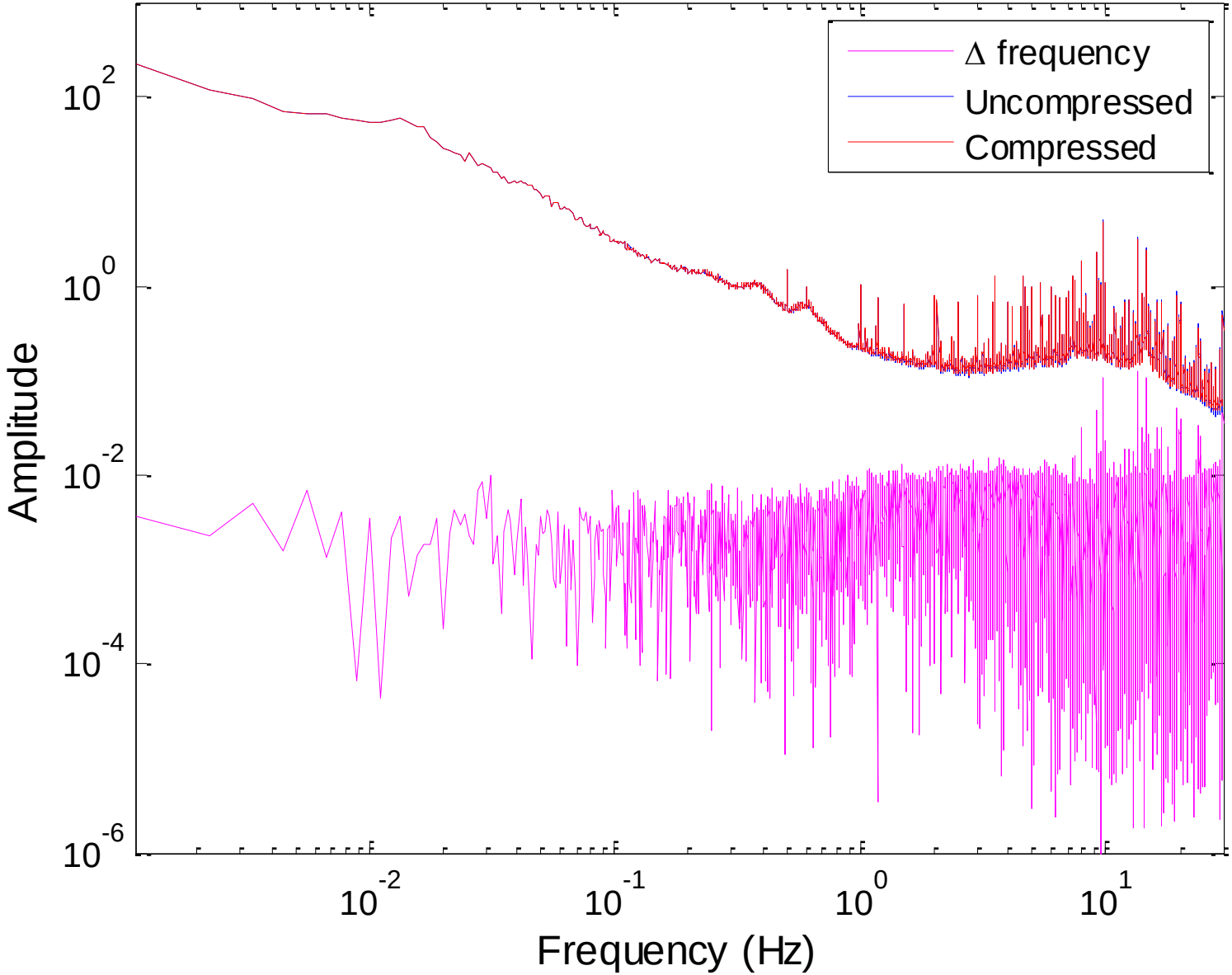
Distortion and compression level



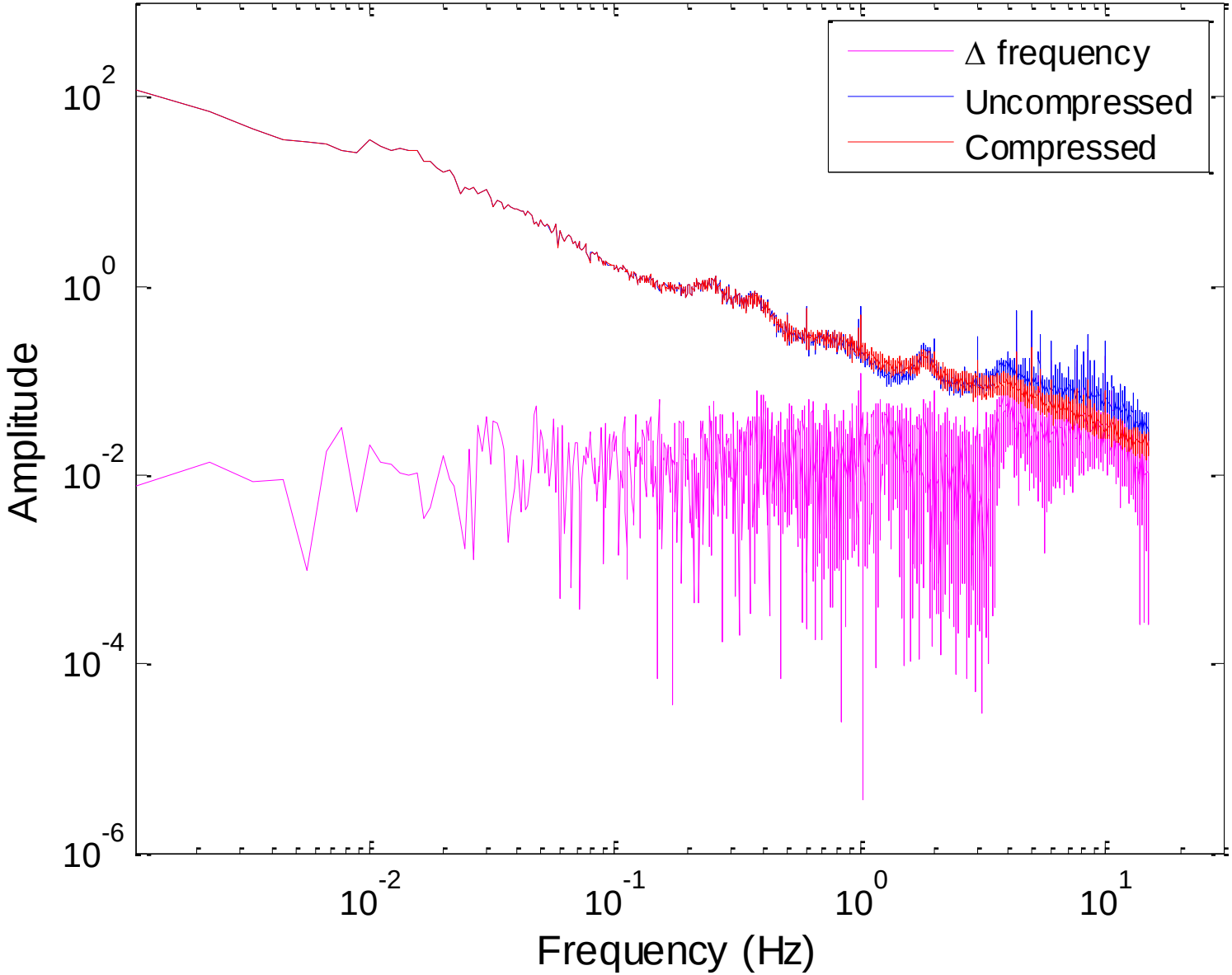
Compression Level = 0.00010



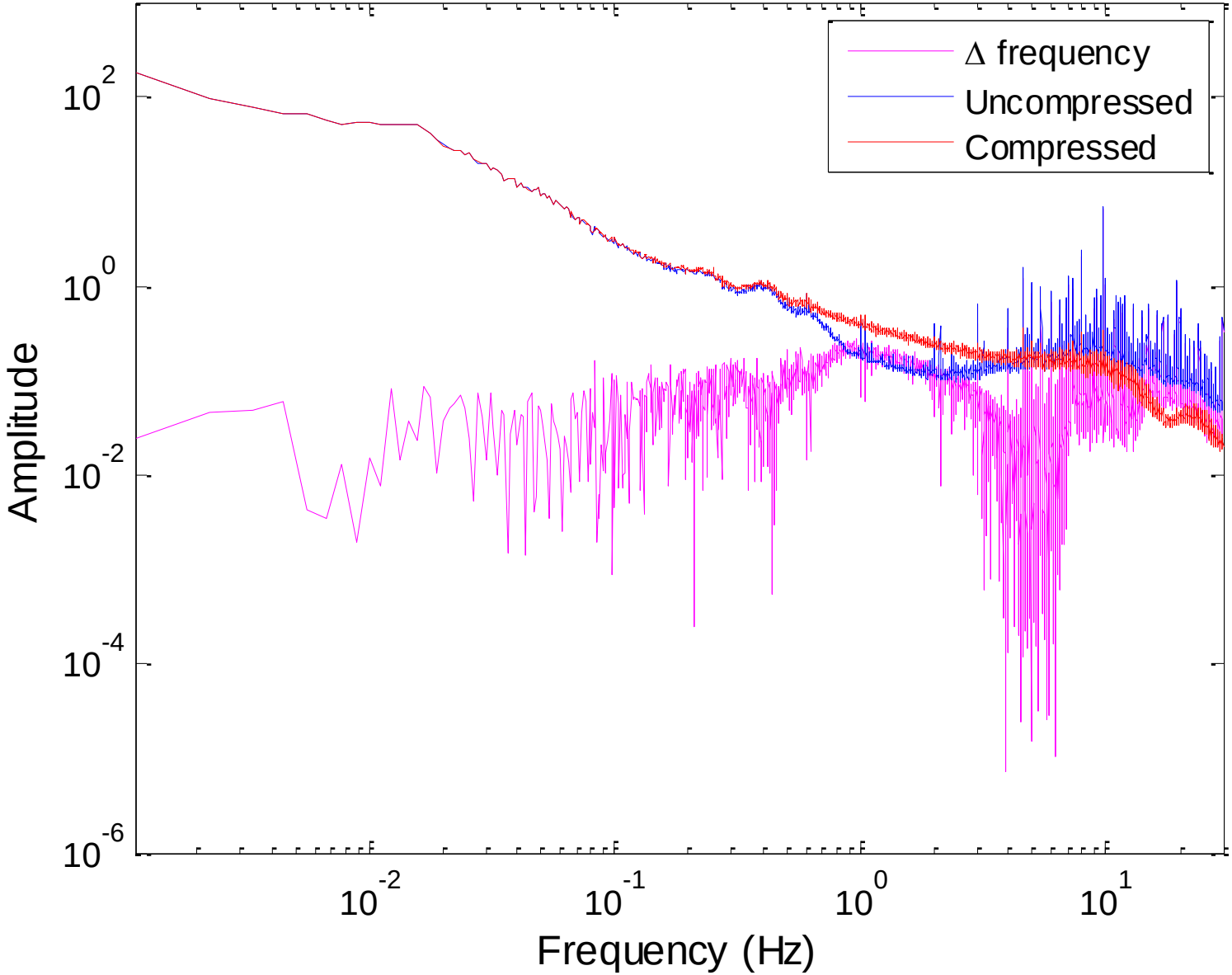
Compression Level = 0.00050



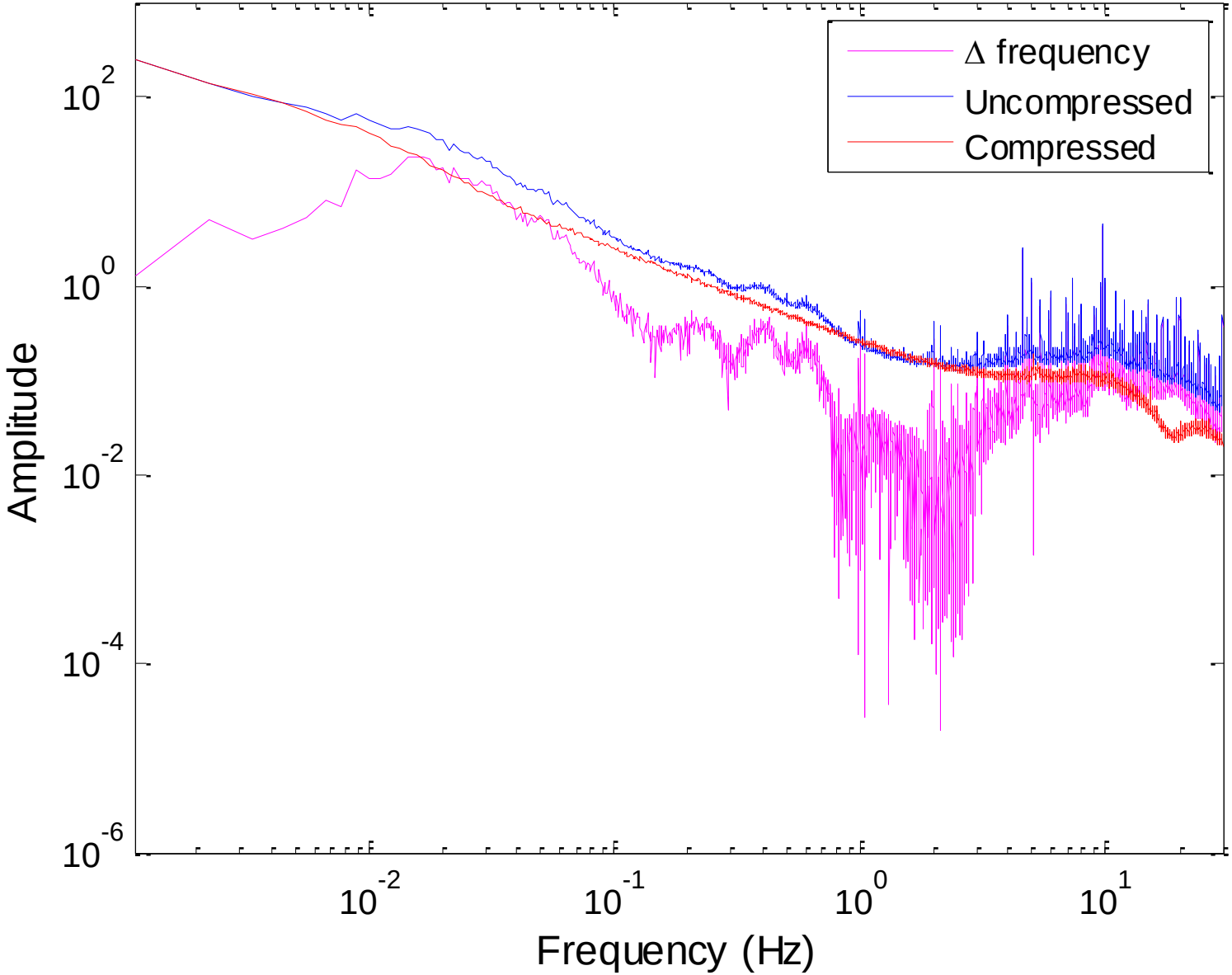
Compression Level = 0.00100



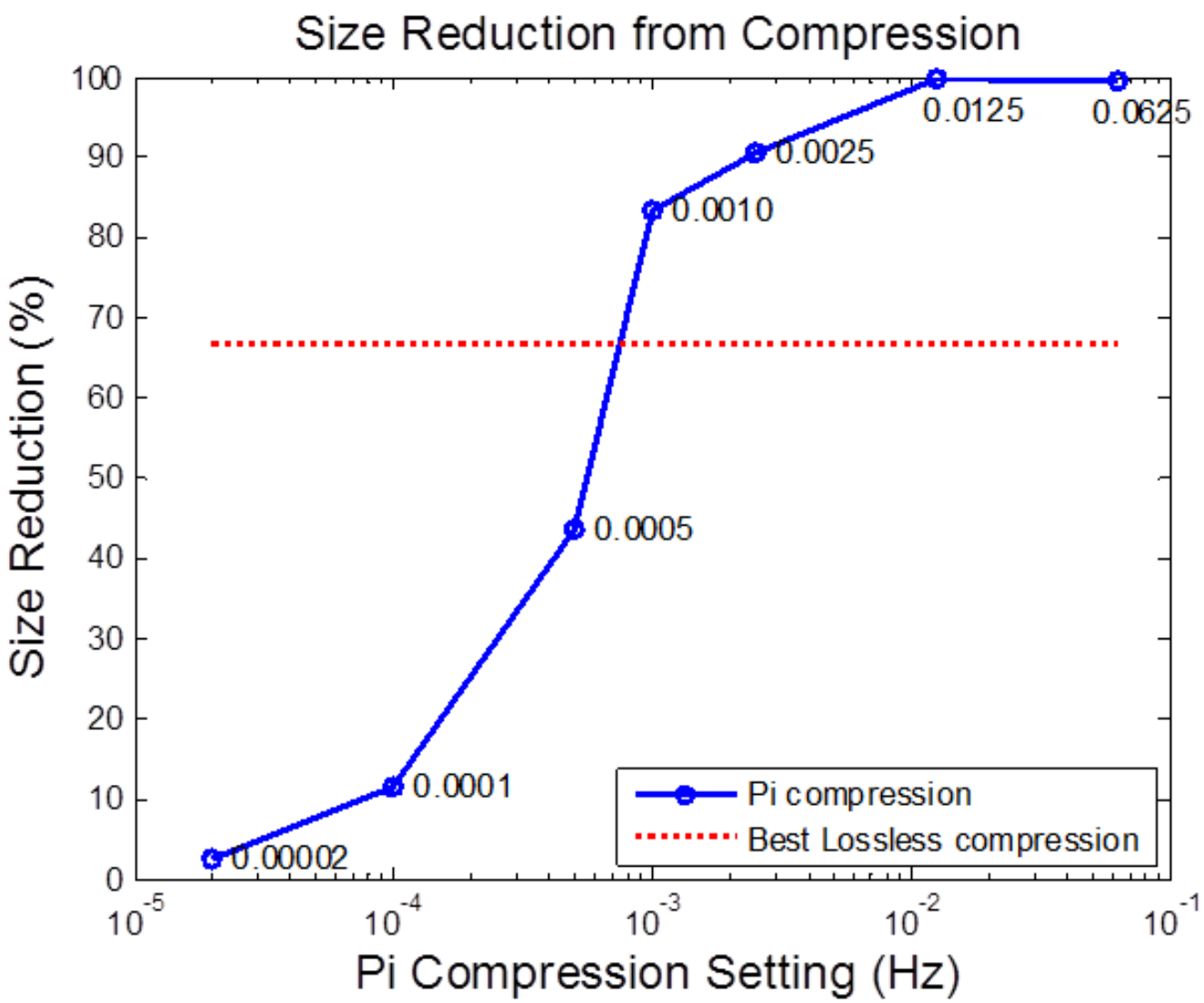
Compression Level = 0.00250



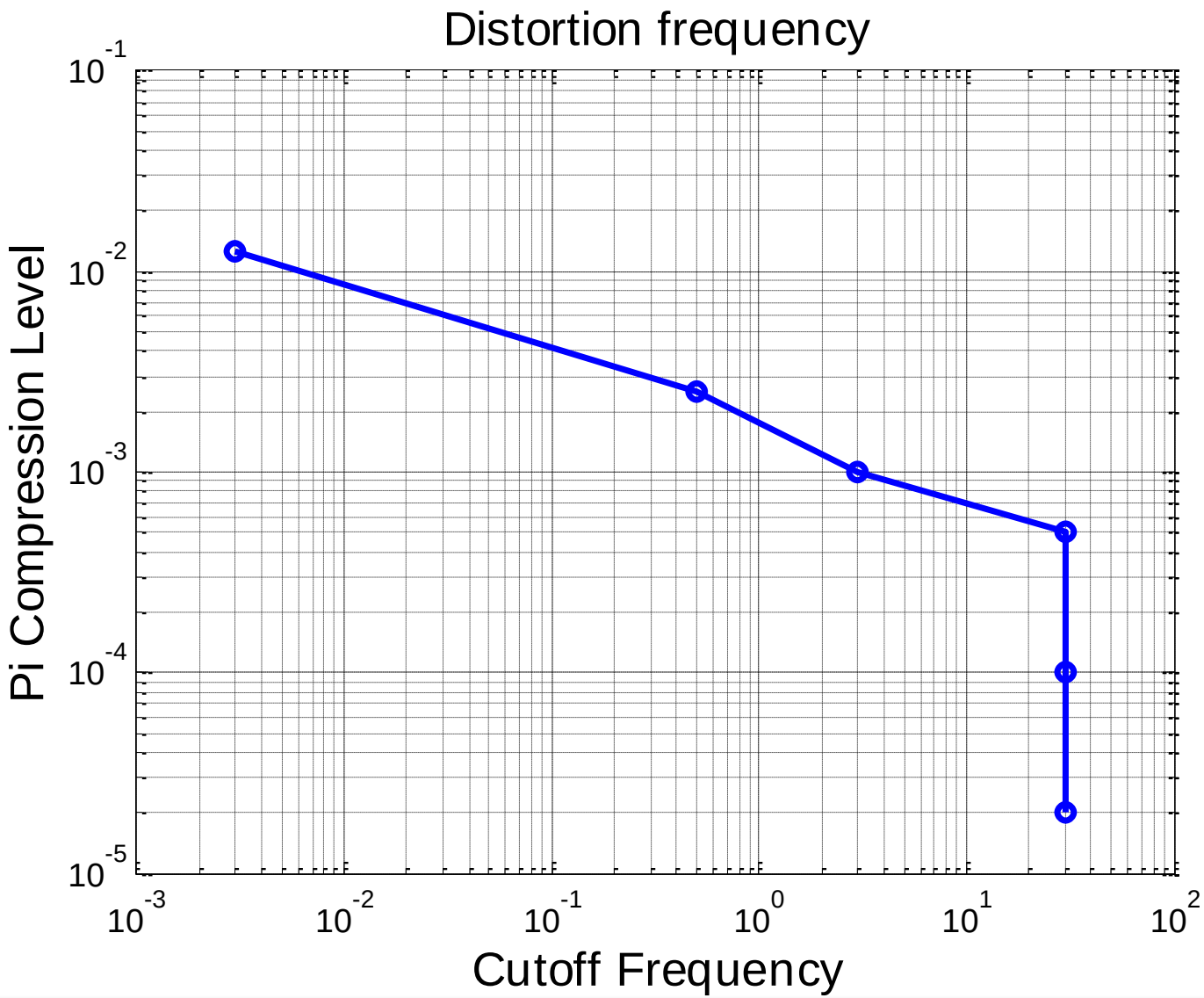
Compression Level = 0.01250



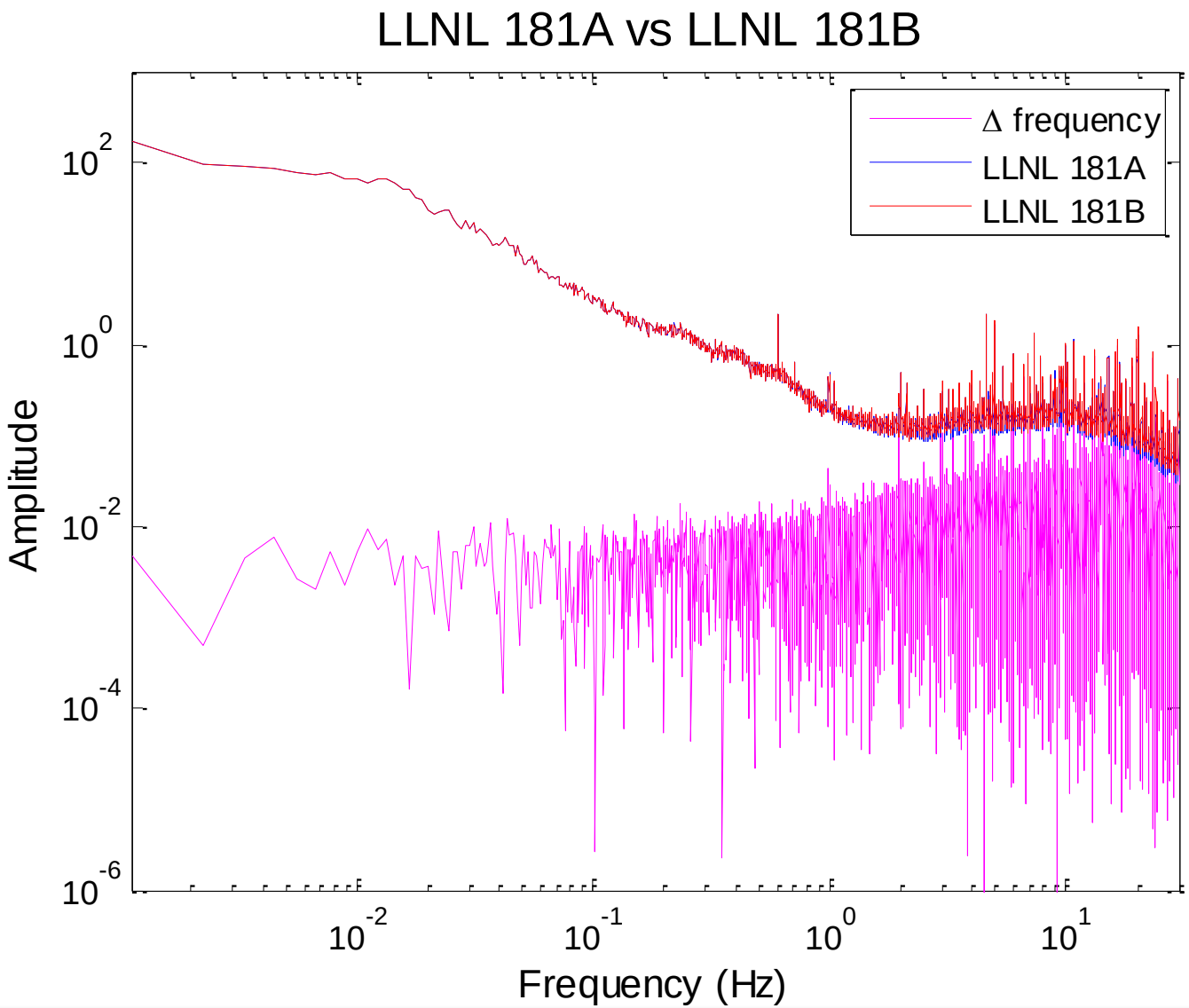
Compression Ratios



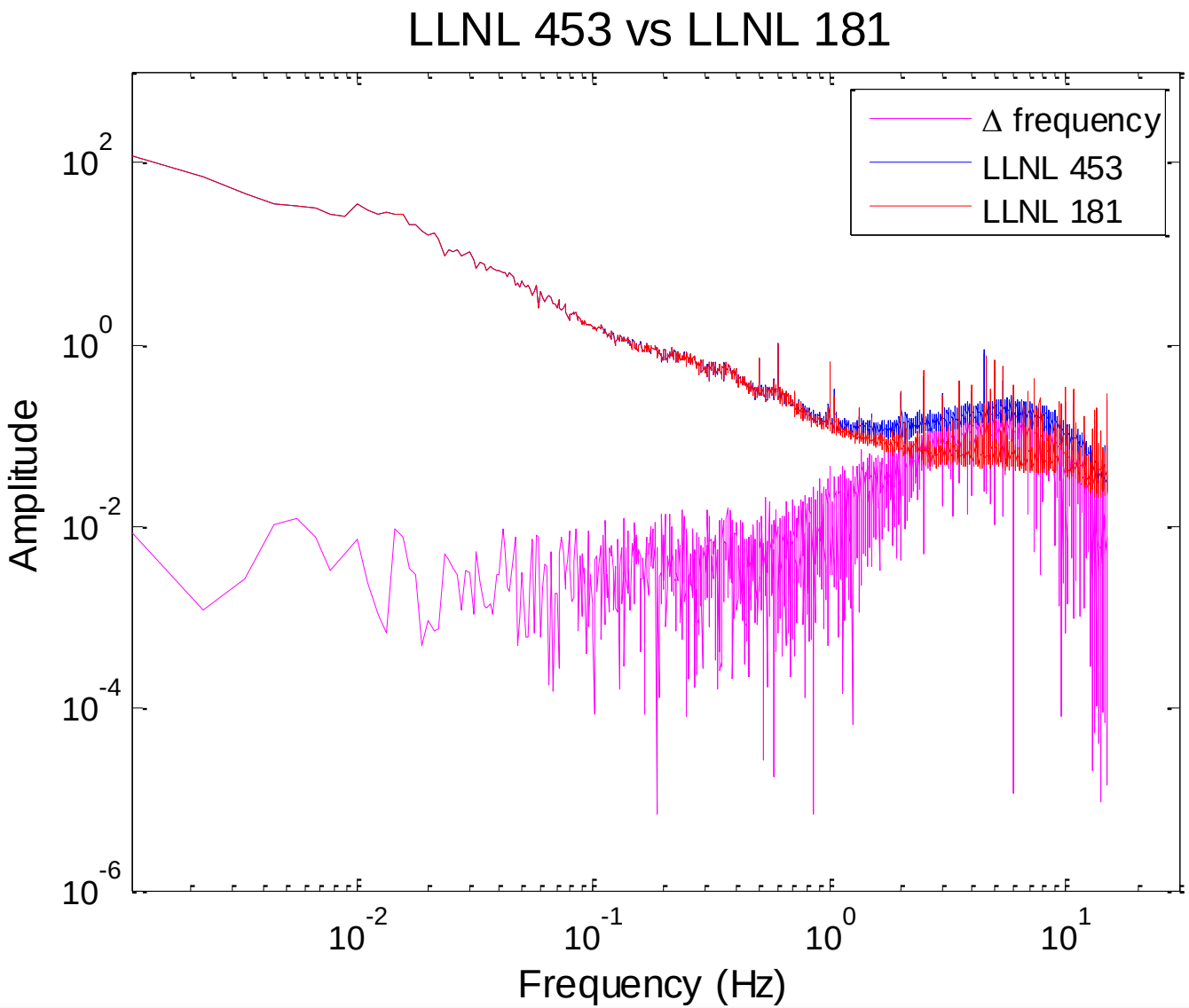
Distortion frequency



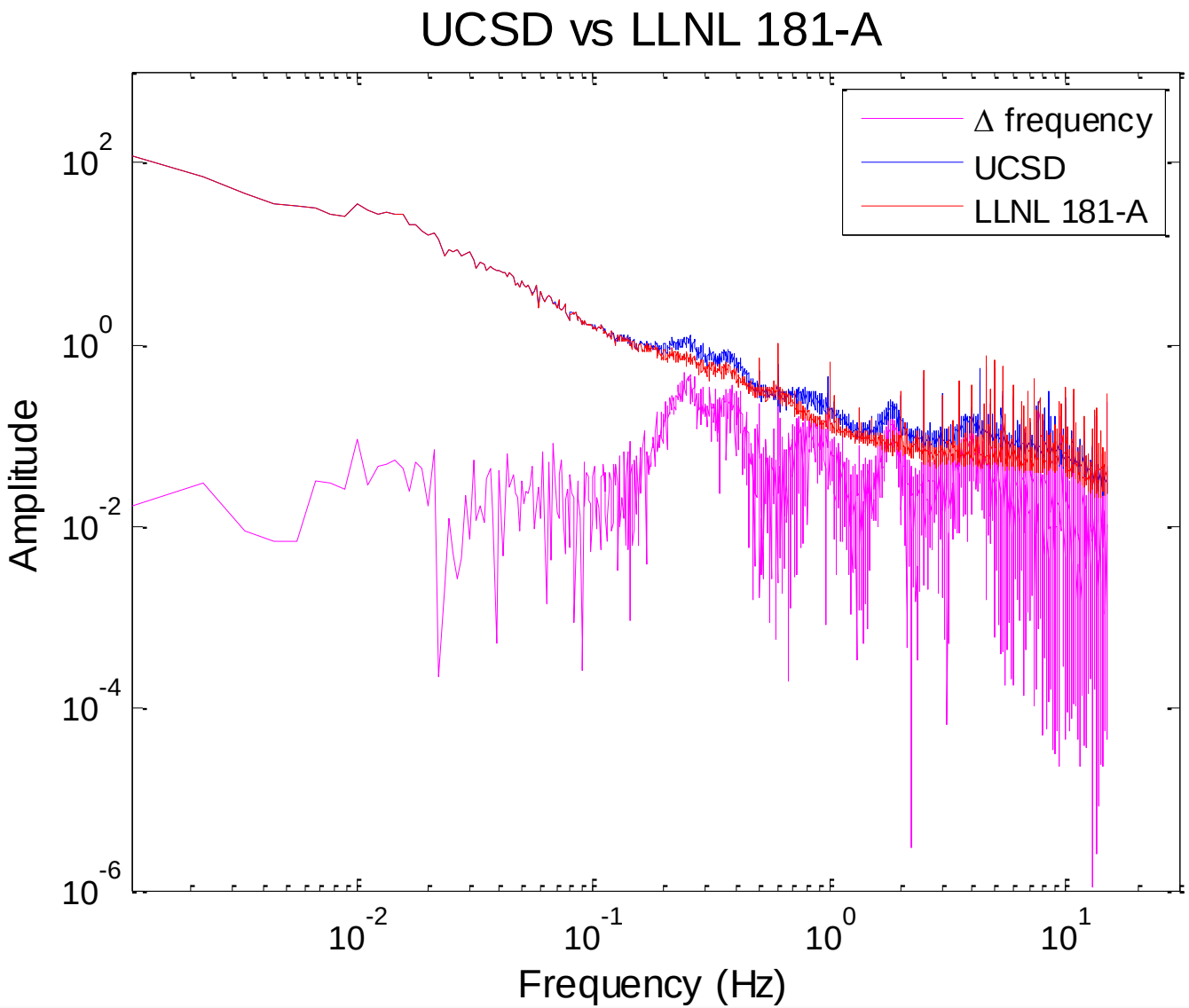
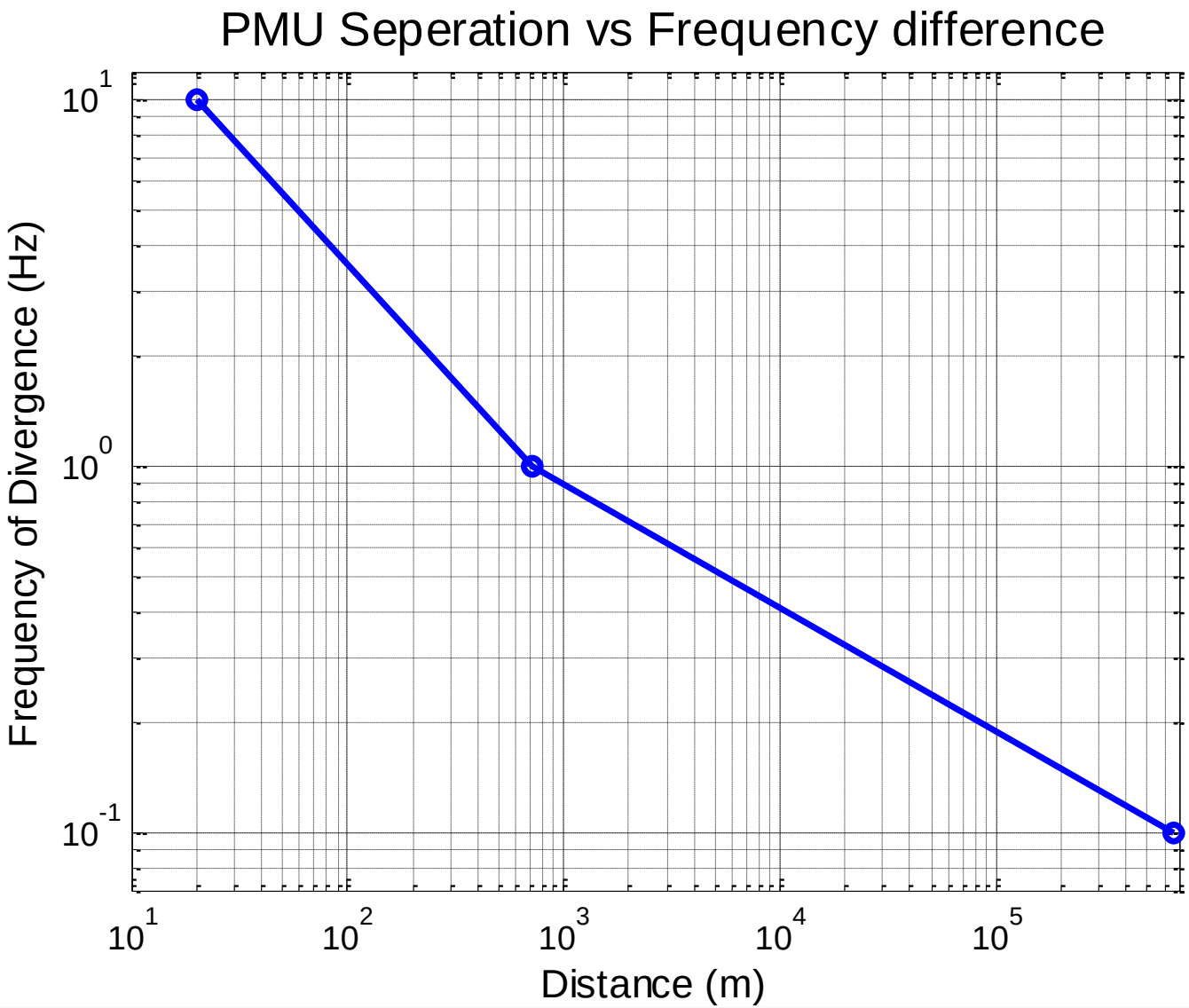
20 m distance



1 KM distance



100 Km distance



Distance & signal divergence