Site Anthropogenic Noise Injections Follow-up

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For LIGO Detector Characterization Group
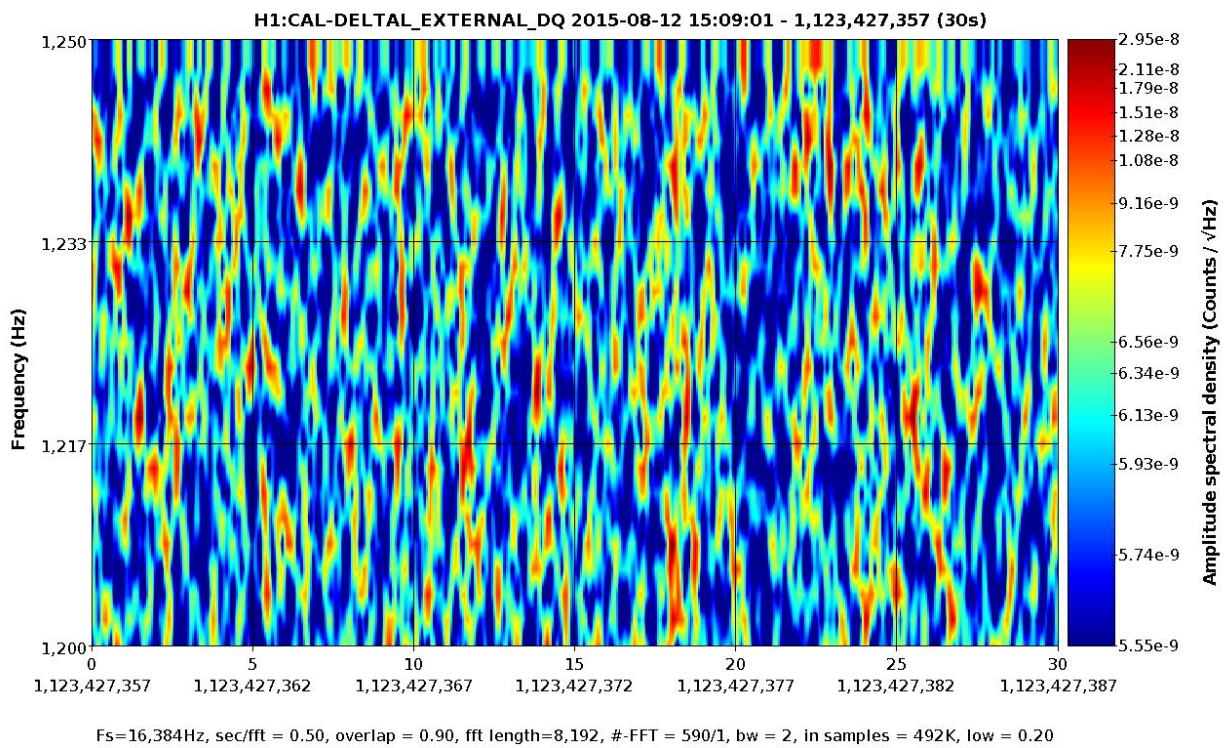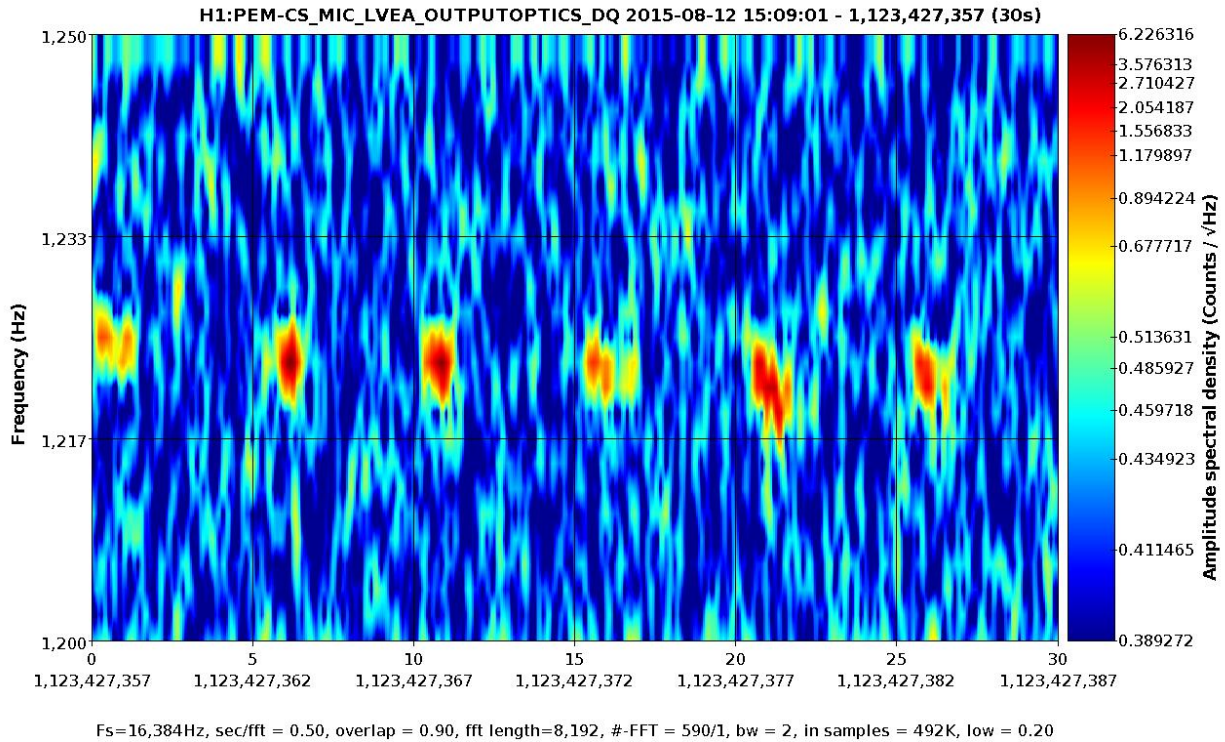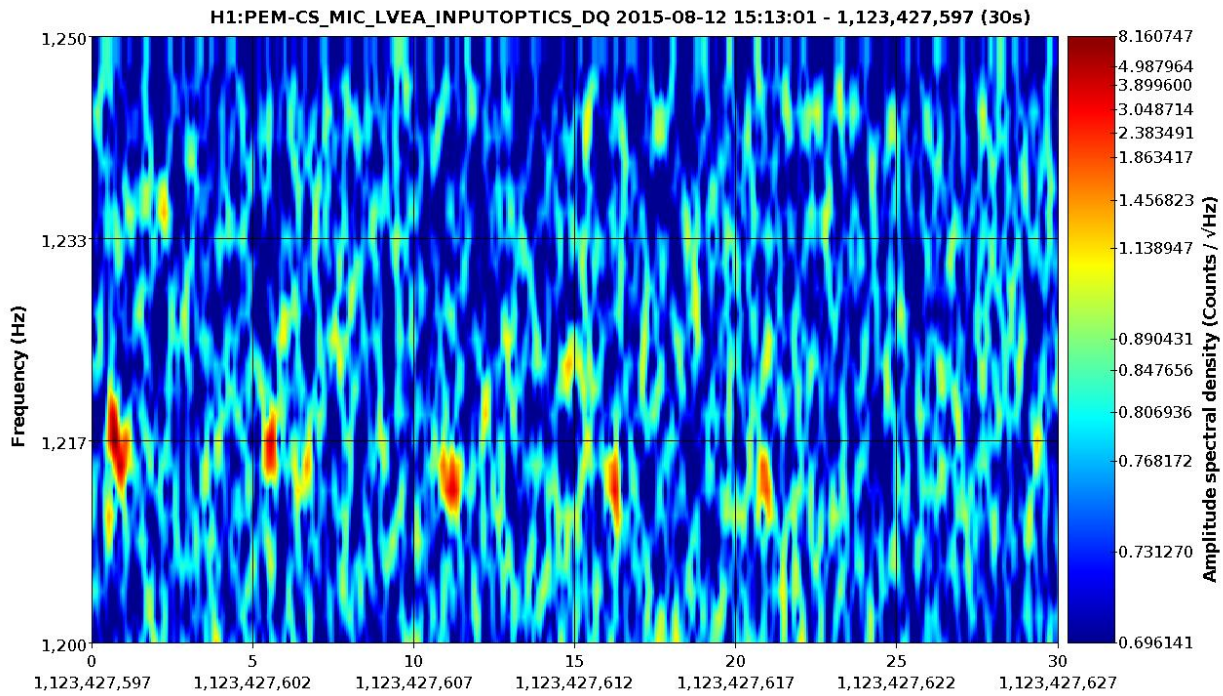
Site Anthropogenic Noise Injections

| Injection	Time of first injection Aug. 12 UTC	Injection spacing (seconds)	Injection session duration and number of injection (seconds, number)
Truck (3808) horn at OSB recieving	15:09:00	5	30, 6
Truck (3808) horn at 2k electronics room building	15:13:00	5	30, 6
Truck (3808) sudden braking near 2k electronics building	15:16:00	5	30, 6
Quick human moves in the optics lab next to the input arm	15:23:00	5	60, 12
Human jumps in the change room	15:25:00	5	60, 12
Silver van horn, 2k electronics building area	17:04:00	5	30, 6
Silver van sudden brakes 2k electronics building area	17:05:00	5	30, 6
Silver van horn, high-bay area	17:08:00	5	30, 6
Siler van brakes high-bay area	17:10:00	5	30, 6
Car door slams, patio area	17:13:00	5	30, 6
Corolla car horn, parking area	17:16:00	5	30, 6

Truck horn at OSB receiving (Aug 12 15:09:00 UTC)

I also looked for any possible up/down conversion in DARM from 1Hz to 5000Hz. I saw nothing.

H1:PEM-CS_MIC_LVEA_OUTPUTOPTICS_DQ 2015-08-12 15:09:01 - 1,123,427,357 (30s)

Fs=16,384Hz, sec/fft = 0.50, overlap = 0.90, fft length=8,192, #-FFT = 590/1, bw = 2, in samples = 492K, low = 0.20

H1:CAL-DELTAL_EXTERNAL_DQ 2015-08-12 15:09:01 - 1,123,427,357 (30s)
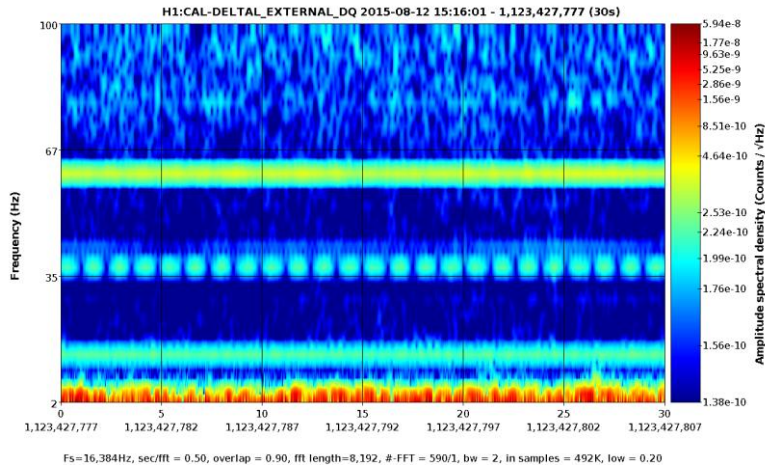
Fs=16,384Hz, sec/fft = 0.50, overlap = 0.90, fft length=8,192, #-FFT = 590/1, bw = 2, in samples = 492K, low = 0.20

Truck horn at 2k electronics room (Aug 12 15:13:00 UTC)

H1:PEM-CS_MIC_LVEA_INPUTOPTICS_DQ 2015-08-12 15:13:01 - 1,123,427,597 (30s)

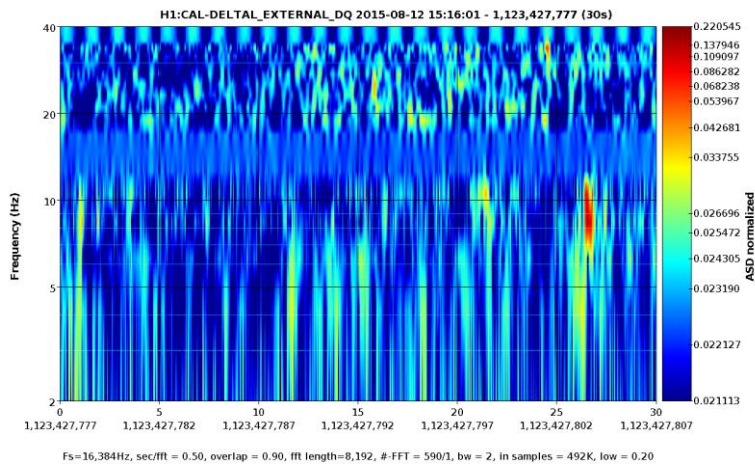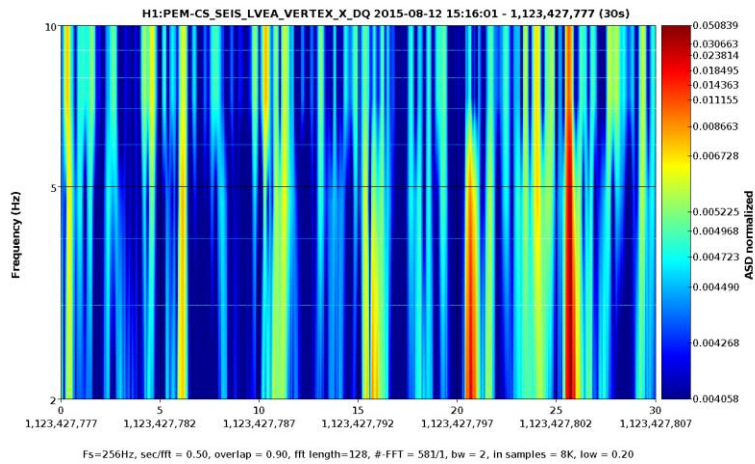Fs=16,384Hz, sec/fft = 0.50, overlap = 0.90, fft length=8,192, #-FFT = 590/1, bw = 2, in samples = 492K, low = 0.20

H1:CAL-DELTAL_EXTERNAL_DQ 2015-08-12 15:13:01 - 1,123,427,597 (30s)
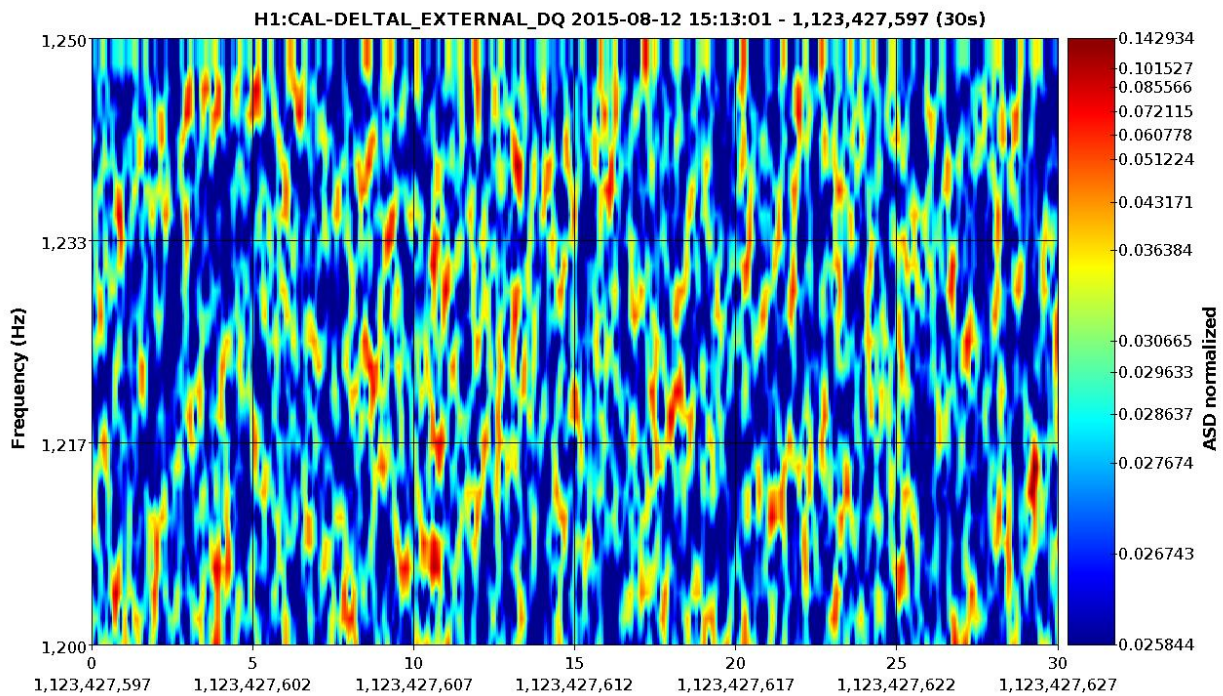
Fs=16,384Hz, sec/fft = 0.50, overlap = 0.90, fft length=8,192, #-FFT = 590/1, bw = 2, in samples = 492K, low = 0.20
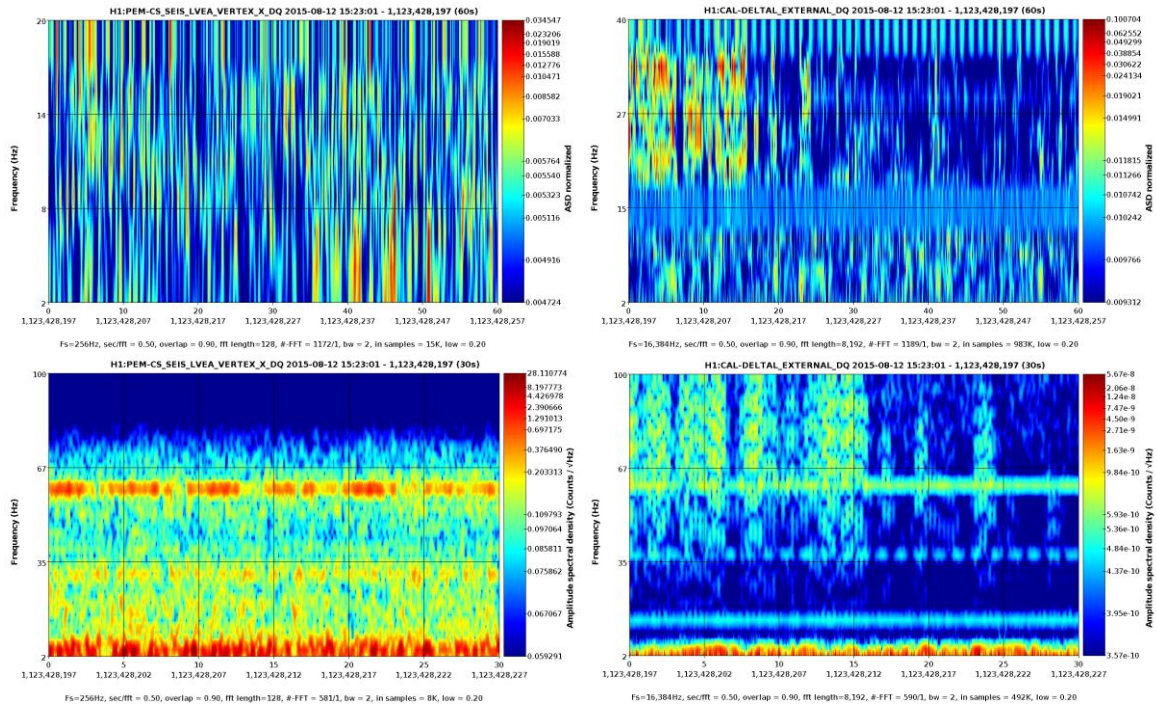
Truck sudden brakes near 2k electronics building

(Aug 12 15:16:00 UTC)

No clear evidence of DARM coupling. I have also looked for any possible up/down conversion in DARM from 1Hz to 500Hz.
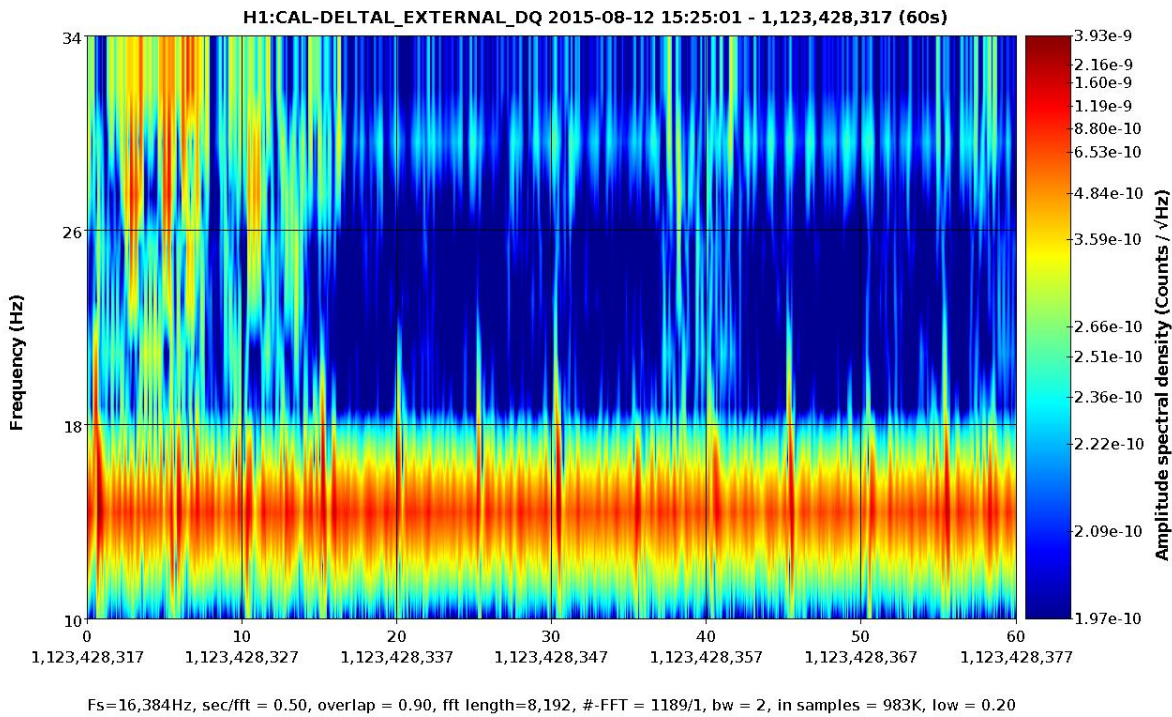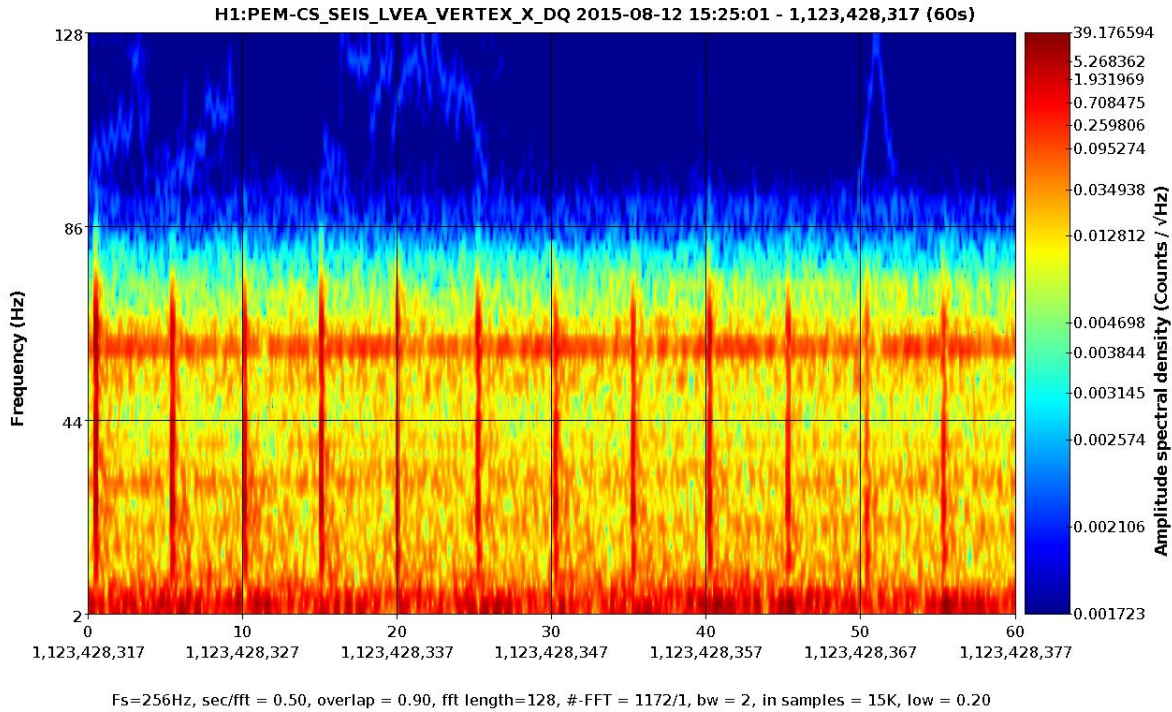

H1:PEM-CS_SEIS_LVEA_VERTEX_X_DQ 2015-08-12 15:16:01 - 1,123,427,777 (30s)

Fs=256Hz, sec/fft = 0.50, overlap = 0.90, fft length=128, #-FFT = 581/1, bw = 2, in samples = 8K, low = 0.20

H1:CAL-DELTAL_EXTERNAL_DQ 2015-08-12 15:16:01 - 1,123,427,777 (30s)

Fs=16,384Hz, sec/fft = 0.50, overlap = 0.90, fft length=8,192, #-FFT = 590/1, bw = 2, in samples = 492K, low = 0.20

H1:CAL-DELTAL_EXTERNAL_DQ 2015-08-12 15:16:01 - 1,123,427,777 (30s)

Fs=16,384Hz, sec/fft = 0.50, overlap = 0.90, fft length=8,192, #-FFT = 590/1, bw = 2, in samples = 492K, low = 0.20

Quick human moves in the optics lab

(Aug 12 15:23:00 UTC)

Not visible in neither DARM nor PEM seismometer

Human jumps in the change room
(Aug 12 15:25:00 UTC)

H1:PEM-CS_SEIS_LVEA_VERTEX_X_DQ 2015-08-12 15:25:01 - 1,123,428,317 (60s)

Fs=256Hz, sec/fft = 0.50, overlap = 0.90, fft length=128, #-FFT = 1172/1, bw = 2, in samples = 15K, low = 0.20

H1:CAL-DELTAL_EXTERNAL_DQ 2015-08-12 15:25:01 - 1,123,428,317 (60s)

Fs=16,384Hz, sec/fft = 0.50, overlap = 0.90, fft length=8,192, #-FFT = 1189/1, bw = 2, in samples = 983K, low = 0.20
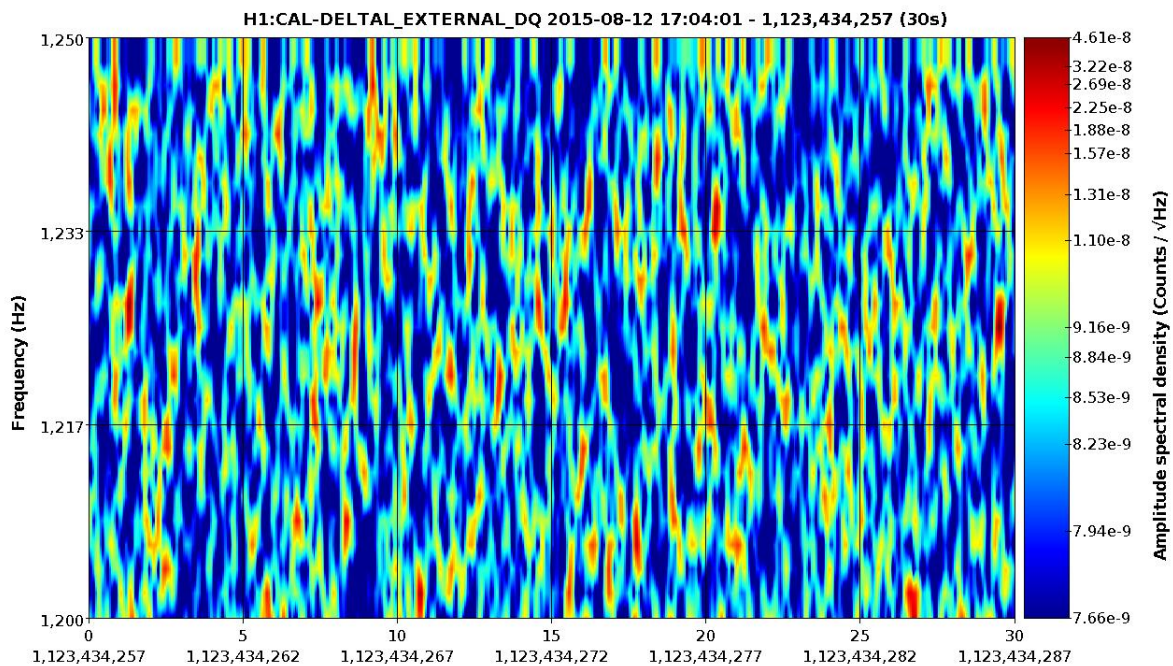
Silver van horn, 2k electronics building area
(Aug 12 17:04:00 UTC)

No up/down conversion found between 600-2000 Hz
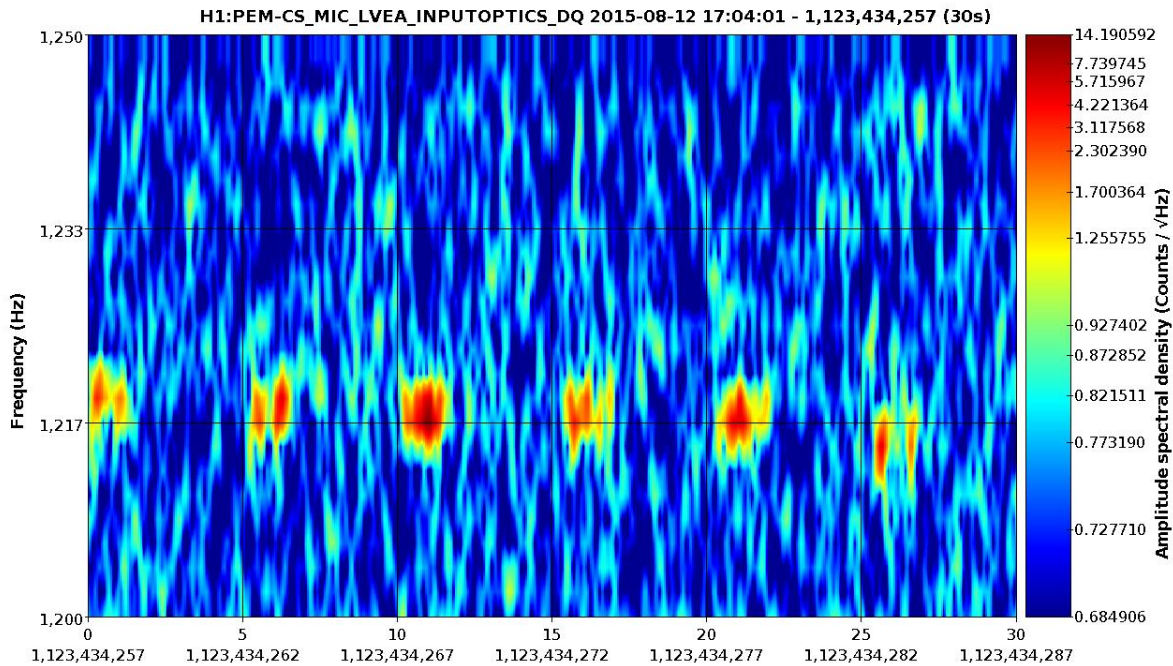
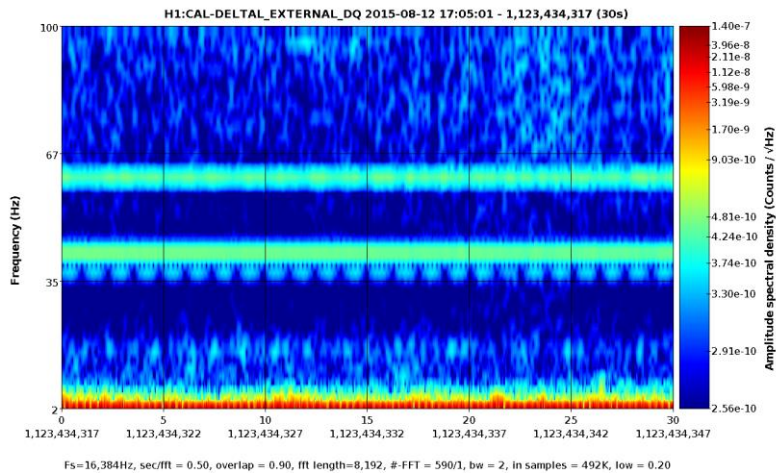### H1:PEM-CS_MIC_LVEA_INPUTOPTICS_DQ 2015-08-12 17:04:01 - 1,123,434,257 (30s)
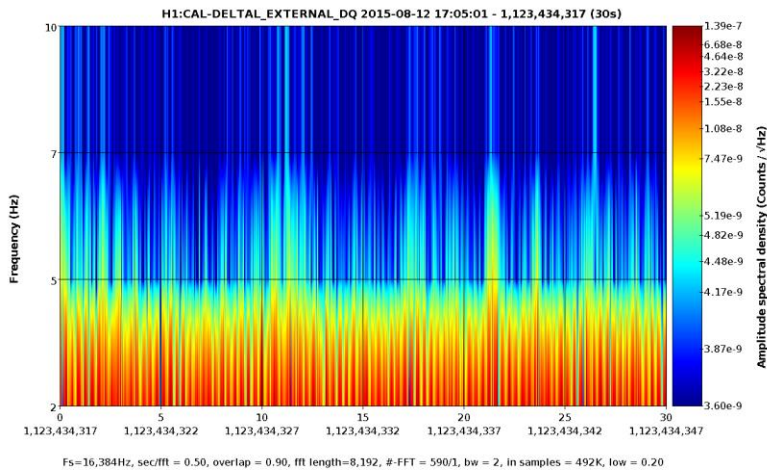

Fs=16,384Hz, sec/fft = 0.50, overlap = 0.90, fft length=8,192, #-FFT = 590/1, bw = 2, in samples = 492K, low = 0.20
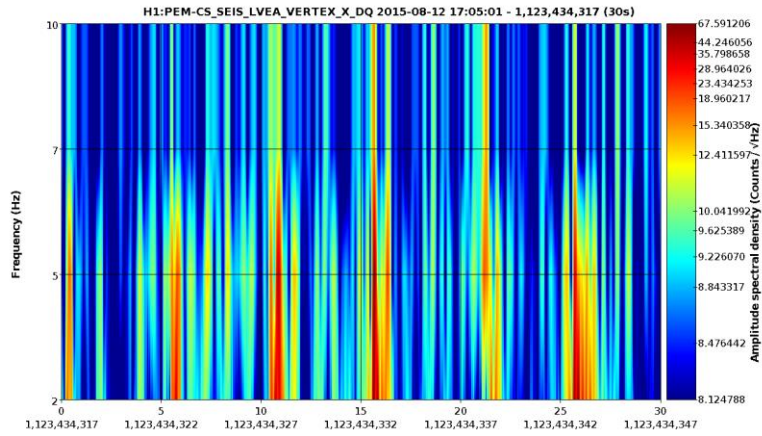
H1:CAL-DELTAL_EXTERNAL_DQ 2015-08-12 17:04:01 - 1,123,434,257 (30s)
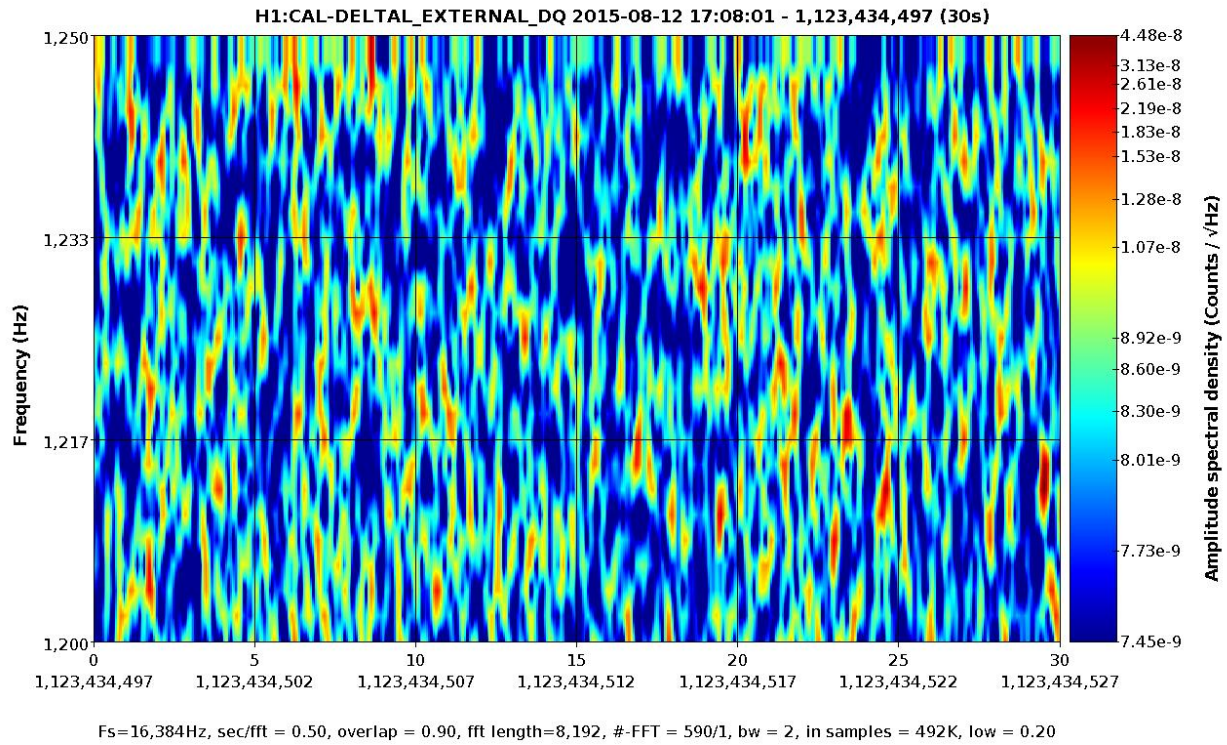

Fs=16,384Hz, sec/fft = 0.50, overlap = 0.90, fft length=8,192, #-FFT = 590/1, bw = 2, in samples = 492K, low = 0.20

Silver van sudden brakes, 2k electronics building area
(Aug 12 17:05:00 UTC)

Silver van horn, high-bay area

(Aug 12 17:08:00 UTC)

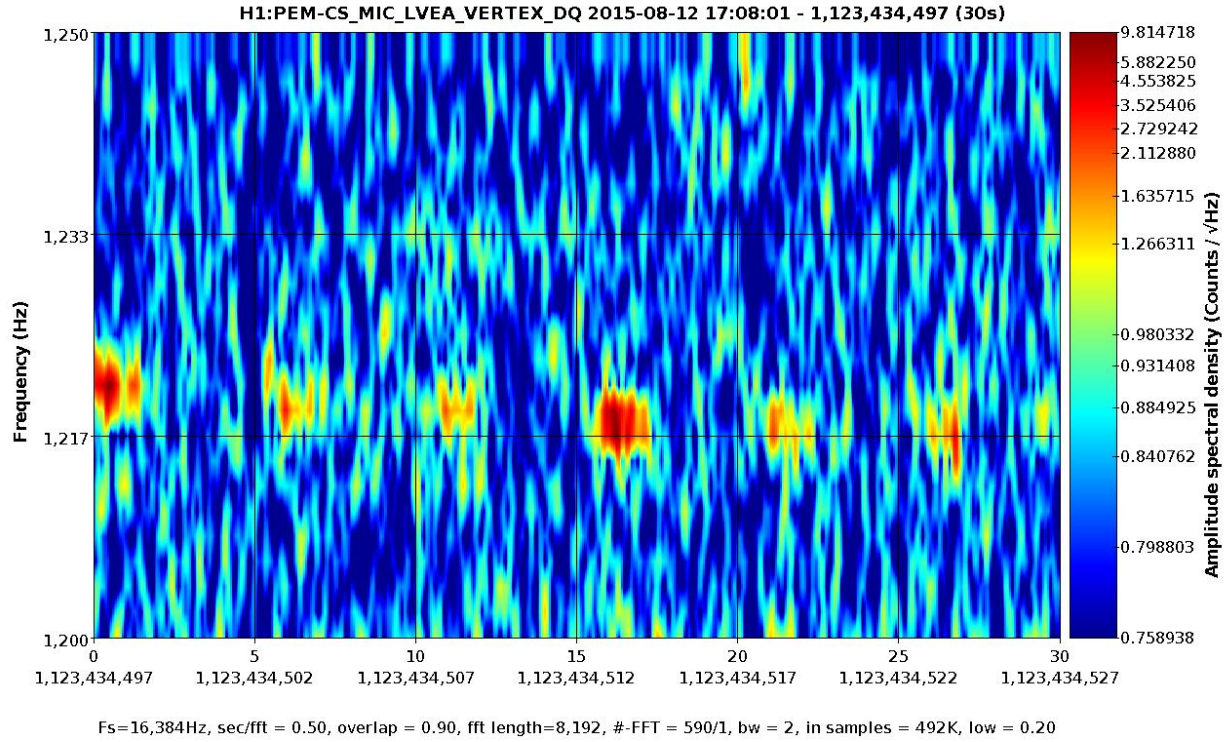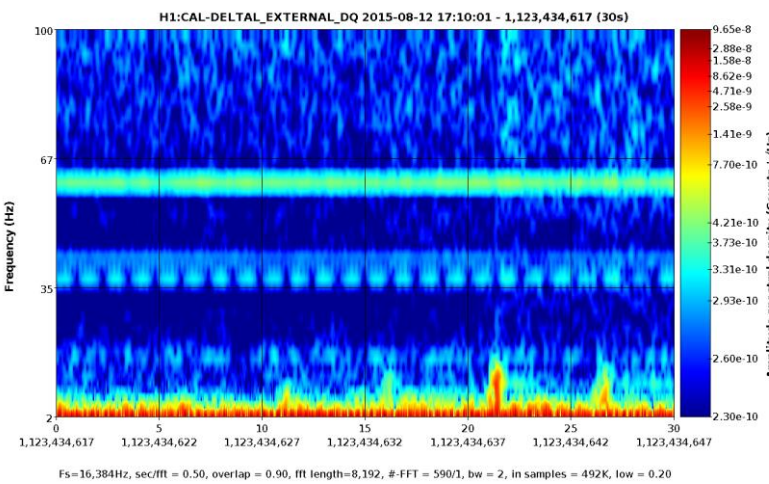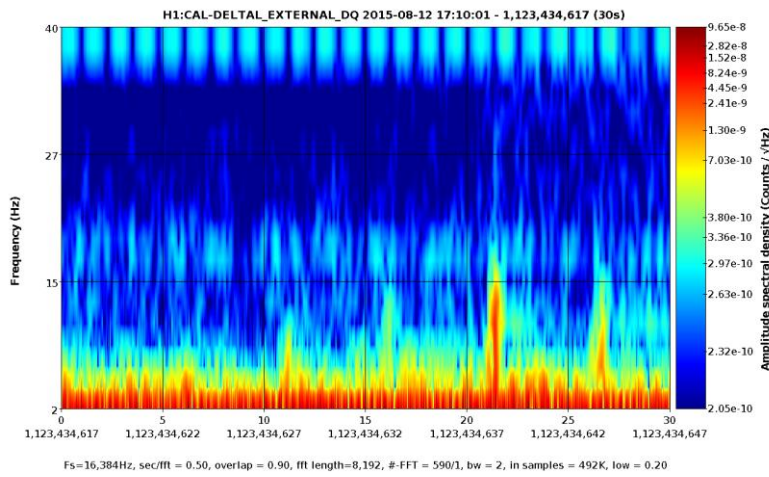**H1:PEM-CS_MIC_LVEA_VERTEX_DQ 2015-08-12 17:08:01 - 1,123,434,497 (30s)**

Fs=16,384Hz, sec/fft = 0.50, overlap = 0.90, fft length=8,192, #-FFT = 590/1, bw = 2, in samples = 492K, low = 0.20

H1:CAL-DELTAL_EXTERNAL_DQ 2015-08-12 17:08:01 - 1,123,434,497 (30s)

Fs=16,384Hz, sec/fft = 0.50, overlap = 0.90, fft length=8,192, #-FFT = 590/1, bw = 2, in samples = 492K, low = 0.20

Silver van brakes, high-bay area (Aug 12 17:10:00 UTC)

H1:PEM-CS_SEIS_LVEA_VERTEX_X_DQ 2015-08-12 17:10:01 - 1,123,434,617 (30s)

Fs=256Hz, sec/fft = 0.50, overlap = 0.90, fft length=128, #-FFT = 581/1, bw = 2, in samples = 8K, low = 0.20

H1:CAL-DELTAL_EXTERNAL_DQ 2015-08-12 17:10:01 - 1,123,434,617 (30s)

Fs=16,384Hz, sec/fft = 0.50, overlap = 0.90, fft length=8,192, #-FFT = 590/1, bw = 2, in samples = 492K, low = 0.20

H1:CAL-DELTAL_EXTERNAL_DQ 2015-08-12 17:10:01 - 1,123,434,617 (30s)

Fs=16,384Hz, sec/fft = 0.50, overlap = 0.90, fft length=8,192, #-FFT = 590/1, bw = 2, in samples = 492K, low = 0.20

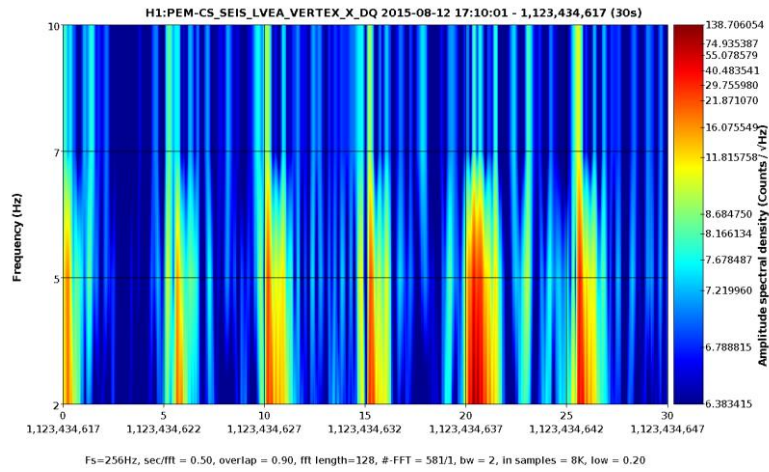# Car door slams, patio area (Aug 12 17:13:00 UTC)
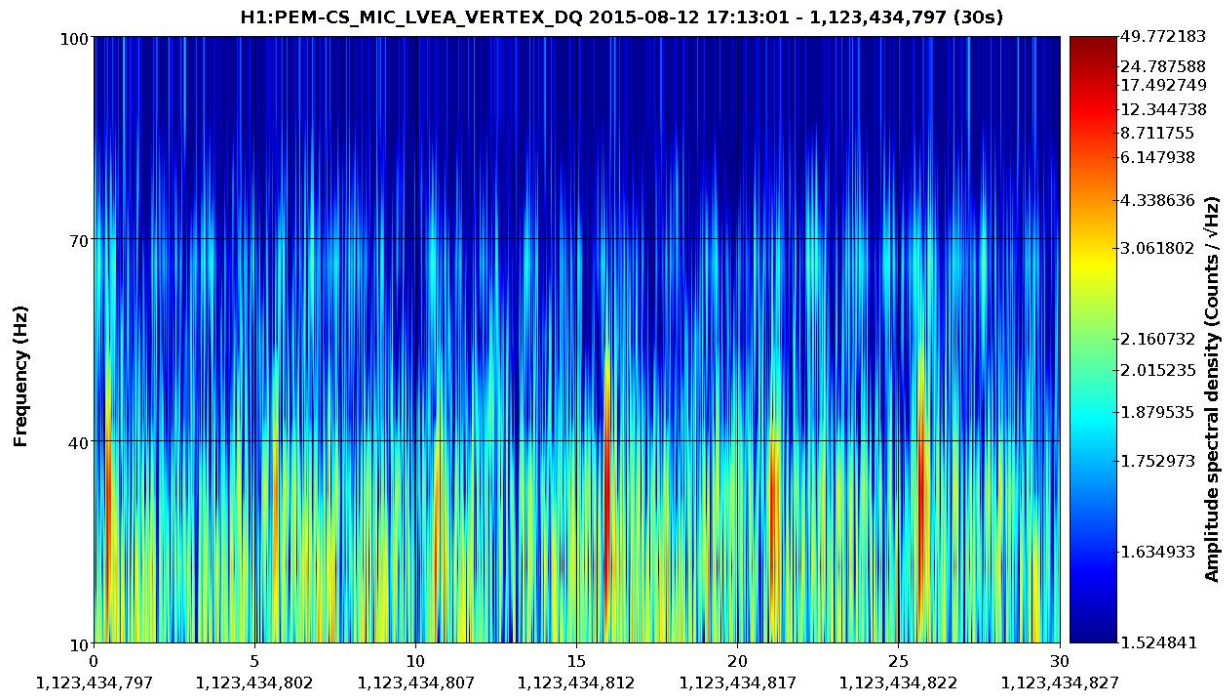
H1:PEM-CS_MIC_LVEA_VERTEX_DQ 2015-08-12 17:13:01 - 1,123,434,797 (30s)

Fs=16,384Hz, sec/fft = 0.10, overlap = 0.90, fft length=1,638, #-FFT = 996/3, bw = 10, in samples = 492K, low = 0.20

H1:CAL-DELTAL_EXTERNAL_DQ 2015-08-12 17:13:01 - 1,123,434,797 (30s)
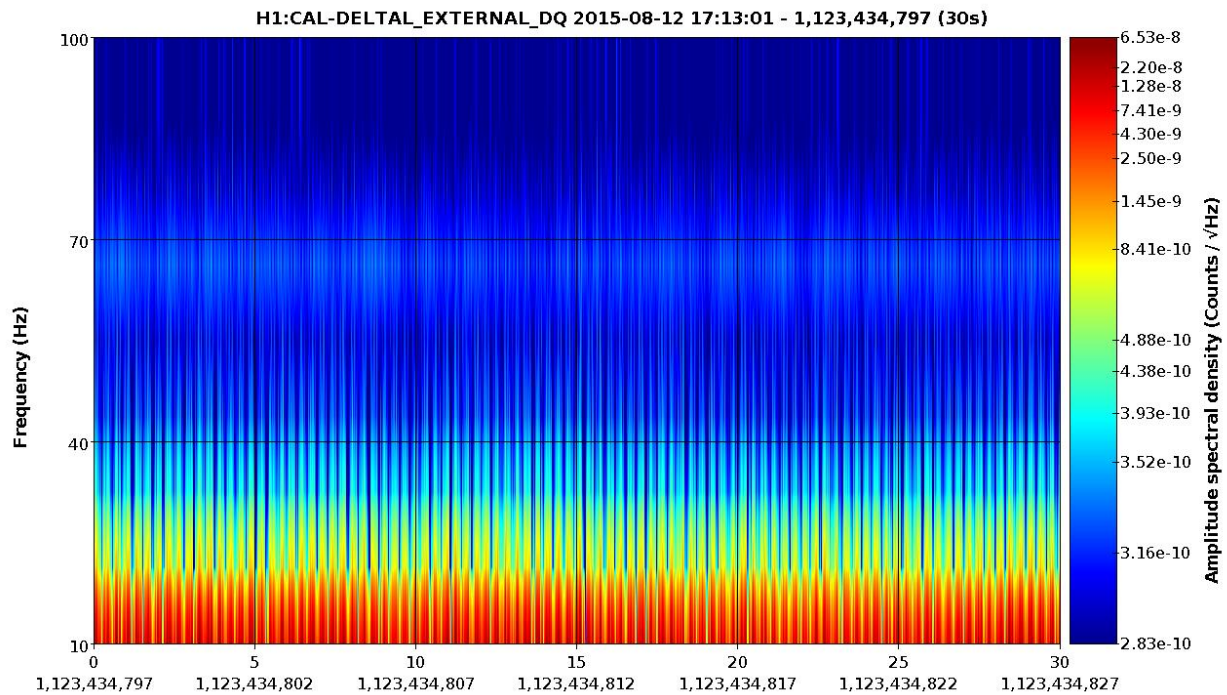
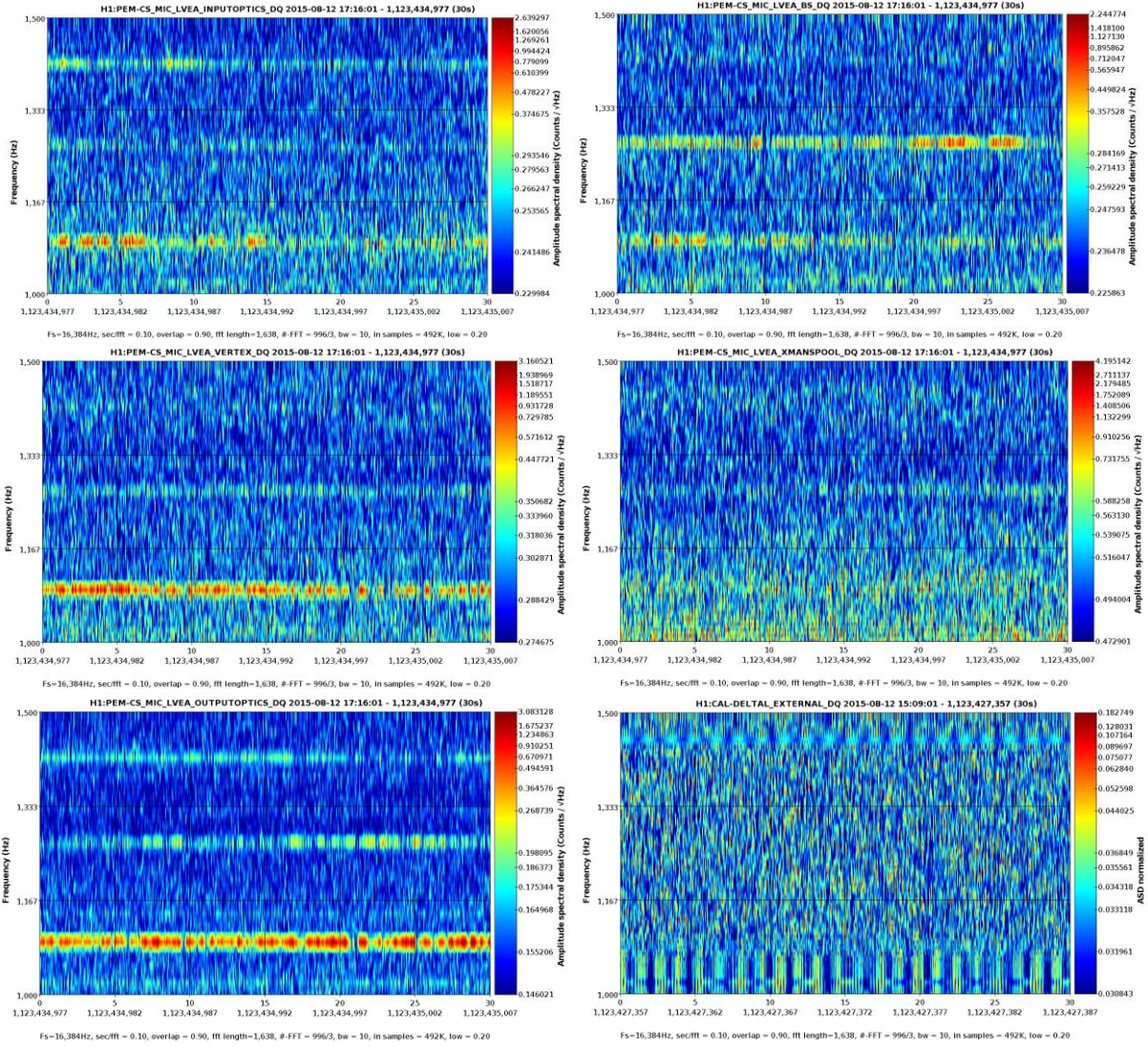

Fs=16,384Hz, sec/fft = 0.10, overlap = 0.90, fft length=1,638, #-FFT = 996/3, bw = 10, in samples = 492K, low = 0.20

Corolla car horn, parking area (Aug 12 17:16:0 UTC)

Not visible in any of the microphones in the LVEA.

Conclusion

Coupled into DARM: Human jumps in the change room, Car sudden breaks near 2k electronics and high-bay area.

No evidence of being coupled into DARM: Car horn, human moves in the optics lab, car door slams.