APPENDIX F:
EXAMPLE AVERAGE SQUARED DIFFERENCE CONTOURS FOR SPECTRAL FIT ALGORITHM

This appendix contains 40 example Average Squared Difference (*ASD*) contours as given by Equation (5.3) for different input values of scatterer size and total attenuation. In Figures F.1-F.8, the colors correspond to the 1/*ASD* values. Hence, dark red corresponds to a small *ASD* value and dark blue corresponds to a large *ASD* value. The 40 contours correspond to 1000 independent waveforms grouped into sets containing 25 waveforms that were subsequently averaged in the normal spectral domain. The waveforms were generated for a *f*/4, 5 cm focal length source whose filtering characteristics were given by Equation (4.19) sonifying an infinite half-space with an attenuation of 0.3 dB/cm/MHz containing Gaussian scatterers with effective radii of 25 μm at a density of 35/mm^3. A hamming window with a length of 2.5 mm was used to gate the time-domain waveforms. Normally, the Spectral Fit algorithm would yield the scatterer size and total attenuation corresponding to the minimum of these *ASD* contours. Hence, the scatterer size yielded by the minimization routine is provided above the corresponding contour.

(a) (b)

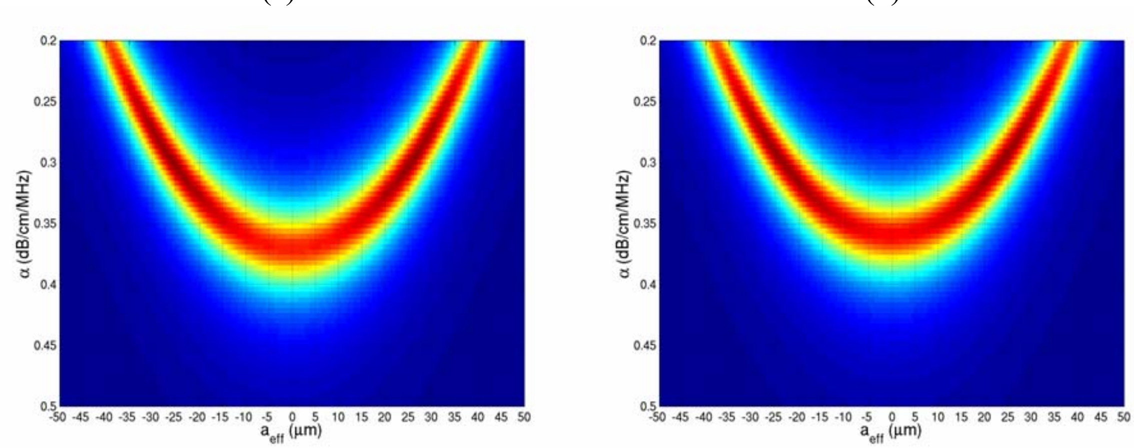
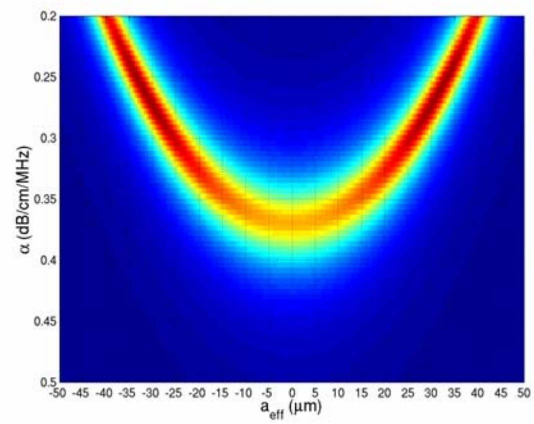
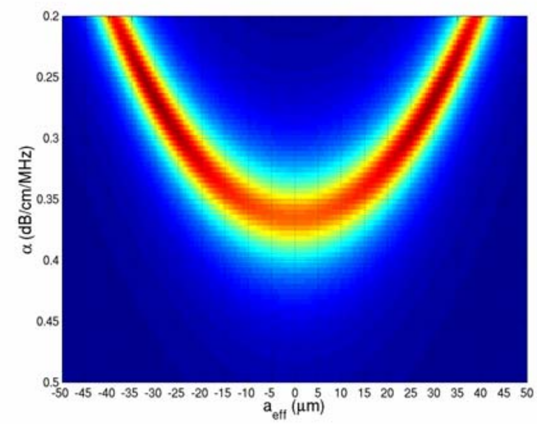


Figure F.1: (a) 1st set of 25 waveforms, a_{eff} = 26.619 μm, (b) 2nd set of 25 waveforms, a_{eff} = 24.383 μm.

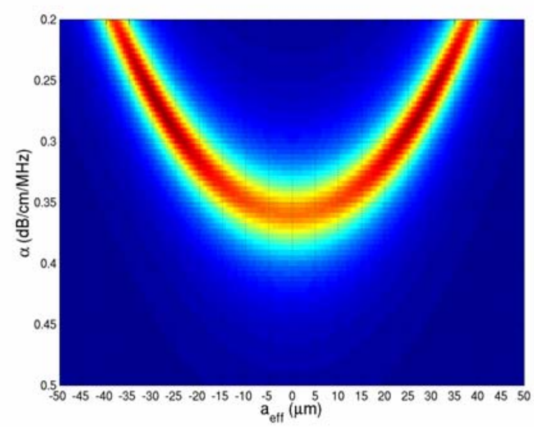
(a)



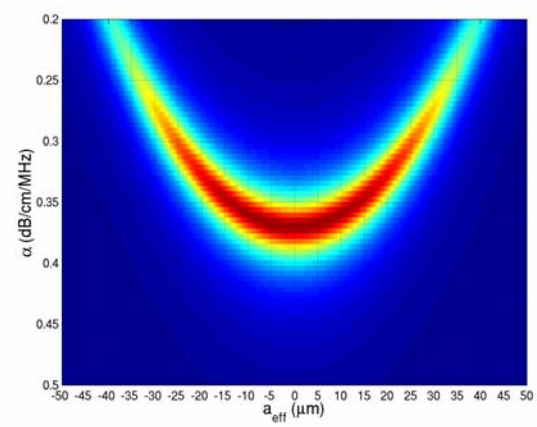
(b)



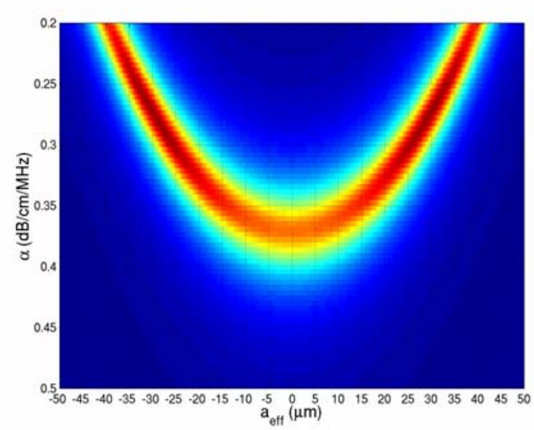
(c)



(d)



(e)



(f)

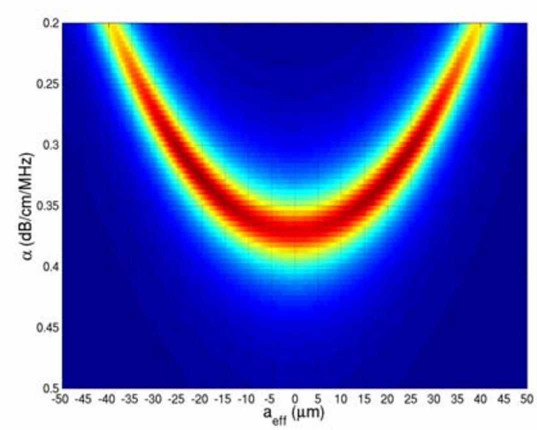


Figure F.2: (a) 3rd set of 25 waveforms, a_{eff} = 31.784 μm, (b) 4th set of 25 waveforms, a_{eff} = 29.921 μm, (c) 5th set of 25 waveforms, a_{eff} = 28.714 μm, (d) 6th set of 25 waveforms, a_{eff} = .076734 nm, (e) 7th set of 25 waveforms, a_{eff} = 29.863 μm, (f) 8th set of 25 waveforms, a_{eff} = 20.974 μm.

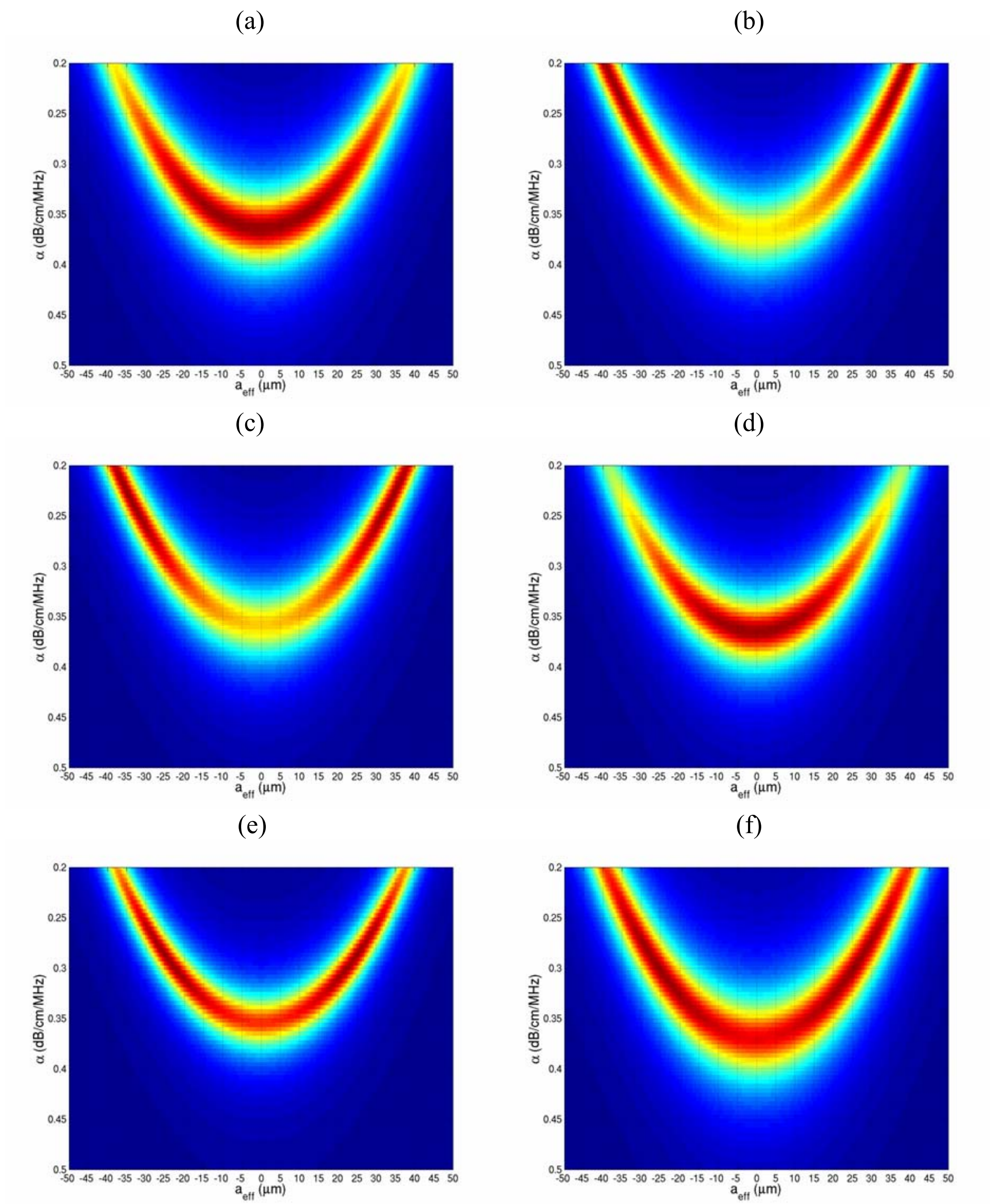


Figure F.3: (a) 9th set of 25 waveforms, a_{eff} = .019431 nm, (b) 10th set of 25 waveforms, a_{eff} = 37.621 μm, (c) 11th set of 25 waveforms, a_{eff} = 33.909 μm, (d) 12th set of 25 waveforms, a_{eff} = .00730 nm, (e) 13th set of 25 waveforms, a_{eff} = 24.294 μm, (f) 14th set of 25 waveforms, a_{eff} = 25.493 μm.

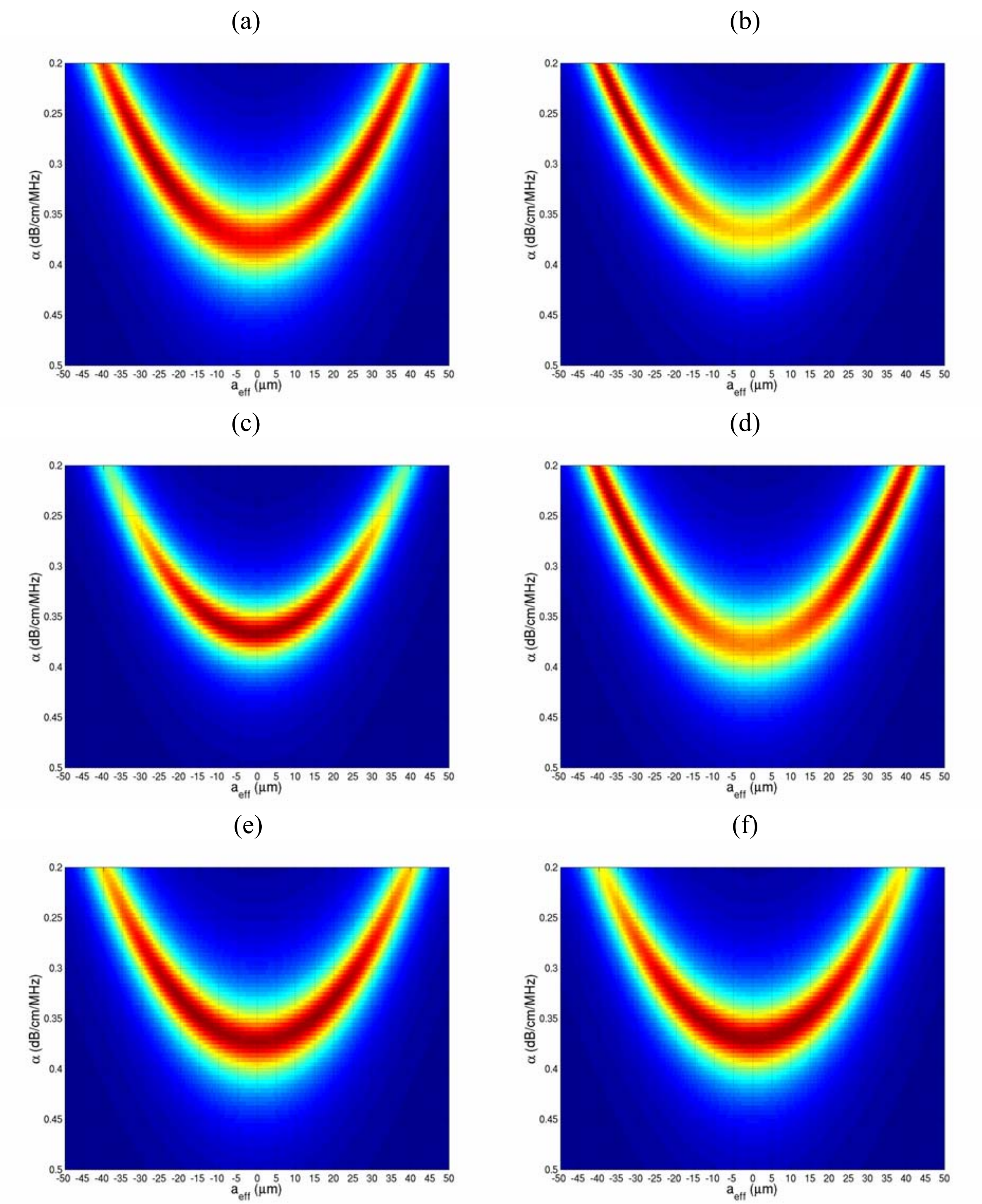


Figure F.4: (a) 15th set of 25 waveforms, a_{eff} = 26.314 μm, (b) 16th set of 25 waveforms, a_{eff} = 34.396 μm, (c) 17th set of 25 waveforms, a_{eff} = .029511 nm, (d) 18th set of 25 waveforms, a_{eff} = 33.286 μm, (e) 19th set of 25 waveforms, a_{eff} = 15.811 μm, (f) 20th set of 25 waveforms, a_{eff} = 4.644 μm.

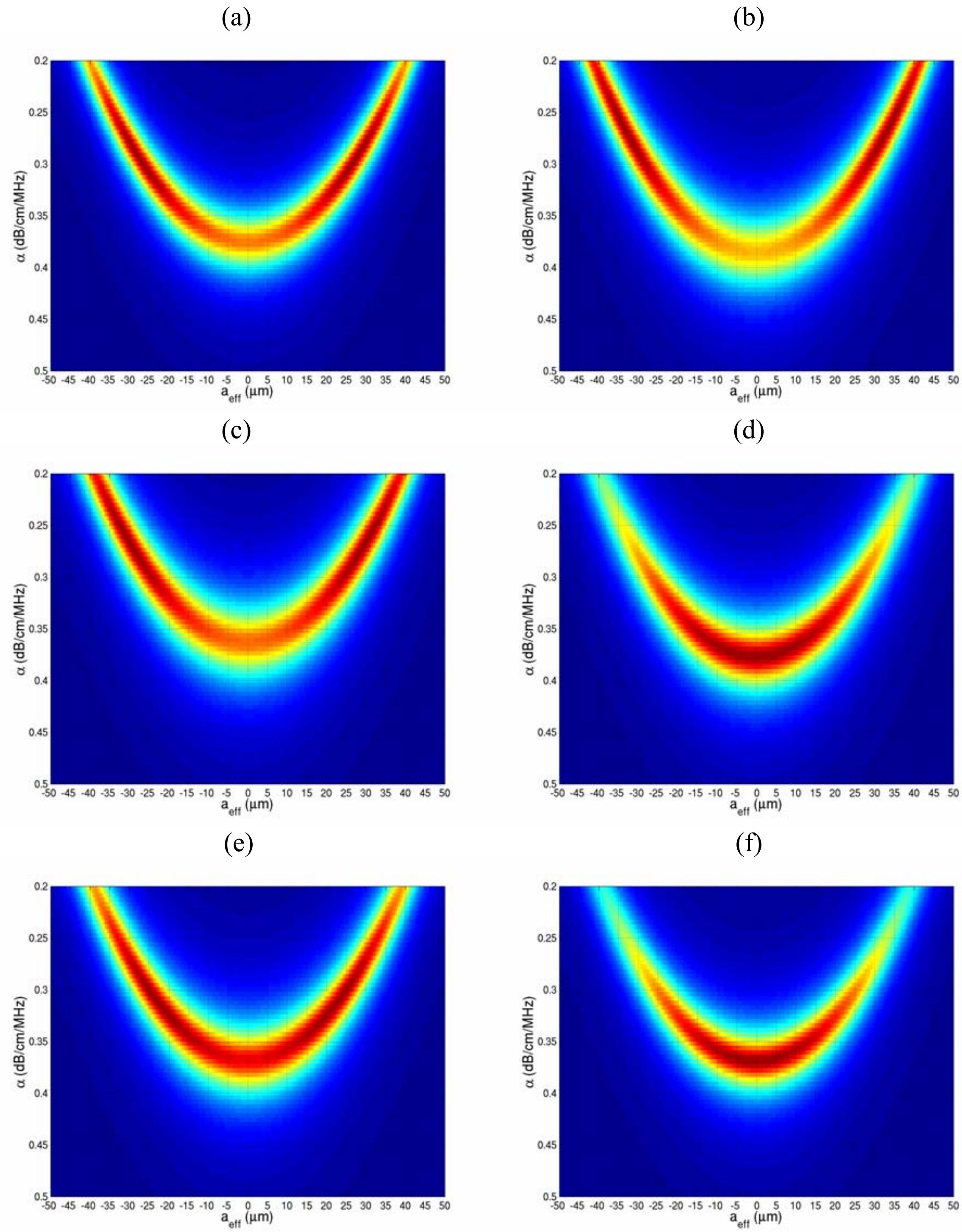


Figure F.5: (a) 21st set of 25 waveforms, a_{eff} = 27.550 μm, (b) 22nd set of 25 waveforms, a_{eff} = 33.151 μm, (c) 23rd set of 25 waveforms, a_{eff} = 29.986 μm, (d) 24th set of 25 waveforms, a_{eff} = .01734 nm, (e) 25th set of 25 waveforms, a_{eff} = 22.460 μm, (f) 26th set of 25 waveforms, a_{eff} = .04838 nm

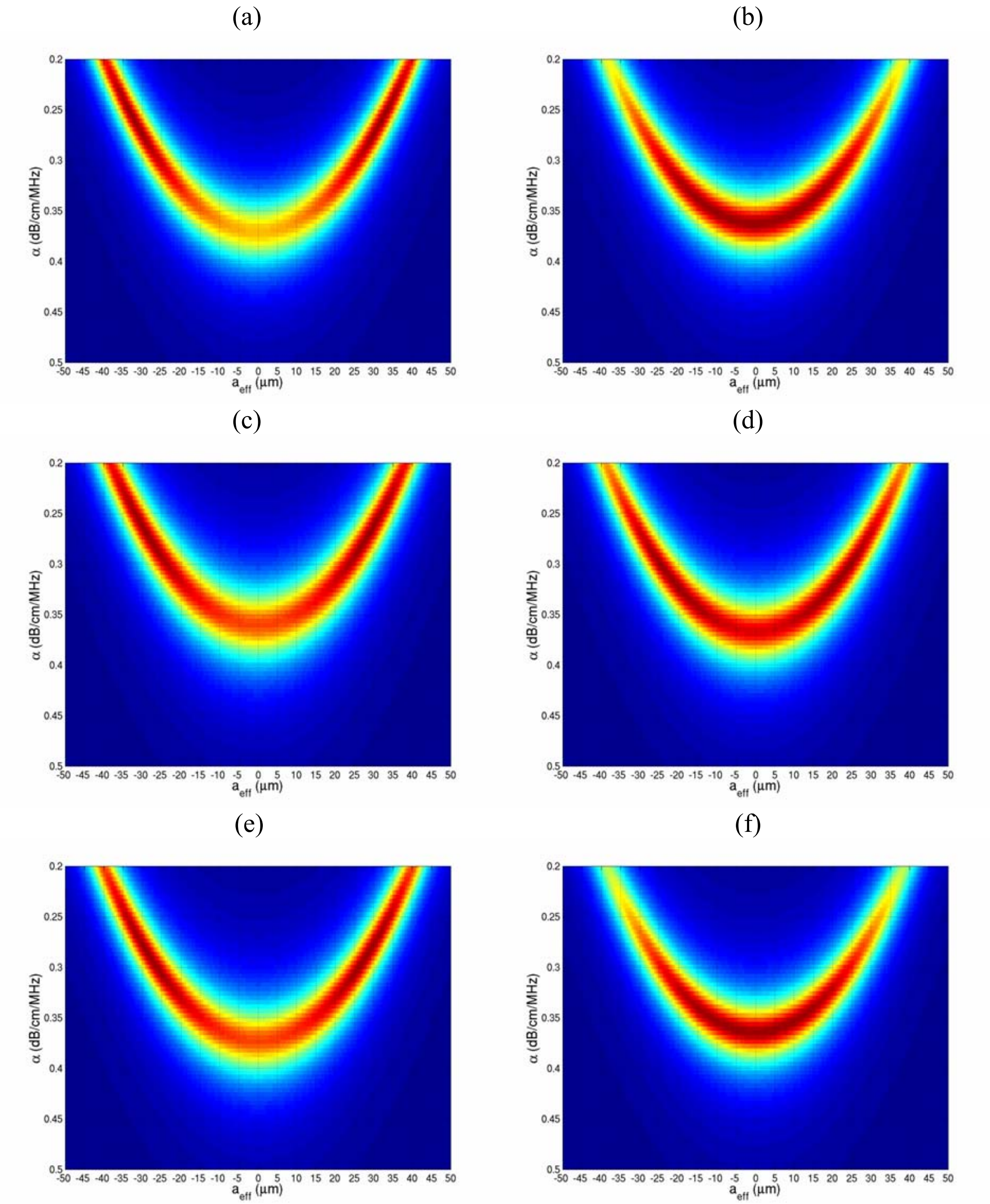


Figure F.6: (a) 27th set of 25 waveforms, a_{eff} = 32.079 μm, (b) 28th set of 25 waveforms, a_{eff} = 11.156 μm, (c) 29th set of 25 waveforms, a_{eff} = 29.071 μm, (d) 30th set of 25 waveforms, a_{eff} = 21.890 μm, (e) 31st set of 25 waveforms, a_{eff} = 28.411 μm, (f) 32nd set of 25 waveforms, a_{eff} = 7.1507 μm.

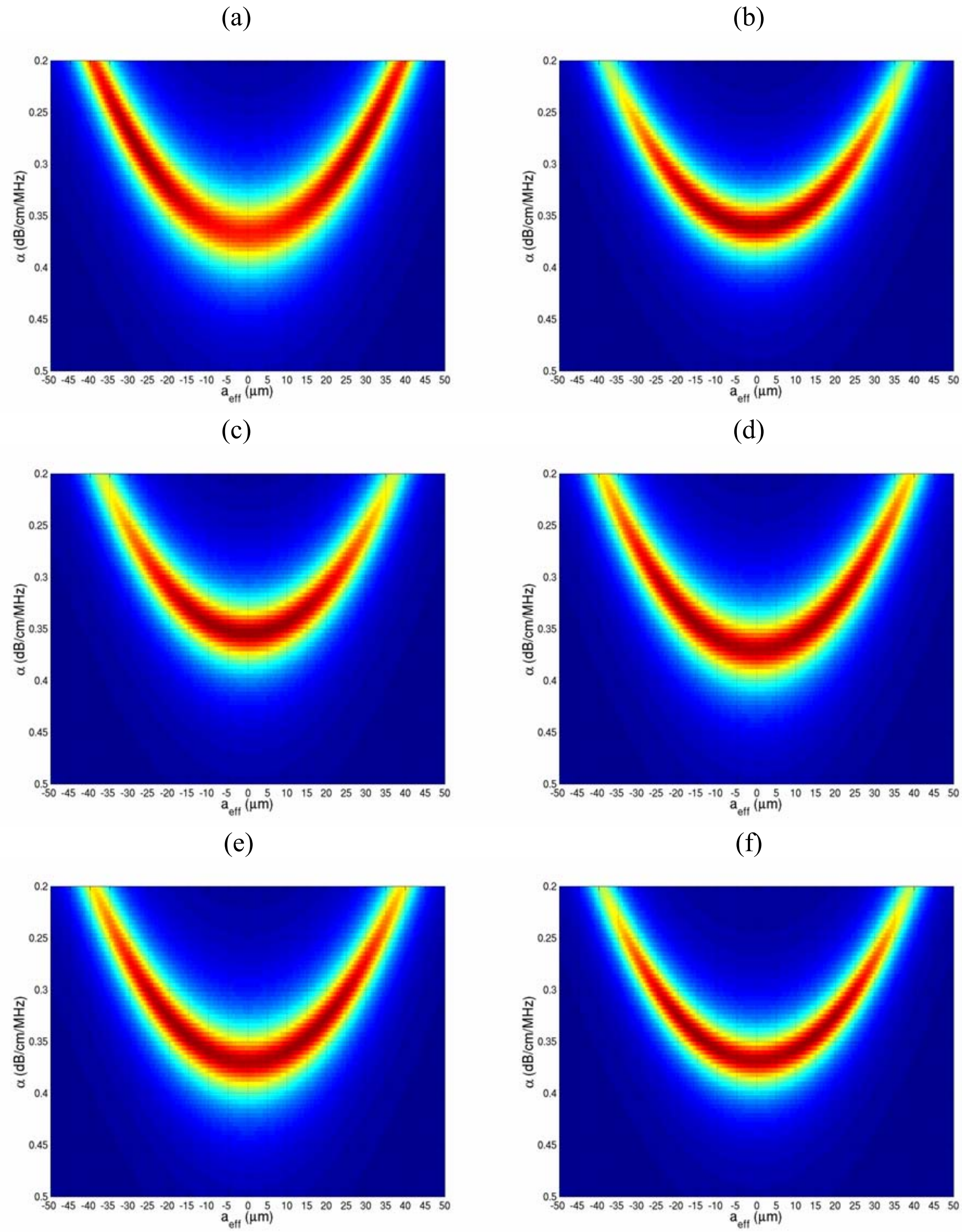


Figure F.7: (a) 33rd set of 25 waveforms, a_{eff} = 27.089 μm, (b) 34th set of 25 waveforms, a_{eff} = 5.6100 μm, (c) 35th set of 25 waveforms, a_{eff} = .010703 nm, (d) 36th set of 25 waveforms, a_{eff} = 23.555 μm, (e) 37th set of 25 waveforms, a_{eff} = 16.582 μm, (f) 38th set of 25 waveforms, a_{eff} = 14.996 μm.

(a) (b)

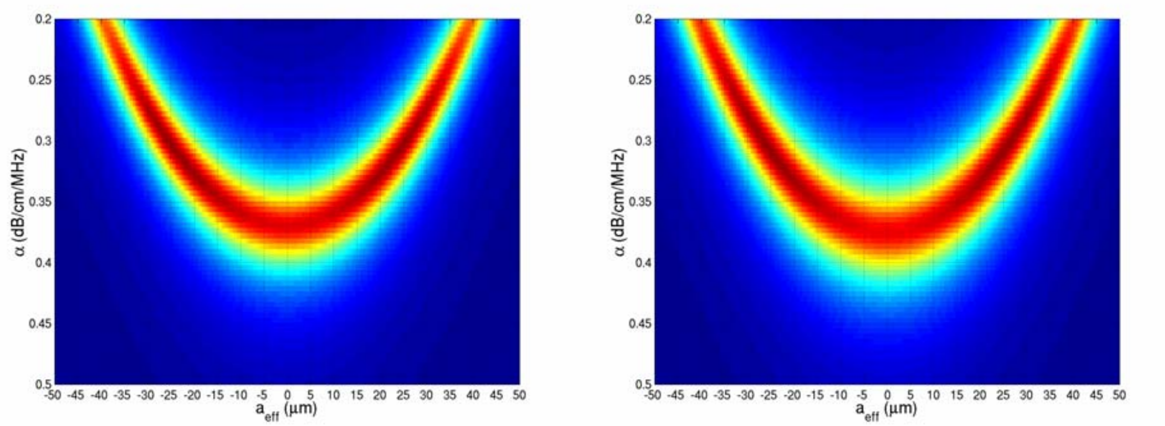


Figure F.8: (a) 39th set of 25 waveforms, a_{eff} = 23.843 μm, (b) 40th set of 25 waveforms, a_{eff} = 26.275 μm.