

Low-Frequency Noise Audit & Dampening Guide

Identifying Domestic Infrasound (20-250 Hz) and Restoring Autonomic Nervous Regulation

1. Domestic Low-Frequency Resonance Sources

Source Appliance	Acoustic Frequency	Physiological Impact & Transmission
Refrigerator Compressor	50 Hz - 120 Hz (Harmonics)	Structural transmission through flooring. Triggers persistent sub-perceptual autonomic arousal.
HVAC Return Air Ducts	30 Hz - 80 Hz (Helmholtz)	Airflow turbulence through thin sheet metal creates continuous standing waves in bedrooms.
External Heat Pump / Mini-split	25 Hz - 60 Hz (Infrasound)	Penetrates double-pane windows effortlessly; correlates with reduced slow-wave REM sleep.
Unbalanced Ceiling Fan	10 Hz - 30 Hz (Mechanical)	Sub-audible wobble vibrates ceiling joists; perceived as chest pressure or mild malaise.

2. Physical Decoupling and Acoustic Dampening Protocol

Intervention Tier	Tactical Implementation	Target Decibel / Vibration Reduction
1. Mechanical Decoupling	Install 2-inch dual-durometer rubber/cork anti-vibration pads under appliance feet.	Reduces structural floor transfer by 12 to 18 dB.
2. Duct Mass Damping	Wrap exposed basement/attic sheet metal ducts with butyl mastic foil tape.	Dampens sheet metal flutter and drum resonance by up to 70%.
3. Acoustic Cavity Fill	Place dense high-pile wool rugs over subfloors above mechanical rooms.	Absorbs airborne low-mid frequencies and prevents cavity reverberation.