Signal fragmentation is a method for transmitting a low frequency signal over a collection of small antennas through a modal expansion (similar to one level of a wavelet expansion), in which the mode has compact support in time. We analyze the spectral leakage and optimality of signal fragmentation. For a special choice of mode, the spectral leakage can be eliminated for sinusoidal signals and minimized for bandlimited or AM signals. We derive the optimal mode for either support size or for energy efficiency.

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