Toughness of recursively partitionable graphs

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A simple graph G on n vertices is said to be *recursively partitionable* if G is connected, and for every integer $1 \leq a < n$ there is a partition of $V(G)$ into a set A of cardinality a and B of cardinality $n - a$, such that both $G[A]$ and $G[B]$ are recursively partitionable. These graphs arise naturally when considering rainbow-cycle-free edge colorings of the complete graph. For example, it is not so difficult to see that path graphs have this property (but they are not the only trees). We show that if S is a vertex cut of a recursively partitionable graph G, with $|S| \geq 2$, then $G - S$ has at most $3|S| - 1$ components.

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