**S1 Table. Comparison of power-law and alternative distributions fit**

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| --- | --- | --- | --- | --- | --- |
|  |  | **Alternative** | **P ∝ f** | **Data segments** | **Test outcome** |
| Favor Power law | Inconclusive | Favor alternative |
| Brain tissue oxygenation | PSD | Exponential | $$ae^{-bx}$$ | Rest | 29.2% | 0.7% | 70.1% |
| All data | 89.9% | 0% | 10.1% |
| Log-normal | $$\frac{1}{x}e^{-\frac{(logx-u)^{2}}{2σ^{2}}}$$ | Rest | 27.1% | 0.7% | 72.2% |
| All data | 89.2% | 0% | 10.8% |
| DFA | Exponential | $$ae^{-bx}$$ | Rest | 100% | 0% | 0% |
| All data | 100% | 0% | 0% |
| Log-normal | $$\frac{1}{x}e^{-\frac{(logx-u)^{2}}{2σ^{2}}}$$ | Rest | 68.1% | 0.7% | 31.3% |
| All data | 83.8% | 0% | 16.2% |
| BLP at gamma-band | PSD | Exponential | $$ae^{-bx}$$ | Rest | 44.4% | 11.1% | 44.4% |
| All data | 100% | 0% | 0% |
| Log-normal | $$\frac{1}{x}e^{-\frac{(logx-u)^{2}}{2σ^{2}}}$$ | Rest | 33.3% | 55.6% | 11.1% |
| All data | 100% | 0% | 0% |
| DFA | Exponential | $$ae^{-bx}$$ | Rest | 100% | 0% | 0% |
| All data | 100% | 0% | 0% |
| Log-normal | $$\frac{1}{x}e^{-\frac{(logx-u)^{2}}{2σ^{2}}}$$ | Rest | 66.7% | 0% | 33.3% |
| All data | 100% | 0% | 0% |