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Product Carbon Footprint Report

Product: kvpruwxrjn (1.0 unit)

42.32 kg CO₂e

System Boundary: Factory Gate (Cradle-to-Grave Analysis)

Total Footprint

42.32

kg CO2e

Carbon Intensity

42.32

kg CO2e/unit

Top Material Hotspot

Aluminum Casing

6.25 kg CO2e

Primary Emission Scope

Use Phase

(66.23% of total)

Lifecycle Stage Breakdown

Materials (S3C1)	13.15 kg CO2e (30.54%)
Production (S1+S2)	0.86 kg CO2e (1.99%)
Logistics (S3C4+9)	0.19 kg CO2e (0.44%)
Use Phase (S3C11)	28.52 kg CO2e (66.23%)
End-of-Life (S3C12)	0.34 kg CO2e (0.79%)

Material Composition Carbon Impact

Aluminum Casing	6.25 kg CO2e (47.53%)
Circuit Board	5.00 kg CO2e (38.02%)
Plastic Enclosure	0.90 kg CO2e (6.84%)
Copper Wire	0.80 kg CO2e (6.08%)
Packaging Cardboard	0.20 kg CO2e (1.52%)

Key Highlights

- The **Use Phase (Scope 3, Category 11)** accounts for the largest share of the footprint, contributing 28.52 kg CO₂e, or approximately 66.23% of the total. This emphasizes the product's energy consumption during its 5-year lifespan.
- **Purchased Goods and Services (Scope 3, Category 1)**, primarily raw materials, represent the second largest hotspot at 13.15 kg CO₂e (30.54%). Aluminum Casing and Circuit Board are significant contributors within this category.
- Manufacturing (Scope 2) emissions from purchased electricity are a smaller but notable contributor at 0.86 kg CO₂e (1.99%), highlighting the need for increased renewable energy adoption at the production facility.

Action Plan: Reducing Carbon Footprint

- **Enhance Use Phase Efficiency:** Invest in R&D to significantly reduce energy consumption during the product's operational life. Explore low-power modes and smart energy management features.
- **Sustainable Material Sourcing:** Investigate lower-carbon alternative materials or materials with higher recycled content, especially for Aluminum Casing and Circuit Boards.
- **Increase Renewable Energy:** Further increase the share of renewable energy used in manufacturing operations, through on-site generation or high-quality renewable energy certificates.
- **Boost Circularity:** Expand and promote take-back programs to increase the effective recycling rate and explore product design for easier disassembly and material recovery.