# Cable and jumper
# Product Carbon Footprint
# Verification Report

Client: Zhongtian Radio Frequency Cable Co., Ltd

Verification Body: TÜV SÜD Certification and Testing (China) Co., Ltd.

Report ID: 64.500.24.01352.01

Date of Issue: 2024-03-28

| | | | |
|---|---|---|---|
| footprint claim | | | **（kg$CO_2$eq/km）** |
| | Cable | HCAAY-50-12 | 2.40E+03 |
| | | HCAAYZ-50-12 | 2.41E+03 |
| | | HRCAYZ-50-9 | 1.79E+03 |
| | | HRCAY-50-9 | 1.77E+03 |
| | | HCTAYZ-50-23 | 2.72E+03 |
| | | HCTAY-50-22 | 2.71E+03 |
| | | HCTAY-50-32 | 4.80E+03 |
| | | HHTAY-50-42 | 5.81E+03 |
| | | HLRWUCYZ-50-22T | 1.62E+03 |
| | | HLRHTCYZ-50-32T | 2.87E+03 |
| | Jumper | 4310M-4310M-9*2 | 1.88E+03 |
| | | 4310M-4310M-9*15 | 1.50E+03 |
| | | NM-NM-9*2 | 1.74E+03 |
| | | 4310M-4310MA-9*5 | 1.62E+03 |
| | | 4310M-DM-9*3 | 1.72E+03 |
| | | 4310M-NM-9*3 | 1.68E+03 |
| | | 4310M-DMA-9*3 | 1.77E+03 |
| | | DM-DMA-9*3 | 1.82E+03 |
| | | NM-NM-12*3 | 2.13E+03 |
| | | DM-DM-12*2 | 2.61E+03 |
| Product carbon footprint statement | **Product category** | **Product model** | **Carbon emission （kg$CO_2$eq/km）** |
| | Cable | HCAAY-50-12 | 2.40E+03 |
| | | HCAAYZ-50-12 | 2.41E+03 |
| | | HRCAYZ-50-9 | 1.79E+03 |
| | | HRCAY-50-9 | 1.77E+03 |
| | | HCTAYZ-50-23 | 2.72E+03 |
| | | HCTAY-50-22 | 2.71E+03 |
| | | HCTAY-50-32 | 4.80E+03 |
| | | HHTAY-50-42 | 5.81E+03 |
| | | HLRWUCYZ-50-22T | 1.62E+03 |
| | | HLRHTCYZ-50-32T | 2.87E+03 |
| | Jumper | 4310M-4310M-9*2 | 1.88E+03 |
| | | 4310M-4310M-9*15 | |

the ISO 14067:2018 standard, and the Responsible Party is responsible for the preparation and fair presentation of the Product Carbon Footprint Report in accordance with the standard;

2）The verifier is responsible for issuing a verification statement based on the verification of the product's carbon footprint claim, and the verification process and results are in accordance with ISO 14064-3:2019;

3）The procedure for collecting verification evidence for the assessment of GHG declarations is: CCB_GHG_P_09ECS Procedures for the Implementation of the Greenhouse Gas Validation and Verification Process.

**Verification conclusion：**

The product carbon footprint verification statement is based on ISO 14064-3:2019 to verify the claim of the responsible party that “The cradle-to-gate carbon footprint associated with cable model HCAAY-50-12 (10 models in total, see product series) and jumper model 4310M-4310M-9*2 (10 models in total, see product series) produced by the responsible party within the manufacturing geographical boundary and time boundary is 2.40E+03 kg$CO_2$eq/kg (for the remaining 9 cable model, see product carbon footprint claim) and 1.88E+03 kg$CO_2$eq/kg (for the remaining 9 jumper model, see product carbon footprint claim)". It was verified regarding compliance with the requirements of ISO 14067:2018. The product carbon footprint claim is consistent with the product carbon footprint verification statement.

# Contents

# Contents of Figures





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## Abbreviations

| | |
|---|---|
| PCR | Product Category Rule |
| IPCC | The Intergovernmental Panel on Climate Change |
| GWP | Global Warming Potentials |
| LCA | Life Cycle Assessment |
| GLO | Global average |
| RoW | Rest of World |
| tkm | tonne kilometre (unit for transportation services) |
| PTFE | Polytetrafluorethylene |
| CN | China |
| HDPE | High-density polyethylene |
| LDPE | Low-density polyethylene |
| PE | Polyethylene |
| LSZH | Low smoke zero halogen |
| EVA | Ethyl vinyl acetate |
| POE | Polyolefin elastomer |
| ECGC | East China grid |
| JS | Jiangsu |
| DQR | Data Quality Rating |
| CV | Control Value |

## 1.3 Verification evidence-gathering procedures

TÜV SÜD conducted document review and on-site verification of the responsible party on 2024-02-07 and 2024-02-16 respectively. The objects and contents include basic information of the enterprise, inventory of emission facilities, inventory of emission sources, inventory of monitoring equipment, information related to activity level and emission factors, etc. Through the strategic analysis of verification activities and risk assessment to identify the risks of verification activities in advance, a reasonable evidence-gathering plan was developed for:

1) Accounting boundaries, emission facilities and emission sources identification of the responsible party, etc.

2) Information management for the acquisition, recording, transmission and aggregation of activity level data and parameters related to emissions within the system boundary of responsible party.

3) Accounting methods and emission data calculation process.

4) Calibration and maintenance of measuring instruments and monitoring equipment.

5) Verification of quality assurance and documentation archiving.

The responsible party provided relevant supporting materials and evidentiary materials according to the evidence-gathering plan formulated by the verification team. Verification activity performed 100% of collection for data sources and all sampling for data source for cross check.

## 1.4 Statement of responsibility

1）The responsible party is responsible for the compliance of the Product Carbon Footprint claim with the ISO 14067:2018 standard, and the Responsible Party is

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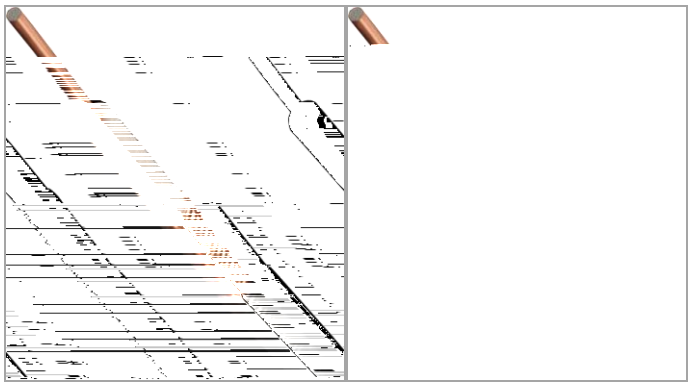
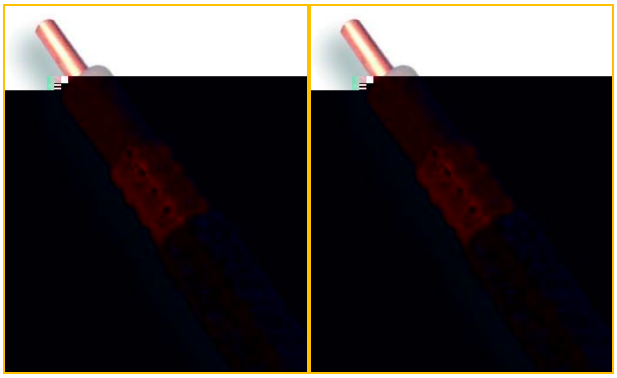
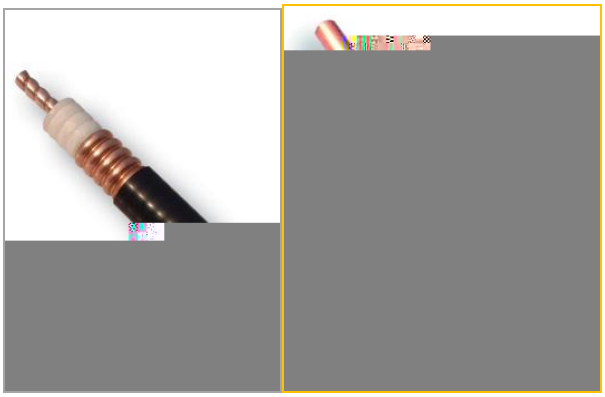
adopting domestic advanced CNC machine tools to produce a variety of supporting accessories products. The company has set up the most modern and complete CNAS-certified communication product testing center and combustion laboratory to monitor the stability and reliability of product quality, as well as cable flame retardant, fire-resistant and other safety performance test

Table 1-1







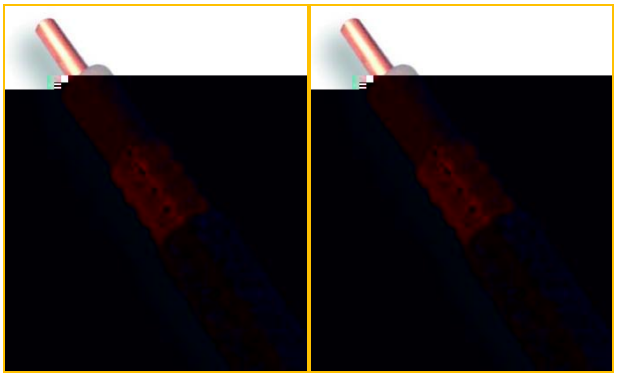


Figure 1-2 Appearance of products of jumper (from top to bottom and from left to right: 4310M-4310M-9*2, 4310M-4310M-9*15, NM-NM-9*2, 4310M-4310MA-9*5, 4310M-DM-9*3, 4310M-NM-9*3, 4310M-DMA-9*3, DM-DMA-9*3, NM-NM-12*3, DM-DM-12*2)

Table 2-1 Time period of each product model

| Product Category | Product model | Time period |
|---|---|---|
| Cable | HCAAY-50-12 | 2023-01-01~2023-12-31 |
| | HCAAYZ-50-12 | 2023-01-01~2023-12-31 |
| | HRCAYZ-50-9 | 2023-01-01~2023-12-31 |
| | HRCAY-50-9 | 2023-01-01~2023-12-31 |
| | HCTAYZ-50-23 | 2023-11-01~2023-11-30 |
| | HCTAY-50-22 | 2023-07-01~2023-12-31 |
| | HCTAY-50-32 | 2023-12-01~2023-12-31 |
| | HHTAY-50-42 | 2023-12-01~2023-12-31 |
| | HLRWUCYZ-50-22T | 2023-06-01~2023-12-31 |
| | HLRHTCYZ-50-32T | 2023-01-01~2023-12-31 |
| Jumper | 4310M-4310M-9*2 | 2023-08-01~2023-08-31 |
| | 4310M-4310M-9*15 | |

Figure 2-1 The production geographical boundary of the product

## 2.3 Declared unit

The declared units of the product carbon footprint use SI units. The declared units of the product carbon footprint of the cable are 1 kilometer of cable. The de

Figure 2

waste discharge and disposal were all taken into account. In addition, the consumption and emissions of roads and plants' infrastructure, equipment of each process, personnel and living facilities in the plants were ignored.

## 2.6 Allocation principles

The activity data collected by the responsible party is allocated according to the allocation procedures, principles, and properties in Table 2-2 and Table 2-3.

Table 2-2 Allocators, principles, and properties of activity data of cable

| Process | Procedure | Principle | Property |
|---|---|---|---|
| Raw materials | Avoid allocation | \ | \ |
| Packaging materials | Avoid allocation | \ | \ |
| Manufacturing energy and resource consumption | Allocation between co-products | Physical allocation | Yield of factory (Total km of cable) |
| Manufacturing emissions and waste | Allocation between co-products | Physical allocation | Yield of factory (Total km of cable) |
| Transportation | Avoid allocation | \ | \ |
| Processes involving recovery | Allocation for recovery operations | Cut-off Model | \ |

Table 3-2 Important unit processes and activity data of cable model HCAAYZ-50-12

| Life cycle stage | Module | Unit process | Consumption/emission of product per |
|---|---|---|---|

Table 3-3 Important unit processes and activity data of jumper model 4310M-DM-9*3

| Life cycle stage | Module | Unit ppvs3t 0s3t |
|---|---|---|

Table 4-1 Product carbon footprint information of cable and jumper

| Product category | Product Model | Carbon footprint per declared unit（$kgCO_2eq/km$） |
|---|---|---|
| Cable | HCAAY-50-12 | 2.40E+03 |
| | HCAAYZ-50-12 | 2.41E+03 |
| | HRCAYZ-50-9 | 1.79E+03 |
| | HRCAY-50-9 | 1.77E+03 |
| | HCTAYZ-50-23 | 2.72E+03 |
| | HCTAY-50-22 | 2.71E+03 |
| | HCTAY-50 | |

Table 4-2 Values and ratios of PCF of cable at different life cycle stages

| Product model | Life cycle stage | Module | Carbon footprint per declared unit ($kgCO_2eq/km$) | Ratio（%） |
|---|---|---|---|---|

Table 4-3 Values and ratios of PCF of jumper at different life cycle stages

| Product model | Life cycle stage | Module |
|---|---|---|



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|---|---|---|---|---|
| | | A3-Manufacturing | 8.40E+01 | 3.22 |

## 4.2 Contribution of each life cycle stage

Taking cable model HCAAYZ-50-12 and jumper model 4310M-DM-9*3 as examples, the unit processes and contribution amount that contributed more than 1% in the product carbon f

Table 4-5 Jumper model 4310M-DM-9*3 Product Carbon Footprint Contribution of Unit Processes (above 1%)

| Life cycle stage | Module | Unit process | Carbon footprint per declared unit ($kgCO_2eq/km$) | Ratio (%) |
|---|---|---|---|---|
| A1-A3 - Product | A1-Raw material supply | Connector (brass) | 1.01E+02 | 5.87 |
| | | Connector (PTFE) | 1.21E+02 | 7.00 |
| | | 1/2'' Super flexible feeder | 1.45E+03 | 84.15 |
| | | Solder wire | 1.78E+01 | 1.03 |
| | A3-Manufacturing | Electricity - | | |

## 4.4 Unce

the methodology's requirement of selecting the top 80% of the unit processes contributing to the Pareto analysis, and can be representative of the product's DQR. The

Table 4-9 Jumper 4310M-DM-9*3 carbon footprint carbon footpr671 0 595.32 841.92 reWEr

## 6 References

1) ISO 14067:2018 Carbon footprint of products —Requirements and guidelines for quantification and communication
2) ISO 14064-3:2019 Greenhouse gases —Part 3: Specification with guidance for the verification and validation of greenhouse gas statements
3) ISO 14040:2006 Environmental management — Life cycle assessment —Principles and Framework
4) ISO 14044:2006 Environmental management — Life cycle assessment — Principles and guidelines
5) PAS 2050:2008 Specification for the assessment of the life cycle greenhouse gas emissions of goods and services
6) GHG protocol Product Life Cycle Accounting and Reporting Standard
7) Zampori, L. and Pant, R., Suggestions for updating the Product Environmental Footprint (PEF) method, EUR 29682 EN, Publications Office of the European Union, Luxembourg, 2019, ISBN 978-92-76- 00654-1, doi:10.2760/424613, JRC115959.
8) Product Environmental Footprint Category Rules Guidance, Version 6.3, May 2018.
9) EN 15804:2012+A2:2019 Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products.

| | |
|---|---|
| | U |
| Copper strip | Copper, cathode {GLO}\| market for copper, cathode \| Cut-off, U |

Copper strip processing

| | |
|---|---|
| panel | photovoltaic, 3kWp slanted-roof installation, multi-Si, panel, mounted \| Cut-off, U |
| Diesel | Diesel {RoW}\| market for diesel \| Cut-off, U |
| Water | Tap water {RoW}\| market for tap water \| Cut-off, U |
| **Waste** | |
| Waste water | Waste water |
| Hazardous waste | Hazardous waste, for incineration {RoW}\| treatment of hazardous waste, hazardous waste incineration \| Cut-off, U |
| Waste cable | Waste, electrical and electronic cables {RoW}\| treatment of waste, electrical and electronic cables, open burning \| Cut-off, U |
| Waste copper scrap | Scrap copper {RoW}\| treatment of scrap copper, municipal incineration \| Cut-off, U |
| Waste injection molding material | Waste polyethylene {RoW}\| treatment of waste polyethylene, municipal incineration \| Cut-off, U |
| Waste brass | Scrap copper {RoW}\| treatment of scrap copper, municipal incineration \| Cut-off, U |
| Waste connector | Scrap copper {RoW}\| treatment of scrap copper, municipal incineration \| Cut-off, U |
| Waste paperboard | Waste paperboard {GLO}\| treatment of waste paperboard, open burning \| Cut-off, U |
| Waste wood | Waste wood, untreated {RoW}\| treatment of waste wood, untreated, municipal incineration \| Cut-off, U |
| Waste plastic paper | Waste polyethylene {RoW}\| treatment of waste polyethylene, municipal incineration \| Cut-off, U |
| Waste foam materials | Waste polyethylene {RoW}\| treatment of waste polyethylene, municipal incineration \| Cut-off, U |
| Waste copper-clad aluminum (red copper) | Scrap copper {RoW}\| treatment of scrap copper, municipal incineration \| Cut-off, U |
| Waste copper-clad aluminum (aluminum) | Scrap aluminium {RoW}\| treatment of scrap aluminium, municipal incineration \| Cut-off, U |
| Waste copper pipe core wire | Scrap copper {RoW}\| treatment of scrap copper, municipal incineration \| Cut-off, U |
| Waste embossing process copper material | Scrap copper {RoW}\| treatment of scrap copper, municipal incineration \| Cut-off, U |
| Waste sheathing material | Waste polyethylene {RoW}\| treatment of waste polyethylene, municipal incineration \| Cut-off, U |
| Waste core wire (copper) | Scrap copper {RoW}\| treatment of scrap copper, municipal |