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.

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footprint claim			**（$kgCO_2eq/km$）**
	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-50-32	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 （$kgCO_2eq/km$）**
	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-50-32	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 kgCO_2eq/kg (for the remaining 9 cable model, see product carbon footprint claim) and 1.88E+03 kgCO_2eq/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

1 General description of verification 11

1.1 Verification purposes 11

1.2 Verification criteria 11

1.3 Verification evidence-gathering procedures 12

1.4 Statement of responsibility 12

1.5 General information of responsible party and verified product 13

2 Scope of verification 19

2.1 Scope of greenhouse gases 19

2.2 Time period and location of verification data 19

2.3 Declared unit 21

2.4 System boundary 21

2.5 Cut-off principles 22

2.6 Allocation principles 23

2.7 Software and Databased

Contents of Figures

Figure 1-1 Appearance of products of cable (from top to bottom and from left to right:

HRCAY-50-9, HRCAYZ-50-9, HCAAY-

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.

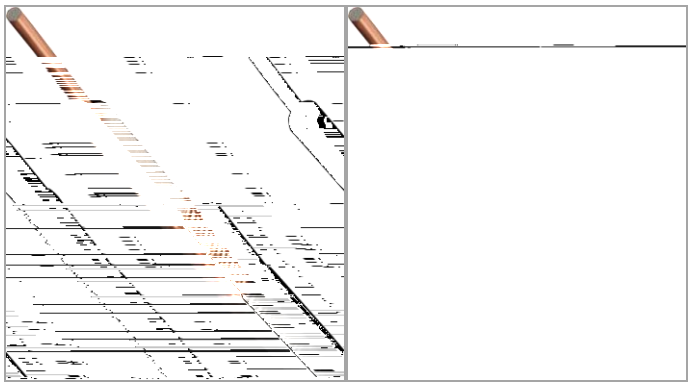
1.4 Statement of responsibility

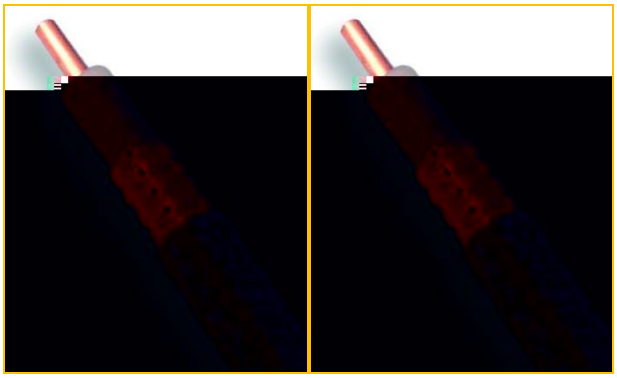
1）The responsible party is responsible for the compliance of the Product Carbon Footprint claim with the ISO 14067:2018 standard, and the Responsible Party is

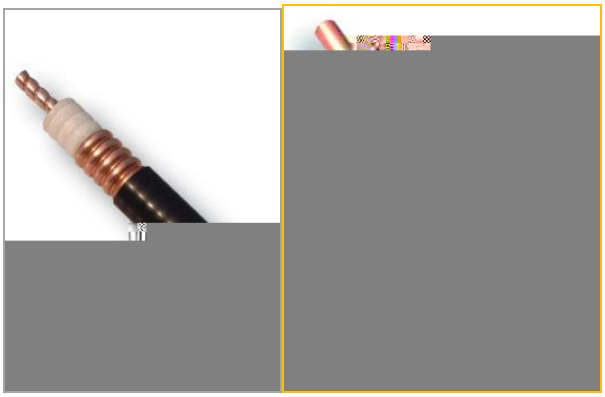
Produ

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







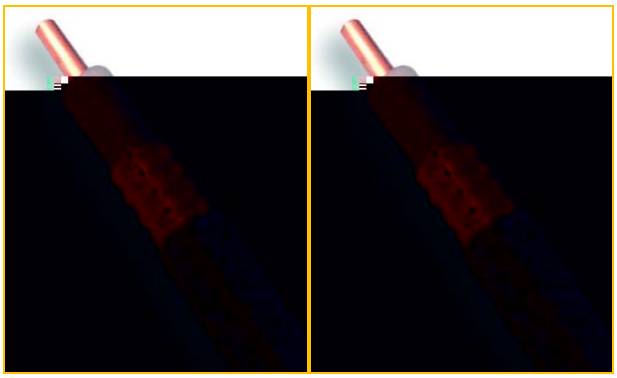




Figure 1-2 Appearance of products of jumper (from top to bottom and from left to right: 4310M-4310M-9*2, 4310M-4310M-9*15, NM-NM-9*2, 4310M-4310MA-9*5, 4310M-DM-9*3, 4310M-NM-9*3, 4310M-DMA-9*3, DM-DMA-9*3, NM-NM-12*3, DM-DM-12*2)

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	

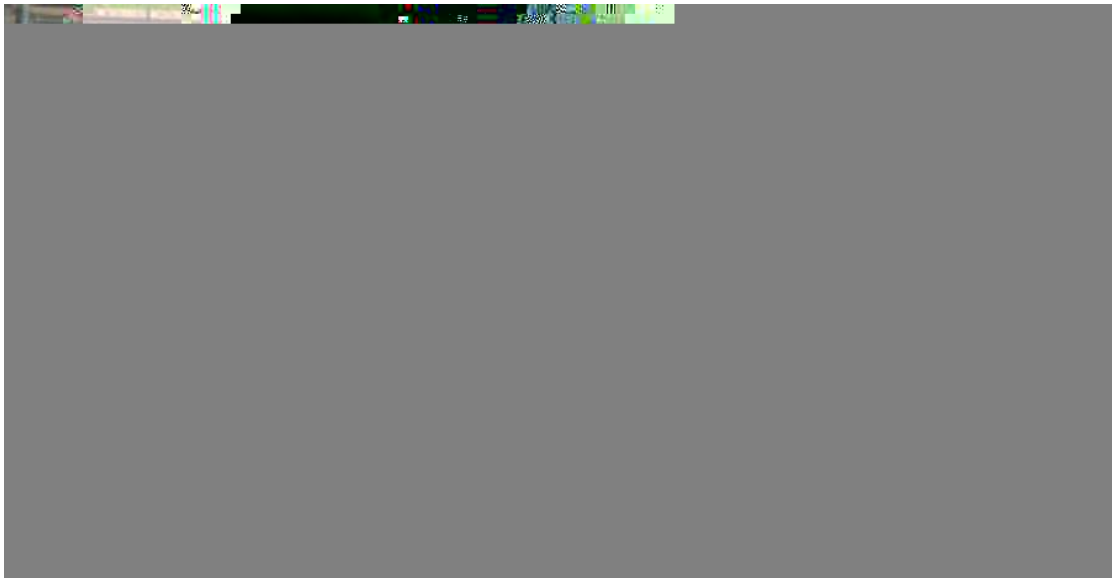


Figure 2-1 The production geographical boundary of the product

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

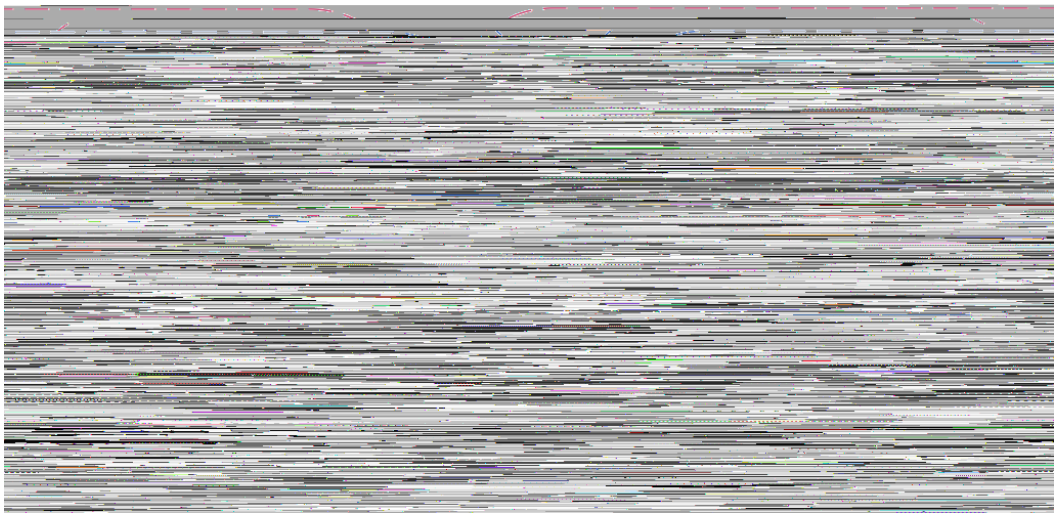


Figure 2

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 process	Consumption/emission of product per declared unit
A1-A3 - Product	A1- Raw material supply	Connector (brass)	1.78E+01 kg
		Connector (PTFE)	7.40E-01 kg
		1/2'' Super flexible feeder	8.23E-01 km
		Solder wire	6.33E-01 kg
	A2 - Transport	Connector transport	3.70E+00 tkm
		Injection molding material transport	2.61E-01 tkm
	A3 - Manufacturing	Tap water	1.40E+03 kg
		Electricity - grid	2.32E+01 kWh
		Hazardous waste - saponified oil	1.14E+00 kg

3.4 Activity data

The secondary data reference sources for each unit process are shown in Annex A.

4 Product carbon footprint verification results and analysis

4.1 Product Carbon Footprint Verification Results

According to the verified carbon footprint data list of products, the carbon footprint of declared units wit

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	



fferent life cycle stages

Carbon footprint per declared unit ($kgCO_2eq/km$)	Ratio（%）
2.00E+03	83.45
6.15E+00	0.26
3.90E+02	16.30
2.01E+03	83.53
5.95E+00	0.25
3.90E+02	16.22
1.39E+03	77.92
3.74E+00	0.21
3.90E+02	21.87
1.38E+03	77.74
3.72E+00	0.21
3.90E+02	22.05
2.29E+03	84.15
8.35E+00	0.31
4.22E+02	15.54
2.31E+03	85.48
7.14E+00	0.26
3.86E+02	14.26
4.39E+03	91.60
1.29E+01	0.27
3.90E+02	8.13
5.40E+03	92.97
1.81E+01	0.31
3.90E+02	6.72
1.23E+03	75.90

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 ratings g thehe ectin3.9 699.58 Tm0 g0 G[r)-31

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

	incineration | Cut-off, U
Waste punch press copper strip	Scrap copper {RoW}| treatment of scrap copper, municipal incineration | Cut-off, U
Waste aluminum	Scrap aluminium {RoW}| treatment of scrap aluminium, municipal incineration | Cut-off, U