

# ENVIRONMENTAL PRODUCT DECLARATION

In accordance with ISO 14025 for:

TIM HUB+ ZXHN H2740

From

ZTE Corporation

ZTE中兴



CTI 华测认证

Declared product:



Programme operator:	EPD China
Registration number:	EPD-CN-00029
Issued date:	2025-07-29
Valid until:	2030-07-28

## Programme Information

EPD Owner	ZTE Corporation ZTE Plaza, Keji Road South, Hi-Tech, Industrial Park, Nanshan District, Shenzhen, Guangdong, P.R.China
Product Name	TIM HUB+ ZXHN H2740
Production Site	Shenzhen, China
Identification of product	UNCPC Code: 47223
Field of Application	Internet Connection
Programme Operator	EPD China Address of Headquarter: Tianping Road, Xuhui District, Shanghai Website: <a href="http://www.epdchina.cn">www.epdchina.cn</a> Email: <a href="mailto:info@epdchina.cn">info@epdchina.cn</a>   <a href="mailto:secretary@epdchina.cn">secretary@epdchina.cn</a>
LCA Practitioner	Shenzhen Guanzhida Industry Co., Ltd.
Responsibility	The EPD owner has the sole ownership, liability, and responsibility for the EPD
Comparability	EPDs within same category of product in different programme operator are not suggested to be compared. Full conformance with a PCR allows EPD comparability only when all stages of a life cycle have been considered. However, variations and deviations are possible even applying the same PCR.
Liability	The EPD owner has the sole ownership, liability, and responsibility for the EPD.
Validity	The EPD is published on 2025-07-29 and valid to 2030-07-28
LCA Software (version)	Simapro 9.6
LCI Dataset (version)	Ecoinvent 3.10
Year(s) of Primary Data	06/2024-03/2025
PCR	EPDItaly007:PCR for electronic and electrical products and systems, Rev. 3.1-12/11/2024
Other Reference Document	EN 50693:2019 Product category rules for life cycle assessments of electronic and electrical products and systems
Verification statement according to ISO 14025	
Independent verification of the declaration and data according to EN ISO 14025:2010 <input type="checkbox"/> internal <input checked="" type="checkbox"/> external Third-party institution verification: <Ying SU, CTI Certification Co., Ltd.> is an approved certification body accountable for third-party verification Approved by: EPD China	
Procedure for follow-up of data during EPD validity involves a third-party certification body: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

# 1 General Information

## 1.1 Company information

### Owner of the EPD

ZTE Corporation

### Address:

ZTE Plaza, Keji Road South, Hi-Tech, Industrial Park, Nanshan District, Shenzhen, Guangdong, P.R.China



Figure 1: ZTE Corporation

### Company Introduction

As a global leading provider of integrated information and communication technology solutions, ZTE provides innovative technologies and integrated solutions for global operators, government and enterprise, and consumers. ZTE has been committed to becoming the “Driver of Digital Economy”. With the wave of technological innovation triggered by intelligent technologies, ZTE will continue to accelerate the expansion of “connectivity-computing-capability-intelligence”. ZTE will also collaborate with global partners to shape a sustainable future that is highly efficient, green, and intelligent.

ZTE founded in 1985 and listed on both the Hong Kong and Shenzhen Stock Exchanges, ZTE has been committed to providing innovative technologies and integrated solutions for global operators, government and enterprise, and consumers from over 160 countries across the globe. Serving over 1/4 of the worldwide population, the company is dedicated to enabling connectivity and trust everywhere for a better future. The company now has over 68,000 employees, and nearly 49% are engaged in R&D, which is expected to rise in the coming years. With 40 years of experience in telecom networks, ZTE has established an end-to-end engineering service capability system globally.

Expanding footprints in over 160 countries and regions, the company has delivered premium products and services to over 2 billion global users and collaborated with more than 1,000 leading industry partners.

Along the way, ZTE has enhanced the competitiveness of our core products and improved our industry standing. Shipping over 100 million home terminals in 2024, ZTE has maintained its world No.1 position in the FWA & MBB market share for four consecutive years, achieving a 38% increase in global shipments. ZTE continues to lead the global market, ranking No.1 in PON CPE and IP STB shipments. In addition, we rank second in global market share of multiple 5G infrastructure products such as 5G base stations, 5GC, and PON OLT products.

As of December 31, 2024, ZTE had filed over 93,000 patents worldwide, with 48,000 granted. To date, its patented technology value has exceeded RMB 45 billion. Besides, ZTE has become a major participant and contributor in global 5G technical research and standard-setting activities. It has declared the Global 5G-related standard essential patents (SEP) to ETSI, and the number of active patent families ranks fifth in the world.

## 1.2 Scope and type of EPD

This study of TIM HUB+ ZXHN H2740 product includes life cycle information from cradle-to-grave. The stage for product includes extraction and processing of raw materials, transportation to the factory and manufacturing processes with packaging, etc. The distribution stage includes transportation of TIM HUB+ ZXHN H2740 product to the site from the factory, the later installation phase is included. The use stage is considered. And the end-of-life stage includes deconstruction, transportation of waste products to final disposition site, disposal and etc, are considered either.

Table 1. Process stages and EPD modules.

PHASES	MANUFACTURING STAGE	DISTRIBUTION STAGE	INSTALLATION STAGE	USE & MAINTENANCE STAGE	END-OF LIFE STAGE DE- INSTALLATION
	IN ACCORDANCE TO EN 50693				
Phases Declared	X	X	X	X	X
Note: X=Declared Module, MND=Module not Declared in this LCA study					

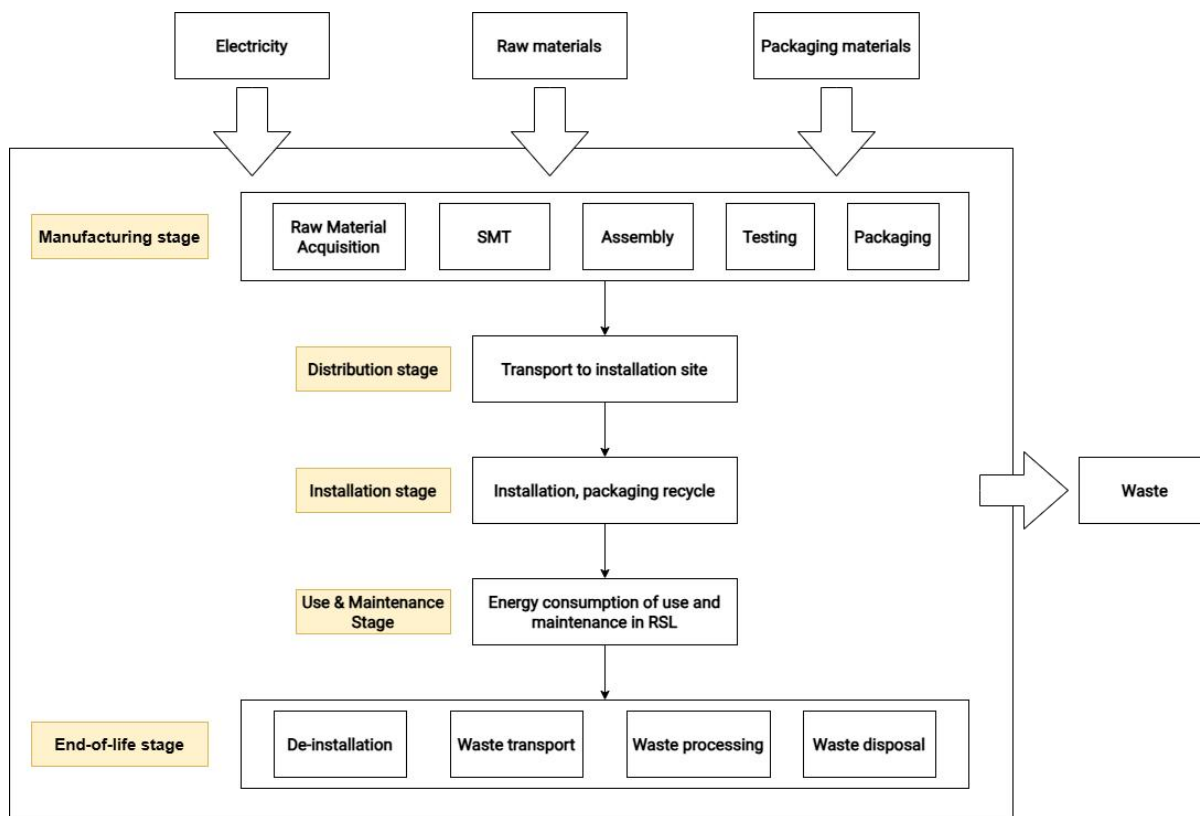


Figure 2: system diagram

## 2 Detailed Product Description

### 2.1 Product Information

TIM HUB+ ZXHN H2740 product is a new generation multi-uplink home gateway device with Wi-Fi 6 , which provides High Speed Internet, IPTV and Voice over IP services through the VDSL2/GE. Those services are delivered by the gateway on home network to the PCs, STBs, phones, gaming devices and so on via the integrated interfaces: Ethernet, Wi-Fi, phone ports.

Total weight of the product per the declared unit is 1.486 kg including packaging (product net weight 0.655kg, package 0.596kg, accessories 0.235kg).

### Highlights

#### Tri-mode Hybrid Uplink

- Auto WAN sensing among VDSL2 35b and GE
- VDSL2 35b single line & vectoring

#### High Efficient Wi-Fi 6

- Dual band concurrent Wi-Fi 6 up to 6000Mbps
- OFDMA and UL/DL MU-MIMO enable high efficiency

#### More Flexible Management

- Remote management via TR-069 protocol
- WEB GUI based management
- TR-064 LAN-side configuration protocol



Figure 3: Picture of TIM HUB+ ZXHN H2740

### Hardware Specifications

Interfaces	WAN	<ul style="list-style-type: none"> <li>VDSL2 35b/GE</li> </ul>
	LAN	<ul style="list-style-type: none"> <li>4xGE RJ-45 ports(Configurable WAN)</li> <li>2xFXS RJ-11 ports</li> <li>1xUSB2.0</li> <li>4x4 802.11b/g/n/ax Wi-Fi @2.4GHz</li> <li>4x4 802.11a/n/ac/ax Wi-Fi @5GHz</li> </ul>
Buttons	<ul style="list-style-type: none"> <li>Wi-Fi</li> <li>WPS</li> </ul>	<ul style="list-style-type: none"> <li>Reset</li> <li>On/Off</li> </ul>
LEDs	<ul style="list-style-type: none"> <li>Power, Broadband, Internet, LAN, WiFi, WPS, Voice</li> </ul>	
Antenna	<ul style="list-style-type: none"> <li>Internal antennas</li> </ul>	

### Other Characteristics

Power Supply	<ul style="list-style-type: none"> <li>AC adapter: 12V DC, 2.0A</li> </ul>
Characteristics	<ul style="list-style-type: none"> <li>Net weight: 655g</li> <li>Dimensions: 275*80*215mm</li> </ul>

	<ul style="list-style-type: none"> <li>• COC on state power: 12.13W</li> </ul>
Environmental	<ul style="list-style-type: none"> <li>• Operating temperature: 0 °C~ 40°C</li> <li>• Humidity: 5% ~ 95% (non-condensing)</li> </ul>
Certification	<ul style="list-style-type: none"> <li>• CE</li> <li>• Wi-Fi 6 certification</li> </ul>

## 2.2 Description of the production processes

A flowchart depicting the production process stages of TIM HUB+ ZXHN H2740 is shown in Figure 3 below.

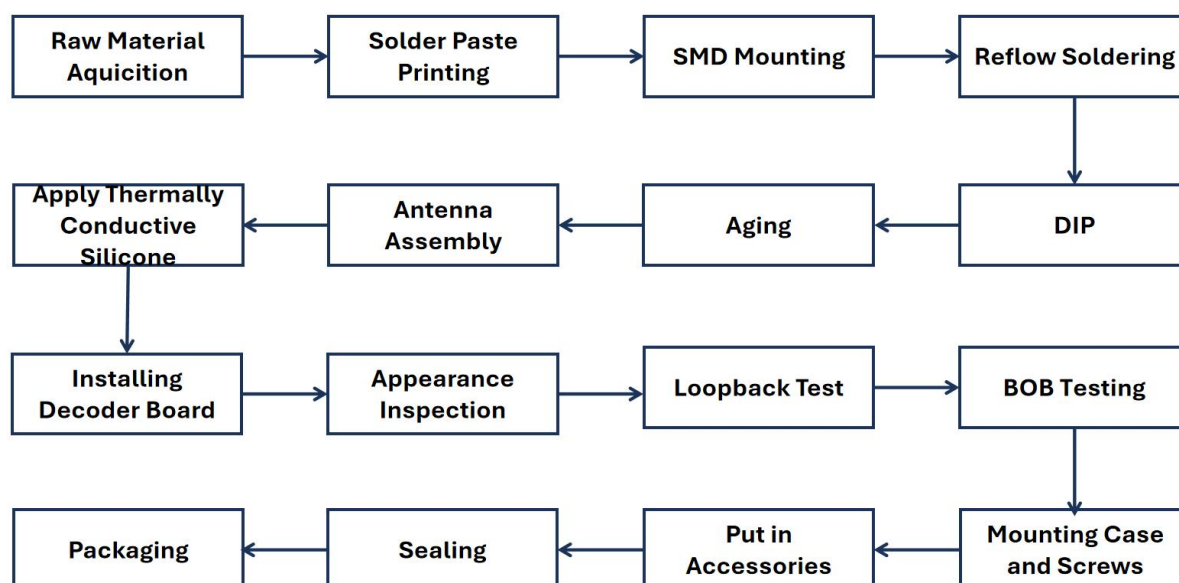


Figure 4: The production process flow of TIM HUB+ ZXHN H2740

The raw material and packaging composition of per unit of TIM HUB+ ZXHN H2740 product is listed below.

Product components	Material classes*	Weight, kg	Weight-% (versus the product)
PC-ABS	M-231	4.10E-01	62.56%
Aluminium and its alloys	M-120	2.50E-02	3.82%
Copper and its alloys	M-121	2.66E-02	4.06%
Other ferrous alloys, non-stainless steels	M-119	4.20E-06	0.00%
Other inorganic materials	M-199	3.54E-04	0.05%
Silicone	M-321	7.60E-03	1.16%
Tin and its alloys (including Pb-free solders)	M-126	5.00E-03	0.76%
Stainless Steel	M-100	7.12E-03	1.09%
Cast and sintered irons	M-101	5.71E-03	0.87%



Electronic components	-	1.68E-01	25.63%
TOTAL		6.55E-01	100%
Packaging materials	Material classes*	Weight, kg	/
Other organic materials	M-399	4.01E-01	
Paper	M-341	2.74E-02	
PolyEthylene (PE)	M-201	3.04E-02	
PolyEthyleneTerephthalate (PET)	M-209	1.56E-04	
Wood	M-340	1.36E-01	
PolyPropylene (PP)	M-202	6.55E-05	
TOTAL		5.96E-01	
Accessories	Material classes*	Weight, kg	/
Cable	-	7.60E-02	
Power Supply	-	1.29E-01	
Separator	-	2.98E-02	
TOTAL		2.35E-01	

\* According to IEC 62474 - Material Declaration for Products of and for the Electrotechnical Industry.

These products contain no substances of very high concern (SVHC) on the REACH Candidate List published by the European Chemicals Agency.

## 3 LCA results

### 3.1 Environmental Impacts

The results of the underlying LCA are provided in this section as environmental impacts, resource use, and waste production. The life cycle assessment results are reported per declared unit of TIM HUB+ ZXHN H2740 product.

Table 2: Environmental impacts

RESULTS OF THE LCA - Environmental impacts of per declared unit of TIM HUB+ ZXHN H2740							
Impact Categories	Unit	Total	Manufacturing	Distribution	Installation	Use & Maintenance	End-of-life
Global Warming Potential total (GWP-total)	[kg CO <sub>2</sub> eq.]	4.02E+02	6.71E+01	4.45E-01	1.76E-01	3.34E+02	3.58E-01
Global Warming Potential fossil fuels (GWP-fossil)	[kg CO <sub>2</sub> eq.]	3.97E+02	6.74E+01	4.45E-01	2.03E-02	3.30E+02	3.68E-02
Global Warming Potential biogenic (GWP-biogenic)	[kg CO <sub>2</sub> eq.]	4.79E+00	-3.77E-01	6.38E-05	6.89E-01	4.16E+00	3.21E-01
Global Warming Potential land use and land use change (GWP-luluc)	[kg CO <sub>2</sub> eq.]	1.37E-01	9.96E-02	2.03E-04	6.24E-06	3.68E-02	1.12E-05
Depletion potential of the stratospheric ozone layer (ODP)	[kg CFC 11 eq.]	1.04E-05	3.12E-06	7.53E-09	2.55E-10	7.23E-06	4.25E-10
Acidification potential, Accumulated Exceedance (AP)	[mol H <sup>+</sup> eq.]	1.55E+00	5.29E-01	7.09E-03	7.35E-05	1.01E+00	1.32E-04
Eutrophication potential, fraction of nutrients reaching freshwater end compartment (EP-freshwater)	[kg P eq.]	1.88E-02	1.28E-02	2.87E-06	3.05E-06	6.02E-03	6.25E-06
Eutrophication potential, fraction of nutrients reaching marine end compartment (EP-marine)	[kg N eq.]	2.61E-01	8.88E-02	1.75E-03	2.18E-04	1.70E-01	4.43E-04
Eutrophication potential, Accumulated Exceedance (EP-terrestrial)	[mol N eq.]	2.97E+00	1.03E+00	1.95E-02	2.63E-04	1.92E+00	4.60E-04
Formation potential of tropospheric ozone (POCP)	[kg NMVOC eq.]	1.17E+00	3.06E-01	5.69E-03	1.30E-04	8.56E-01	2.37E-04
Abiotic depletion potential for non-fossil resources (ADP-minerals&metals)	[kg Sb eq.]	2.71E-02	2.48E-02	1.16E-06	3.54E-08	2.28E-03	5.74E-08
Abiotic depletion potential for fossil resources (ADP-fossil)	MJ, net calorific value	5.72E+03	8.79E+02	5.82E+00	2.00E-01	4.84E+03	3.39E-01
Water deprivation potential, deprivation-weighted water consumption (WDP)	[m <sup>3</sup> world eq. Deprived]	1.34E+02	2.44E+01	2.81E-02	-3.56E-02	1.10E+02	-7.40E-02

### 3.2 Resource use and waste categories

Table 3: Resource use

RESULTS OF THE LCA - Resource use of per declared unit of TIM HUB+ ZXHN H2740							
Impact Categories	Unit	Total	Manufacturing	Distribution	Installation	Use & Maintenance	End-of-life
Use of non-renewable primary energy excluding nonrenewable primary energy resources used as raw material (PENRE)	MJ	5.72E+03	8.79E+02	5.82E+00	2.00E-01	4.84E+03	3.39E-01
Use of renewable primary energy excluding renewable primary energy resources used as raw material (PERE)	MJ	4.04E+02	1.06E+02	9.25E-02	4.43E-03	2.98E+02	7.90E-03
Use of non-renewable primary energy resources used as raw material (PENRM)	MJ	1.44E+01	1.44E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of renewable primary energy resources used as raw material (PERM)	MJ	9.15E+00	9.15E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PENRT)	MJ	5.74E+03	8.94E+02	5.82E+00	2.00E-01	4.84E+03	3.39E-01
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PERT)	MJ	4.13E+02	1.15E+02	9.25E-02	4.43E-03	2.98E+02	7.90E-03
Net use of fresh water (FW)	m <sup>3</sup>	3.20E+00	6.19E-01	6.93E-04	-8.27E-04	2.59E+00	-1.72E-03
Use of secondary materials (SM)	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of renewable secondary fuels (RSF)	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of non-renewable secondary fuels (NRSF)	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Table 4: Waste production

RESULTS OF THE LCA - Waste Production of per declared unit of TIM HUB+ ZXHN H2740							
Impact Categories	Unit	Total	Manufacturing	Distribution	Installation	Use & Maintenance	End-of-life
Hazardous waste disposed (HWD)	kg	6.10E+00	6.10E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Non-hazardous waste disposed (NHWD)	kg	4.90E+02	2.07E+02	1.65E-01	1.15E+00	2.79E+02	2.38E+00
Radioactive waste disposed (RWD)	kg	5.03E-03	1.84E-03	1.72E-06	8.54E-08	3.18E-03	1.53E-07
Components for re-use (CRU)	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Material for recycling (MFR)	kg	8.08E-01	1.07E-02	0.00E+00	3.71E-01	0.00E+00	4.27E-01
Materials for energy recovery (MER)	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported electricity energy (EEE)	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported thermal energy (ETE)	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

## 4 Supplementary information

### 4.1 Calculation rules

#### Declared Unit

In this EPD, a declared unit is defined as one TIM HUB+ ZXHN H2740 product. And the mass of the product per the declared unit is 1.486 kg including packaging (product net weight 0.655kg, package 0.596kg, accessories 0.235kg).

#### Reference Service Life (RSL)

The RSL information of TIM HUB+ ZXHN H2740 product is provided by the manufacturer, which is 5 years (24 hours per day, 365 days per year).

#### Database and LCA Software Used

Ecoinvent 3.10 Database, Simapro 9.6 Software.

#### Assumptions

In manufacturing stage. The recycle rate of some solid wastes is assumed according to the Table G4 of EN 50693: 2019: ABS-60%, other plastics-50%. The recycle rate of waste paper is assumed to be 51.20% based on China Paper Industry Annual Report 2023. The rest of solid wastes are assumed to be disposed by landfilling without energy recovery. All the hazardous wastes are assumed to be disposed by incineration without energy recovery.

In distribution stage. The specific scenario is assumed and applied: the distributed market of the products assessed in this report is Italy. The transportation means and distance of product is from the manufacturing plant (Pingshan, Shenzhen, China) to the Yantian Port (Shenzhen, China), the average distance is 34 km (lorry transport). The average distance from the Yantian Port in Shenzhen to Genoa Port, Italy is 14800 km (sea transport). The transportation of the product to the customers or installation sites in Italy is considered, with the transport distance assumed to be 250 km by lorry, based on Chapter 7.14.3, Product Environmental Footprint Category Rules Guidance, Version 6.3, May 2018.

In installation stage. The product is assumed installed manually, so there is no other emissions and energy consumptions. The packaging materials are plastic bags, paper and corrugated board, etc., and the default recycling rates below from the Section 6 of Regulation (EU) 2025/40 of the European Parliament and of the Council of 19 December 2024 on packaging and packaging waste are applied: 50% for plastics, 25% for wood and 75% for paper and cardboard. The remain disposal parts are assumed to be landfilled without energy recovery. The transport from the installation site to the disposal factory is assumed to 100 km by lorry, which based on Chapter 7.14.4, Product Environmental Footprint Category Rules Guidance, Version 6.3, May 2018.

In use & maintenance stage. The reference service life (RSL) is assumed to be 5 years (24 hours per day, 365 days per year) according to the manufacturer's instruction. Once a product fails, the usual way is to replace it, and maintenance hardly ever happen, so it is assumed that there is no energy consumption in maintenance.

In end-of-life stage. It is assumed that the product is de-installed manually. The end-of-life transport distance of 100 km from the use site to disposal site by lorry is assumed based on Chapter 7.14.4, Product Environmental Footprint Category Rules Guidance, Version 6.3, May 2018. The ratios based on the Table G4 of EN 50693: 2019 showed as followed table are applied to the recycling and disposal rates for each material and component of the disassembled product. The remain disposal part is assumed to be landfilled without energy recovery.

Material or component	Recycling rate	Final disposal rate
Steel	80%	20%
Other ferrous metals	80%	20%
Aluminum	70%	30%
Copper	60%	40%
Other non-ferrous metals	60%	40%
PP	60%	40%
ABS	60%	40%
Other plastics	50%	50%
Rubber	50%	50%
Other minerals	0%	100%
PCBs (support)	0%	100%
PCBs (metals)	50%	50%
Wood	50%	50%

### Cut-off Rules

According to the PCR EPDItaly007 and EN 50693:2019, the cut-off criteria are set to a maximum of 5% of the overall environmental impact of the analyzed product system. The following flows and operations may be cut-off: Production, use and disposal of the packaging of components and semi-finished intermediates;

- Materials making up the TIM HUB+ ZXHN H2740 product itself whose total mass does not exceed 1% of the total weight of the product;
- Material and energy flows related to dismantling phase, whenever it is reasonable to assume that dismantling is performed by adopting manual tools (e.g., screwdrivers, hammers, etc.);
- Devices external to the product itself required for installation;
- Maximum 5% of the overall environmental impact of the analysed product system;

In this LCA, all input and output flows have been considered at 100%, including raw materials as per the product composition provided by the manufacturer as well as the final product. The only cut-off criterion was the environmental relevance of the production of capital equipment, construction activities, and infrastructure, maintenance and operation of capital equipment, personnelrelated activities, energy and water use related to company management and sales activities.

## Data Quality

According to EN 50693, and further required by ISO 14044, 4.2.3.6, the data quality requirements for this study mainly covered four aspects: precision, completeness, representativeness, consistency:

- Precision: measure of the variability of the data values for each data expressed (e.g. variance);
- Completeness: percentage of flow that is measured or estimated.
- Representativeness: qualitative assessment of the degree to which the data set reflects the true population of interest (i.e. geographical coverage, time period and technology coverage);
- Consistency: qualitative assessment of whether the study methodology is applied uniformly to the various components of the analysis;

In this EPD, electricity has been combined with a dataset containing LCI-data, selected from database Ecoinvent 3.10. Market for electricity data of the State Grid South China Branch was chosen in manufacturing stage since there is no residual mix data for the China grid. The residual mix of electricity in Italy was chosen in the use and maintenance stage.

Both primary and secondary data are used. Site specific foreground data have been provided by ZTE Corporation. This data is under the control and management of the company (e.g., bills, invoices, transport documents, weighing records). For all processes for which primary are not available, secondary data originating from the Ecoinvent 3.10 database, allocation cut-off by classification, are used. The Ecoinvent database is available in the SimaPro 9.6 software used for the calculations.

## Allocations

According to EN 50693, in the case of parallel production of different product versions on a line or at a location where only the level of inputs and outputs is known however, “Multi-Output” shall be applied as an allocation rule in order to calculate the environmental impact of the product under study. "Multi-Output" means the allocation is based on a quantitative calculation of the resource consumption and the emissions, for example in relation to the distribution of functions, physical properties or economic aspects. Physical properties, such as mass, net calorific values, etc., shall be preferred, otherwise economic aspects, such as man-hours, operating hours or manufacturing cost may be used.

In this EPD, The manufacturer produces more than one product, and the production process is similar for all products, mainly assembly, testing and packaging. So the “Multi-Output” is applied as an allocation rule that based on the quantitative calculation of the resource, energy consumption and the emissions, in relation to the distribution of production volume.

## Allocation for recovery operations

According to PCR EPDIItaly007 and EN 50693, the polluter pays principle (PPP) is followed for the end-of-life stage of TIM HUB+ ZXHN H2740 product in this LCA study. This means that the waste transportation to the treatment site and the waste processing (from de-installation to the waste processing and disposal) is considered in this report, while the benefit, the load from waste treatment for recycling purposes such as de-pollution and crushing, etc., is allocated to the next life cycle of substituted products, but not the primary producers, hence no burden or benefit will be allocated to the primary producer of the electric products (cut-off approach).

## 4.2 Scenarios and additional technical information

### Manufacturing Stage

The system boundary includes raw material extraction, transportation to the factory, and manufacturing processes such as component assembly, testing, and packaging. Specific data for material inputs (e.g., ABS, aluminum, PCB) and energy consumption (electricity) were provided by ZTE Corporation. Waste generated during manufacturing (e.g., scrap metal, plastic trimmings) is accounted for, with recycling rates based on default values from EN 50693 Annex G (e.g., 80% for steel, 60% for ABS).

The grid mix data on electricity of for the production site is based on grid mixes of the State Grid Corporation of China (SGCC). The southern region was selected (State Grid South China Branch), since the ZTE locates at Shenzhen City, which belongs to the south of China. The electricity mix data is taken where the process takes place (Shenzhen, China) based on grid mixes of the country from the Ecoinvent database.

Since there is no residual mix data for the China grid, market for electricity data was chosen. The manufacturing stage of the electricity use is very low, so the impact on the results from a sensitivity point of view is very low. The electricity profiles are showed below.

Country	Production mix	Electricity mix technology reference
China	Electricity, medium voltage {CN-CSG}  market for electricity, medium voltage   EN15804, U	2021

### Distribution Stage

Transportation scenarios are defined as follows:

Lorry transport (Shenzhen factory to Shenzhen port): 34 km on average.

Sea transport (Shenzhen to Italy): 14800 km on average.

Final delivery (Italy to customers): 250 km by lorry on average.

### Installation Stage

Manual installation is assumed with no additional energy or material inputs.

Packaging waste (plastic bags, corrugated board, paper) is assumed to be partly recycled, with residual landfill (default values from EN 50693 Annex G).

The transport distance from the installation site to the waste treatment facility is assumed 100 km on average.

### Use & Maintenance Stage

Operational Energy: Calculated based on a Reference Service Life (RSL) of 5 years (24 hours per day and 7 days per week operation), with power consumption of 12.13 W (from product specifications and the COC Test Report of ZXHN H2740).

The electricity mix data is taken where the process takes place (Italy) based on grid mixes of the country from the Ecoinvent database. The electricity profiles are showed below.

Country	Production mix	Electricity mix
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		technology reference
Italy	Electricity, low voltage {IT}  electricity, low voltage, residual mix   EN15804, U	2023

Maintenance: Excluded due to negligible impact since the F6745M product is usually replaced and maintenance hardly ever happen.

#### End-of-Life Stage

De-installation: Manually removed, assumed to generate no significant emissions (cut-off applied).

Transport: 100 km by lorry to treatment facilities.

Recycling/Disposal: Material-specific recovery rates applied (e.g., 70% for aluminum). Residual waste is landfilled without energy recovery (per EN 50693 Table G.4).

Polluter Pays Principle: Benefits from recycling (e.g., avoided virgin material production) are excluded.

## References

- 1) ISO 14025: 2006, Environmental labels and declarations - Type III environmental declarations - Principles and procedures
- 2) ISO 14040 (2019): Environmental Management - Life Cycle Assessment - Principles and Framework
- 3) ISO 14044 (2019): Environmental Management - Life Cycle Assessment - Requirements and Guidelines
- 4) EN 50693: 2019 Product category rules for life cycle assessments of electronic and electrical products and systems
- 5) PCR EPDIItaly007, Product category rules for electronic and electrical products and systems, version 3.1, 12.11.2024
- 6) EPD China General Programme Instruction
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