



# Product Environmental Report

## Z590 Gaming



**Non-use of 10 Restricted Substances<sup>\*</sup>**

## GIGABYTE & You – 2 Powerful Guardians of the World

GIGABYTE endeavors to provide quality products with excellent performance, and hopes to protect the Earth together with you. All brand products of GIGABYTE adhere to the principle of environmental friendliness, seeking for achieving low-carbon, non-pollutant, and zero-waste. We sincerely expect you to act as a supervisor and practitioner, understanding the environmental characteristics of the product in your hands, and putting responsible recycling into effect.



## Product Environmental Characteristics

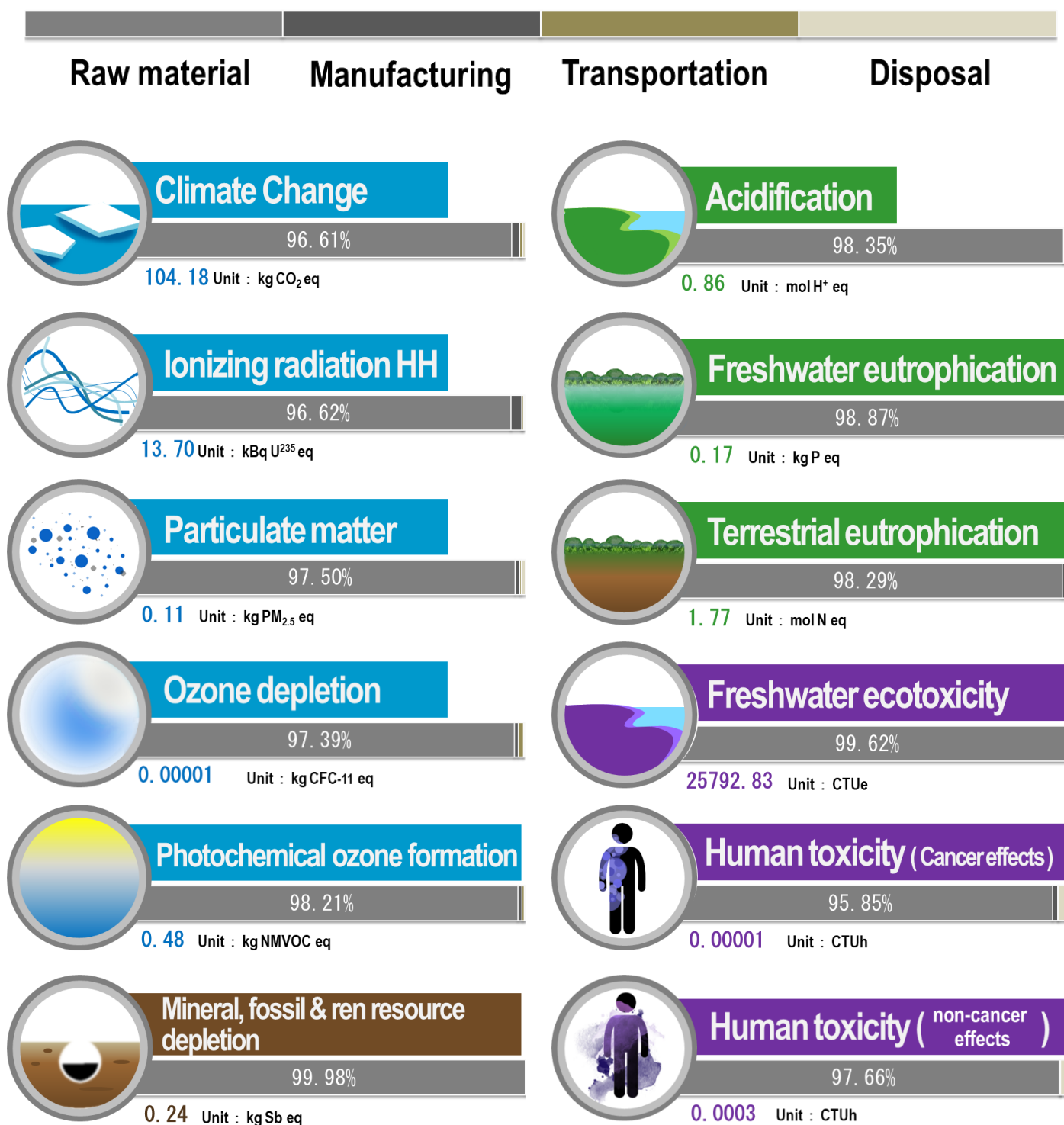
Do you know how much environmental impact this product can have from material extraction, manufacturing, usage, to waste disposal? GIGABYTE actively implements product lifecycle assessment to systematically understand the environmental impacts of our products. We are devoted to improving the environmental performance of our products from the design stage in order to reach free of harmful substances, high product recovery rate, less energy and resource consumption, lower emissions of greenhouse gas and atmospheric particulate matter, and a minimized of land or water acidification.

## Full Disclosure of 12 Environmental Impact Categories in LCA

The environmental impact results of the product disclosed in this report are based on the principles and framework of CNC 14040 and screening life cycle assessment (LCA). By evaluating these impact indicators, we aim at providing more comprehensive information about the potential environmental impacts this product would have to our consumers and also giving a reference for internal research and design. Through LCA and management, GIGABYTE drives green design internally and requests suppliers to comply with harmful substance restrictions externally in order to lower the negative environmental impacts of our products. Moreover, suppliers are also required to abide by the RBA Standards to provide consumers with products with more environmental and social friendliness.

The table below displays the impact ratio of Z590 Gaming at four life cycle stages ( ie. raw material, manufacturing, transportation, and disposal) in each 12 environmental impact categories. Taking climate change resulted from carbon emissions as an example, during its life cycle,Z590 Gaming generates 104.18 kg-CO<sub>2</sub>e, of which 96.61% are emitted from the raw material stage. Please note that this product is a non-system product, thereby no data are shown at using stage.

Note: The database used in this report has been updated. Compared with the version 8.3.0 used before, this version 9.1.0 has a 38~46 % increase in carbon emissions at the raw material extraction stage.



## Recycling Information

Electronic waste can be reused if recycled appropriately. However, it can also become environmental pollution if it is not treated properly after disposal. As a responsible producer, GIGABYTE provides a legal and proper recycling mechanism to consumers. We encourage you to stand by our side, being a responsible consumer and recycling defunct electronic devices and packaging materials through appropriate take-back channels. A small action makes a big difference! For more recycling information, please scan/click the QR Code.



## Definitions

### ■ EU Directive of RoHS

An EU directive restricts the hazardous substances contained in electrical and electronic equipment, including lead (Pb), cadmium (Cd), mercury (Hg), hexavalent chromium (Cr6+), flame retardants (PBBs, PBDEs), and phthalates (DEHP, BBP, DBP, DIBP).

### ■ Climate Change

Excessive greenhouse gases lead to global climate abnormality. According to the UNFCCC, the major greenhouse gases include carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) sulfur hexafluoride (SF<sub>6</sub>) and nitrogen trifluoride (NF<sub>3</sub>).

### ■ Product Carbon Footprint

A product carbon footprint is defined as the total greenhouse gas emissions a product emits directly and indirectly through its lifetime from raw materials processing, manufacture, distribution, use, and disposal or recycling. As more energy and resources consumed, the greater amount of greenhouse gas emissions, meaning that a larger carbon footprint.

### ■ Particulate Matter

Particulate matter means the microscopic solid matter suspends in the atmosphere of Earth. The particles with a diameter between 2.5 and 10 micrometers (μm) called PM<sub>10</sub>, and fine particles with a diameter of 2.5μm or less called PM<sub>2.5</sub>.

### ■ Ozone depletion

The ozone layer protects life on Earth from highly hazardous ultraviolet radiation (UVR). Before the Montreal Protocol was signed, the massive use of certain substances had led to ozone depletion, commonly known as "the ozone hole", which then posed threats to life and human health.

### ■ Photochemical ozone formation

The formation of ozone at the troposphere level is mainly caused by a chemical reaction between volatile organic compounds (VOCs) and nitrogen oxides (NO<sub>x</sub>) emitted from vehicles or factories and sunlight. It looks like smog, thus it is also known as photochemical smog academically.

### ■ Human toxicity, (non-) cancer effects

Toxic substances such as persistent organic pollutants (POPs), heavy metal, chlorinated organic compounds, and volatile organic compounds (VOCs) enter human bodies through respiration, food, water, or skin contact and lead to adverse health effects (e.g. toluene) or even cause cancers (e.g. benzene).

## ■ Ionizing radiation

Radiation is a kind of waves or particles that carry energy. The radiation with low energy is called non-ionizing radiation, such as radio waves, microwaves, ultrasonic waves, and ultraviolet rays. By comparison, the radiation that carries sufficient energy is called ionizing radiation, such as X-rays and γ-rays. There is always a small amount of ionizing radiation in our living environment.

## ■ Acidification

The increasing concentration of carbon dioxide (CO<sub>2</sub>), nitrogen oxides, and sulfides in the atmosphere can lead to decreasing the pH of soil and water. The situation may cause soil depletion, ecosystem damage, etc.

## ■ Terrestrial eutrophication

The excess atmospheric nitrogen deposition on land which is mainly caused by burning fossil fuel and vehicle emissions. It would lead to negative impacts on terrestrial ecosystems.

## ■ Freshwater eutrophication

The excessive supply of nitrogen and phosphorus into lakes caused by fertilization at farmland, detergents used in urban areas, and human and animal excrement results in rapid growth of plants and algae in the water. When a large number of algae die, it would reduce the oxygen concentration in the water and therefore lead to the death of other aquatic animals. Water quality also worsens because of the oxygen deficit and subsequently destroys the natural balance.

## ■ Freshwater ecotoxicity

The impact on aquatic ecosystems and freshwater as a result of excessive use of fertilization entering into river systems by rainwater. It not only destroys ecological balance but also threatens human health by deteriorating water quality.

## ■ Mineral, fossil & ren resource depletion

Fossil fuel accounts for 80% of commercial energy consumption. According to a survey conducted by BP in 2018, the crude oil deposits will run out in just 50.2 years, natural gas in 52.6 years, and uranium in 90 years.

## A Tree in Your Name Let's Make Earth Green Again

GIGABYTE keeps a faith in providing environmental friendly products, and we also hope to invite you to plant trees with us. Trees not only play a key role in the nature, but also have multi-functions such as carbon fixation, air purification, water circulation, and cooling down temperature. The benefit of a tree is beyond imagination. Scan/Click the QR code and register online with your name and e-mail, then GIGABYTE will plant a tree in your name. You will receive a tree certificate via email from Plant-for-the-Planet Foundation. Every tree is a hope. Let's make earth green again!

