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UL 2710

**Outline of Investigation for Sustainability for Portable Electronic Products**

**Issue Number: 1**

**October 23, 2017**

***Summary of Topics***

***This first issue of the Outline of Investigation for Sustainability for Portable Electronic Products, UL 2710. This outline is designed to reduce adverse environmental and social impacts associated with the design, manufacture, use, and end of life management of portable electronic products as well as to establish a set of multi-sustainability performance criteria to address the life cycle impacts of the product that may be used to evaluate the sustainability performance of portable electronic products.***

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## INTRODUCTION

### 1 General

1.1 This outline of investigation is designed to reduce adverse environmental and social impacts associated with the design, manufacture, use, and end of life management of portable electronic products. The goal of this outline of investigation is to establish a set of multi-sustainability performance criteria addressing the life cycle impacts of the product that may be used to evaluate the sustainability performance of portable electronic products.

1.2 These requirements provide a life cycle and human health-based approach to setting the criteria to be achieved. These requirements reflect the major areas of impact and provide a criteria structure that will allow manufacturers to demonstrate that any product meeting these requirements has made significant gains toward becoming sustainable.

### 2 Scope

2.1 This outline of investigation establishes multiple attribute sustainability criteria for portable electronic products, covering the portable electronic product, accessories shipped in the box with the portable electronic product, and packaging.

2.2 These requirements apply to products that are or will be available for purchase at the time of evaluation.

2.3 The criteria in this outline of investigation were developed based on the life cycle stages of portable electronic products and corporate sustainability performance factors. Sustainability factors considered in this outline of investigation are:

- a) Materials;
- b) Energy use;
- c) End of life management and extension of useful life;
- d) Packaging;
- e) Corporate practices;
- f) Manufacturing and operations.

Credit for innovations in these, or other factors not listed, is also addressed in this outline.

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### 3 Units of Measurement

3.1 For the purposes of this outline of investigation, values shall be reported in accordance with the requirements of the specific criteria and shall be in the International System of Units (SI).

### 4 Undated References and Regional Conformity

4.1 Any undated reference to a code or standard appearing in this outline of investigation shall be interpreted as referring to the latest edition of that code or standard. The exception shall be in the case where the criterion explicitly states a certain version or date to be used. In the case of EU Directives, which contain an adoption date in their title, when the EU repeals a directive and replaces it with a new directive, or otherwise edits and updates a directive, the new directive will apply as the referenced directive upon its enforcement date, unless otherwise explicitly stated in the normative reference.

4.2 With regard to being region or country specific, there are the two following options for criteria:

- If the criterion does not specify, the criterion shall be certified to the same specifications in all countries or regions for which the product is certified to this outline. The approach used to conform to the criterion may vary by country or region; or
- The criterion may specify, "The number of points earned for this criterion may be different in each country or region for which the product is certified to this outline."

Note: Region means countries and territories whose independence may not be recognized by all countries (e.g., Taiwan).

### 5 Glossary

5.1 For the purpose of this outline of investigation, the following definitions apply.

5.2 ACCESSORIES – Components used external to the portable electronic product, such as cables and external power supplies, shipped in box with the portable electronic product, not including the portable electronic product. Printed materials and packaging are excluded.

5.3 AUTHORIZED REPAIR SERVICE PROVIDERS – A service provider that has been provided permission directly by the portable electronic product manufacturer to provide repair services.

5.4 BIOBASED – A material that is composed of biological materials, including renewable agricultural (plant, animal, and marine) and/or forestry materials.

5.5 BIOBASED CONTENT – The amount of biobased carbon in the material or product as a percent of the weight (mass) of the total organic carbon in the product, as determined by ASTM D6866, Standard Test Methods for Determining the Biobased Content of Solid, Liquid, and Gaseous Samples Using Radiocarbon Analysis.

5.6 CHEMICAL ABSTRACT SERVICES (CAS) NUMBER – A unique numerical identifier assigned to every chemical by the CAS division of the American Chemistry Council.

## 5.7 CONFLICT MINERALS –

- a) Columbite-tantalite (coltan), cassiterite, gold, wolframite, or their derivatives, which are limited to tantalum, tin, and tungsten, unless the U.S. Secretary of State determines that additional derivatives are financing conflict in the Democratic Republic of the Congo or an adjoining country; or
- b) Any other mineral or its derivatives determined by the U.S. Secretary of State to be financing conflict in the Democratic Republic of the Congo or an adjoining country.

Source: U.S. Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010, Section 1502, and the Securities and Exchange Commission Rule.

5.8 CONSUMER – Individual and institutional purchaser of the product.

5.9 ENVIRONMENTAL MANAGEMENT SYSTEM (EMS) – Part of an organization's management system used to develop and implement its environmental policy and manage its environmental aspects. (Reprinted from ISO 14050 Environmental management – Vocabulary.)

5.10 EUTROPHICATION – The process whereby a body of water receives excess nutrients that stimulate excess plant growth, usually resulting in the depletion of dissolved oxygen.

5.11 FIBER BASED – Materials primarily derived from natural fiber, including but not limited to wood, hemp, kenaf, palm, bamboo, starch, straw, cellulose and bagasse.

5.12 FINAL ASSEMBLY – The assembly process for a product after which it is sold directly to a customer, retail store or other distribution channel, without further assembly or manufacture, and does not include non-physical (e.g. software/firmware installation on the product) and/or packaging processes or services.

5.13 GLOBAL WARMING – The sustained increase of the average temperature of the earth's atmosphere, resulting in climatic change, due to the increased emission of greenhouse gases.

5.14 GRI STANDARDS – A sustainability reporting framework that can be used to measure and report on the economic, environmental, and social performance of an organization.

5.15 HOMOGENEOUS – Uniform composition throughout. (Reprinted from the UK RoHS Guidance Producer Support Booklet.)

5.16 HOMOGENEOUS MATERIAL – A material that cannot be mechanically disjointed into different materials. (Reprinted from UK RoHS Guidance Producer Support Booklet).

5.17 HOUSING – External enclosure of the portable electronic product that provides protection to the internal components of a portable electronic product. Secondary cases on top of, or attached or applied to the exterior of the manufacturer's original housing; and a portable electronic product display, buttons and connection ports; are not included.

5.18 LIFE CYCLE ASSESSMENT – Compilation and evaluation of the inputs, outputs and the potential environmental impacts of a product system throughout its life cycle. (Reprinted from ISO 14050 Environmental management – Vocabulary.)

5.19 MANUFACTURER – The legal entity that is the owner or the licensee of the brand or trademark under which the portable electronic product in the scope of this outline is placed on the market and

- Manufactures a portable electronic product, and/or
- Has a portable electronic product designed or manufactured, and/or
- Acquires a portable electronic product for sale under their brand or trademark

5.20 MECHANICALLY DISJOINTED – The materials can, in principle, be separated by mechanical actions such as:

- Unscrewing;
- Cutting;
- Crushing;
- Grinding; and
- Abrasive processes.

(Reprinted from the UK RoHS Guidance Producer Support Booklet.)

5.21 NON-PROPRIETARY TOOL – Legally available for purchase by the general public. If patented, the patent is available for licensing under Fair, Reasonable, and Non-Discriminatory terms.

5.22 OZONE DEPLETION – The destruction of the stratospheric ozone layer which shields the earth from ultraviolet radiation harmful to life.

5.23 PACKAGING – A container enclosing the product along with any required protective materials designed to contain and protect from the point of manufacture to the point of sale. The packaging includes any individual assembled parts of the packaging such as, but not limited to, any interior or exterior blocking, bracing, cushioning, weatherproofing, exterior strapping, coatings, closures, inks, labels, bags, and films. The packaging does not include additional protective packaging used when transporting to a customer or reseller nor does it include printed information such as warranties and user guides.

5.24 POINT OF SALE (POS) PACKAGING – The packaging that contains the portable electronic product and accessories as packaged for sale to the user.

5.25 PORTABLE ELECTRONIC PRODUCT – A lightweight electrically-powered device intended to be used and/or transported without a fixed location. This definition includes only the device itself and not packaging or accessories. Typical products include, but are not limited to, consumer electronics such as ebooks, keyboards, wearables, cameras, and portable speakers. Slates/tablets and computers, as defined in the most recent applicable version of ENERGYSTAR specification, are excluded from this definition.

**5.26 POST-CONSUMER RECYCLED MATERIAL** – Material that was used by an end-user which is no longer being used for its intended purpose.

**5.27 PRE-CONSUMER RECYCLED MATERIAL** – Material diverted from the waste stream during a manufacturing process having never reached the end user. Excluded is the reutilization of materials generated in a manufacturing process and capable of being reused as a substitute for raw material without being modified in any way.

**5.28 PRIMARY ENERGY DEMAND** – The demand for energy found in nature that has not been subjected to any conversion or transformation process. It is energy contained in raw fuels as well as other forms of energy received as input to a system.

**5.29 PRIMARY RECYCLERS** – The entity(ies) that is contracted by the manufacturer or its agent to provide recycling services. A manufacturer may have multiple primary recyclers (i.e. regional providers).

**5.30 PRODUCT** – The distinct portable electronic product device identified by a unique stock keeping unit (SKU) identified and created to be available for sale to and used by a portable electronic product end user and including all accessories contained in the POS packaging.

Note: The product does not include the packaging (see 5.23).

**5.31 QUALIFIED REPAIR SERVICE PROVIDERS** – Companies and organizations which provide repair services for portable electronic products that have demonstrated qualifications through training and experience. May include organizations that have partnerships with wireless carriers and local third-party logistics providers.

**5.32 RECYCLED CONTENT** – The proportion of pre-consumer and/or post-consumer recycled material, by mass, in a product or packaging.

**5.33 REFURBISHMENT** – The process by which electronic products or components are restored to a defined condition in function and form that is comparable to, or better than, a new portable electronic product or component. The portable electronic product or component's composition and design is not changed significantly. Refurbishment may include repair or replacement of a consumable item such as an EMC or quick-release tape, or of parts or components associated with repair.

**5.34 RENEWABLE ENERGY** – Energy derived from resources that are naturally replenished and can be sustained indefinitely. Potential sources include, but are not limited to, solar electric (photovoltaic), solar thermal, wind, geothermal, bio-gas, biomass, low-impact hydro and renewable cogeneration on-site or off-site, on- or off-grid.

**5.35 REUSE** – Using an object again, for its original purpose or as repurposed, without significantly altering the physical form of the object although the object may be cleaned, repaired or refurbished between uses. (Reprinted from IEEE Std. 1680.2-2012, Standard for Environmental Assessment of Imaging Equipment.)

**5.36 UNIQUE SUPPLIER PARTS** – Parts, components, or materials in the product manufacturers' Bill of Materials of the product that have a unique part number defined by the parts manufacturer.

5.37 WASTE – Material from the generator or holder that does not possess characteristics or meet technical specifications for use in the marketplace without further processing and will be discarded or released to the environment.

## COMPLIANCE, EVALUATION AND ASSESSMENT CRITERIA

### 6 Evaluation and Assessment Criteria

#### 6.1 General

6.1.1 This outline of investigation recognizes three levels of environmental performance. To conform to this outline, a product shall meet all required criteria. Products are certified to a specific achievement level by meeting all required criteria and a percentage of optional points, as described below.

6.1.2 For each optional criterion a total number of possible points is specified. No minimum number of optional points is needed from within each environmental performance category. The total number of points needed may be obtained by any combination of total points available. Overall, a maximum of 119 points are available (excluding criteria from which a particular product is excluded, or that are not applicable), not including innovation points. No more than eight innovation points, as described in this outline of investigation, are permitted to be assigned to a candidate product. Innovation points achieved are added to the numerator and not the denominator.

#### 6.2 Levels of achievement

6.2.1 Three levels of achievement are available within this outline of investigation: Bronze, Silver and Gold. Table 6.1 below identifies the levels, with the associated points needed to achieve each level.

**Table 6.1**  
**Achievement Level – Optional Points Needed**

| Level of Achievement | Points Needed                                        |
|----------------------|------------------------------------------------------|
| Bronze               | Required                                             |
| Silver               | Required criteria + 50% of available optional points |
| Gold                 | Required criteria + 75% of available optional points |

6.2.2 Table 6.2 lists the required criteria for this outline of investigation and Appendix A contains the full list of criteria in this outline.

**Table 6.2**  
**Required Criteria**

| Category                     | Criteria                                                       |
|------------------------------|----------------------------------------------------------------|
| MATERIALS                    | 7.1.1, 8.1.1, 9.1.1, 9.2.1, 9.2.2, 9.2.5, 9.2.6                |
| ENERGY USE                   | 10.1.1, 10.1.3                                                 |
| END OF LIFE MANAGEMENT       | 11.1.1, 11.2.1, 11.3.1, 11.4.1, 11.5.1, 11.6.1, 11.7.1, 11.8.1 |
| PACKAGING                    | 12.2.1, 12.4.1, 12.5.1, 12.7.1, 12.8.1                         |
| CORPORATE PRACTICES          | 13.1.1                                                         |
| MANUFACTURING AND OPERATIONS | 15.2.1, 15.3.1                                                 |

## **MATERIALS**

### **7 Supply Chain Management of Materials**

#### **7.1 Compliance with the European Union REACH Regulation**

##### **7.1.1 Required – Compliance with the European Union REACH Regulation**

The manufacturer shall disclose in accordance with Article 33 disclosure requirements for Substances of Very High Concern (SVHC) under the European REACH regulation.

#### **7.2 Reduction of European Union REACH Candidate SVHC substances**

##### **7.2.1 Optional – Reduction of European Union REACH Candidate SVHC substances**

The product shall not contain applicable substances included in the Candidate List of Substances of Very High Concern (SVHC) and REACH Annex XIV (List of Substances Subject to Authorization) above 0.1% weight by "article", as per Article 33 paragraph 1 of the European Union REACH regulation and interpreted according to the European Chemicals Agency "Guidance on requirements for substances in articles C"<sup>1</sup>, excluding uses and levels allowable under the European Union RoHS directive and amendments.

Substances on the Candidate List of SVHC that have a Date of Inclusion on the Candidate List of two years or more prior to the date the product is first certified to this criterion are subject to this requirement.

In order to identify applicable substances, manufacturers may pre-screen the European Union REACH Candidate List and Annex XIV using IEC 62474, Material Declaration for Products of and for the Electrotechnical Industry.

Manufacturer shall utilize a system to ensure that the product does not contain these substances above 0.1% by weight per "article", as per Article 33 paragraph 1 of the European Union REACH regulation and interpreted according to the European Chemicals Agency "Guidance on requirements for substances in articles." The system may include supplier management and trustworthiness assessment, Supplier Material Declaration, Disclosure to manufacturer, or analytical testing, to ensure that the product does not contain these substances.

Point value: 6

<sup>1</sup><http://echa.europa.eu/guidance-documents/guidance-on-reach>

## 7.3 Substitutions assessment

### 7.3.1 Optional – Substitutions assessment

The manufacturer shall provide documentation showing that it or a supplier or a recognized competent and reliable scientific expert in partnership with the manufacturer has performed a chemical hazard assessment of alternatives to one or more substances that are on the "Declarable Substances List" of IEC 62474, Material Declaration for Products of and for the Electrotechnical Industry and that have been used in previous products manufactured within 5 years prior to certification to this outline of investigation.

This evaluation shall be based on assessment tools equivalent to the U.S. EPA's Design for the Environment Alternative Assessment Methodology<sup>2</sup>. The assessment shall cover human health and environmental endpoints including but not limited to those listed in U.S. EPA's Design for the Environment Program Alternatives Assessment Criteria for Hazard Evaluation<sup>3</sup>.

The manufacturer shall indicate whether it replaced the target substance with a lower-hazard substance to serve the same function in the product, based upon the results of the assessment. The manufacturer shall determine the weighting of hazard endpoints evaluated and provide documentation supporting its decision.

A manufacturer may only claim these points if it elects to use a lower-hazard alternative, or if the assessment demonstrates the target substance represents a lower hazard than the evaluated potential alternatives. An evaluation performed on a substance used in a manufacturer's prior-shipped product is considered sufficient if the application is relevant to the product to which this outline of investigation is being applied, and if the evaluation reflects recent science on substance hazards.

Point value: 6

<sup>2</sup><https://www.epa.gov/saferchoice/design-environment-alternatives-assessments>

<sup>3</sup><https://www.epa.gov/saferchoice/alternatives-assessment-criteria-hazard-evaluation>

## 7.4 Requesting and receiving substance inventory

### 7.4.1 Optional – Requesting substance inventory

The manufacturer shall request information from suppliers on the inventory of substances in the materials, components, and parts contained in the portable electronic product and have a documented process, and a system or tool, to manage that information as defined below.

**Requesting information:** The manufacturer shall have a record of having requested suppliers of the materials, components, and parts in the portable electronic product to disclose a unique identifier (e.g. CAS, EC, MITI, ECHA), or substance name if a unique identifier is not available, or the inventory of substances comprising either:

- materials, components, and parts encompassing at least 90% of the total portable electronic product mass, or
- at least 90% of the directly contracted suppliers of materials, components, and parts.

"Request" means one or more of the following:

- The manufacturer, or an agent or supplier of the manufacturer, has requested this information in writing from the supplier directly (e.g. email, letter) and has documented acknowledgement of receipt by the supplier, or
- A contract, agreement, or purchase order between the supplier and the manufacturer (or between the supplier and an intermediary supplier [e.g. contract manufacturer]) requires the supplier to provide this information, or
- A specification or other document to which the supplier is held by the manufacturer or an intermediary supplier that requests to provide this information.

**Managing substance information:** The manufacturer shall have a documented process for collecting the information requested above; and an information management system or tool to address the nature and quantity of parts, suppliers and information relevant to the requested substance information. The system or tool shall include a means of recording the collected information that is used to calculate the percentage of directly contracted suppliers for the portable electronic product (including a list of all suppliers) or percentage mass of the portable electronic product (including a list of all parts and their masses).

Point value: 3

#### 7.4.2 Optional – Receiving substance inventory

The manufacturer shall demonstrate that it has received, validated, and is maintaining an inventory of the substances in accordance with 7.4.1 contained in the materials, components, and parts contained in the portable electronic product at the percentage mass level specified in Table 7.1.

The following equation shall be used to calculate the percentage:

$$\% \text{ mass of inventory of substances of the portable electronic product} = (\text{Mass of substances inventoried} / \text{Total mass of the portable electronic product}) \times 100$$

In the calculation, only the portion of materials, components, and parts for which substance inventory information is received from the supplier shall be counted in the numerator. If a supplier withholds disclosure on the basis of confidential business information, the mass of the undisclosed substances shall not be included in the numerator.

For instances where there are multiple suppliers for a given material, component, or part, at a minimum the manufacturer shall select which inventoried supplier mass(es) to include in the calculation.

Manufacturer demonstrates it has a system to validate and maintain information which has been collected. Examples include but are not limited to requiring suppliers to notify the manufacturer when a change in the part or material is made, collecting signed declarations of conformity from the supplier, performing analytical testing, and other methods for checking or updating the information over time. It shall remain the manufacturer's discretion whether to conduct analytical testing to validate the substance inventory information, and is not a requirement of this criterion.

Substances consumed in the manufacturing process which are not retained in the finished part or material received by the manufacturer (i.e. process chemicals), are not covered by this criterion.

Point value: maximum 5

**Table 7.1**  
**Percentage Mass Levels**

| <b>Metric</b>                                                                      | <b>Points Awarded</b> |
|------------------------------------------------------------------------------------|-----------------------|
| Inventory of substances that comprise >25% mass of the portable electronic product | 2                     |
| Inventory of substances that comprise >50% mass of the portable electronic product | 3                     |
| Inventory of substances that comprise >75% mass of the portable electronic product | 4                     |
| Inventory of substances that comprise >90% mass of the portable electronic product | 5                     |

## **8 Sustainable Materials Use**

### **8.1 Post-consumer recycled and biobased plastic content**

If filler materials or additives are used in post-consumer recycled and/or biobased plastics, the calculation of the post-consumer recycled and/or biobased plastic content is made by dividing the weight of the post-consumer recycled and/or biobased plastic by the full weight of the plastic material, including additives and fillers, in the part or product. Only additives or fillers that are derived from a recycled feedstock may be considered recycled plastic.

#### **8.1.1 Required – Declaration of post-consumer recycled and biobased plastics content**

Manufacturer shall declare both the minimum percentage of post-consumer recycled plastic content, and minimum percentage of biobased plastic content, each calculated as a percentage of total plastic (by weight) in the product. This declaration shall be available to the public through the manufacturer's website, or other publicly accessible electronic resources.

The following may be excluded from the calculation of percentage: printed circuit boards, labels, cables, connectors, electronic components, optical components, electrostatic discharge (ESD) components, electromagnetic interference (EMI) components, films, coatings and adhesives.

Demonstration of conformance shall include a supplier letter stating minimum percentage of post-consumer recycled and biobased plastic content in material supplied to manufacturer or to manufacturer's part supplier, and documentation of calculation; and is not required if a declaration is zero content.

Note: A declaration of 0% is acceptable for this criterion.

If the product does not contain any non-excluded plastics, this criterion is "Not Applicable."

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### 8.1.2 Optional – Post-consumer recycled plastic and biobased plastic content in the portable electronic product

The use of post-consumer recycled plastic and biobased plastic content in the portable electronic product – calculated as a percentage of total plastic (by weight) in the portable electronic product – shall be awarded points on a sliding scale as shown in Table 8.1.

The following may be excluded from the calculation of percentage: printed circuit boards, labels, cables, connectors, electronic components, optical components, ESD components, EMI components, films, coatings and adhesives.

If the portable electronic product does not contain any non-excluded plastics, this criterion is "Not Applicable."

Point value: maximum 4

**Table 8.1**  
**Post-Consumer Recycled Content and Biobased Content**  
**(measured as a percentage of the total weight of plastic in the portable electronic product)**

| Total Combined Post-Consumer Recycled Content and Biobased Content | Points Awarded |
|--------------------------------------------------------------------|----------------|
| 1% – 5%                                                            | 1              |
| > 5% – 10%                                                         | 2              |
| > 10% – 25%                                                        | 3              |
| > 25%                                                              | 4              |

Note: Verification of biobased content can be determined using ASTM D6866-04a.

### 8.1.3 Optional – Post-consumer recycled plastic and biobased plastic content in accessories

The use of post-consumer recycled plastic and biobased plastic content in the accessories – calculated as a percentage of total plastic (by weight) in the accessories – shall be awarded points on a sliding scale as shown in Table 8.2.

The following may be excluded from the calculation of percentage: printed circuit boards, labels, cables, connectors, electronic components, optical components, ESD components, EMI components, films, coatings and adhesives.

If the accessories do not contain any non-excluded plastics, this criterion is "Not Applicable."

Point value: maximum 3