Product-Category Rules (PCR)

for preparing an environmental product declaration (EPD) for

Home Network Infrastructure Devices

PCR 2010:1.0

ZyXEL Communications Corporation

Version 1.0

2010-09-28

This PCR complies with the requirements of the International EPD®SYSTEM as well as the guidance of the Environment and Development Foundation (www.edf.org.tw).

Table of Contents

1. General Information

This document is to be used as the product category rules (PCR) for Home Network Infrastructure Devices (HNID). The requirements specified in this PCR are intended to be used for EPDs certified in accordance with ISO 14025 standard. This document shall be valid until 09 28, 2015.

This PCR was prepared by the ZyXEL Communications Corporation. Representatives from major Taiwanese manufacturers of similar products and stakeholders were invited by the Taiwan Electrical and Electronic Manufacturers Association (TEEMA) to the open consultation meeting on September 10, 2010, to participate in the discussion and review of this PCR. EDF then reviewed and approved this PCR.

For further information and processing of feedback comments concerning this PCR, please contact ZyXEL Communications Corp. - Totel Quality Management Division Mr. Whisky Lin (tel：+886-3-5783942, ext.3102，fax：+886-3-5782439；email：whisky.lin@zyxel.com.tw) or ZyXEL Communications Corp. - Totel Quality Management Division Mr. Alan Cho (tel：+886-3-5783942, ext.3100，fax：+886-3-5782439；email：acho@zyxel.com.tw).

2. Company and product description

The EPD shall include information about the manufacturing company/organization. The information may include manufacturing process related information, and environmental related information, such as the environmental management system information. The information may also include special issues which the company/organization would like to emphasize, such as the products meeting certain environmental criteria, or environmental safety and health related information.

This PCR covers the Home Network Infrastructure Devices (HNID) and is applicable to communications between businesses and consumers (B to C), as well as business to business (B2B), regarding the full life-cycle of the HNID products. While determining the environmental impacts of the product, the product's accessories and packaging shall also be included in the scope of the study.

2.1 Product function

The following description on the product function of the HNID adopted the language used in the *Requirements for Home Network Infrastructure Device (Draft v.3)* developed by the Home Gateway Initiative, as well as EU's *Code of Conduct on*

Energy Consumption of Broadband Equipment Version 3 (Final).

A home segment is a portion of a home network and shares a common underlying MAC + PHY layers dedicated to this home segment. Home portions connected via devices that extend the physical layer, such as repeaters or network hubs, are also considered to be same home segments. Home network can be divided into different segments based on the underlying MAC + PHY layers, such as Ethernet, WiFi, Powerline, Phoneline and etc.

A HNID is a Home Network Infrastructure Device that is bridging a minimum of two home net-work segments, and is located in the data and signalling paths between end devices and home gateway. It can be WiFi to Powerline adapter, Ethernet to WiFi adapter and etc.)

(Figure 1 presents a generic HNID topology, where HNIDs lies between different home segments, or between HG and home segment, or home segment and end devices, connecting two or more devices or home segments.

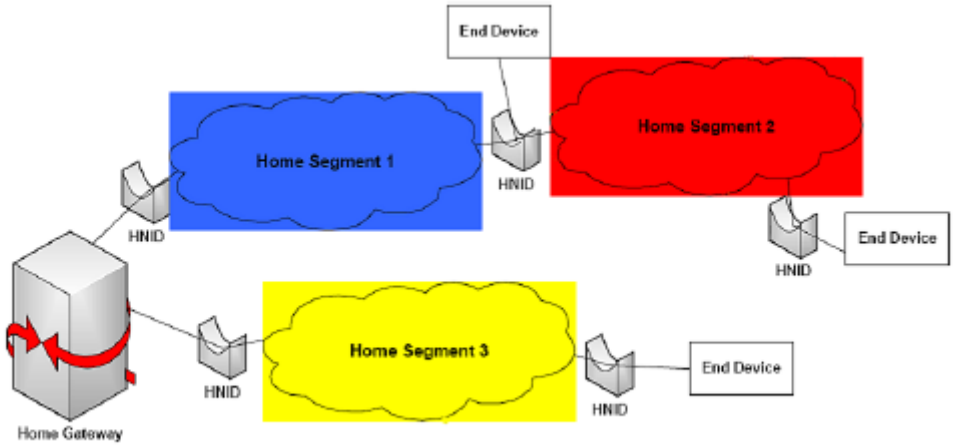

Figure 1 Generic HNID Topology

In some cases, HNID can be integrated in HG so that HG can be connected directly to home segments, as explained in Figure 2.
Multicast architecture can be supported by some HNIDs.

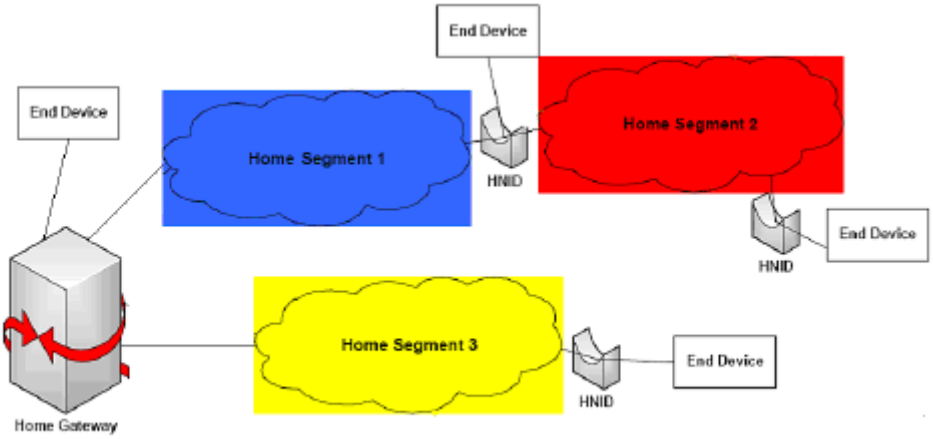

Figure 2 Topology for HG with integrated HNIDs

The following figure shows the functions and interfaces of an HNID. The HNID has at least 2 interfaces, each to home segments that are of a different PHY technology (Ethernet wireline, Wi-Fi, Powerline, coax, phoneline,…). The HNID has a bridging capability at Layer 2 (MAC layer), bridging the different interfaces. There is a system management function, which communicates with a remote management entity (located in the HG or further in the network). The sys- tem management function is at layer 7, addressable via either layer 2 (MAC) or layer 3 (IP).

The HNID system contains some support functions like QoS , Diagnostics and multicast enabling.

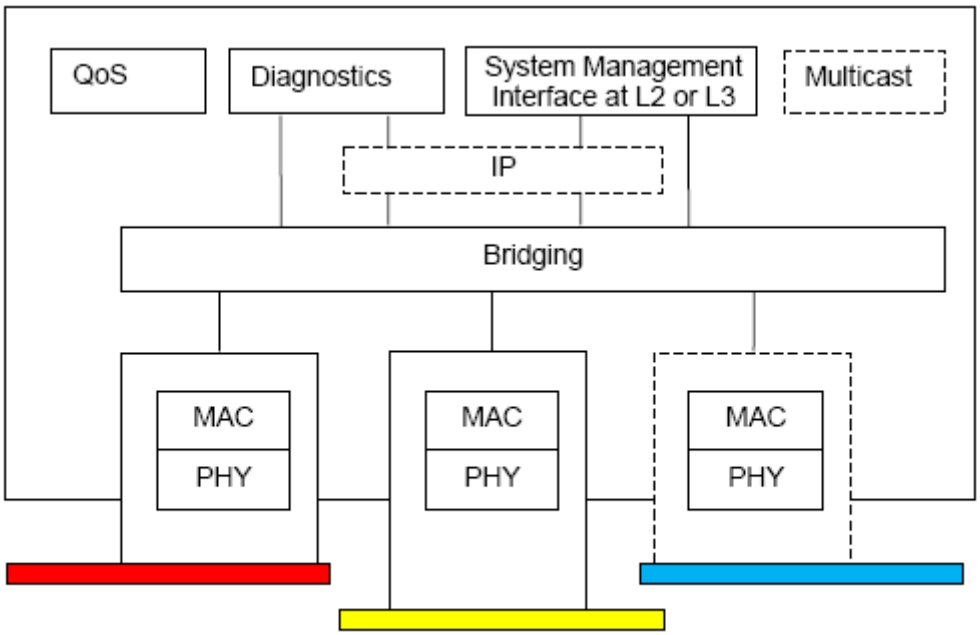

Figure 3 HNID entity Reference Diagram

Based on the definition of HNID provided in EU's *Code of Conduct on Energy Consumption of Broadband Equipment Version 3 (Final),* the positioning of the

HNID in the network system architecture is shown in Figure 4 below.

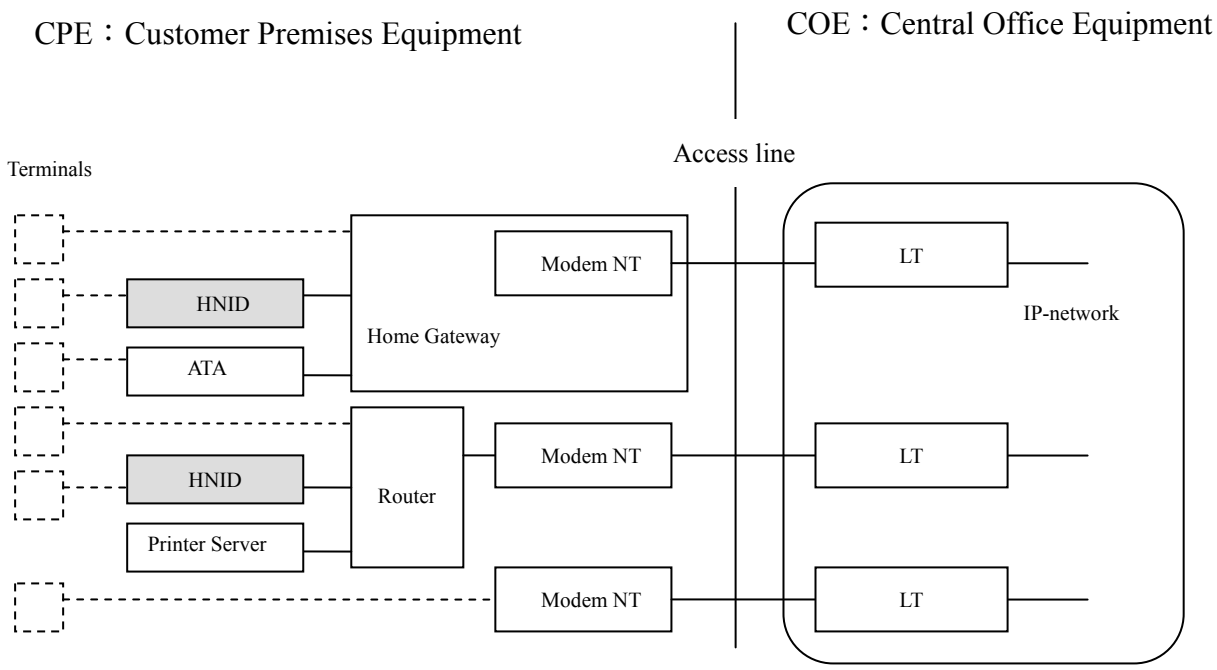

Figure 4 Positioning of the HNID in the Network System Architecture

As there are a wide variety of HNID products, this PCR adopted the contents of EU's *Code of Conduct on Energy Consumption of Broadband Equipment Version 3 (Final)* in defining the scope of HNID product groups applicable to this PCR.

(1) Wi-Fi access points

(2) Small hubs and non-stackable Layer 2 switches

(3) Powerline Adapters

(4) Alternative LAN technologies: Adapters utilizing the Home Phoneline Networking Alliance (HPNA) standard and Multimedia over Coax Alliance (MoCA) standard.

(5) Optical LAN adapter

2.2 Product components

The basic components of the HNID shall at least include the following:

— External Casing

— Input/Output Interface

— Mother Board
— Electronic Components
— Network Cable, Phone Cable, etc.
— Packaging

HNID may also include the following components/accessories:

— Antenna
— External power supply
— Others: CD/DVD, User manual

2.3 Product technical description

The product technical description part of the EPD shall include the following information:

— Equipment dimension and weight
— Connected device and terminal device
—
— Types, number and transmission rate of interfaces. The interfaces are defined as follows (not interfaces not covered in the following definitions, the definition of such interfaces shall be provided):

- Ethernet wireline interface: This interface is according to standard IEEE 802.3. The interface plug is a RJ-45.
- Ethernet wireless (Wi-Fi) interface: This interface is according to standard IEEE 802.11. The interface is via antenna.
- HomePlug powerline interface: This interface is according to HomePlug standard. The interface plugs are country dependent power plugs.
- HomePNA phoneline interface: This interface is according to standard HomePNA3.1 which is equivalent to ITU-T G.9954 recommendation. The interface plug can be anything belonging to twisted pair or coax.
- MoCA Coax interface: This interface is according to standard MoCa specification 1.0. The interface plug is a PAL plug
- Unified high-speed wireline interface: This interface is according to standard ITU-T G.9960. Plugs are according to wireline technologies as mentioned in previous sections.

— Equipment configuration
— Upgradeability of firmware
— Expected/design product life
— Other supported functions and their definitions, such as Quality of Service (QoS), network diagnosis, performance monitoring, power management.

3. List of materials and chemical substances

The contents of the following materials and chemical substances in the product shall be declared:

- All materials used in the product with accumulated weight ≥ 99.5% product weight (excluding power supply, accessories and packaging).
- All banned substances regulated by legal and customer requirements;
- The following materials in the basic components: flame retardants, lead content in solder, lead and flame retardant content in solder masking agent, and substances regulated by RoHS Directive (2002/95/EC)(the latest version).

The declaration of halogen-free flame retardants, lead-free solders and no RoHS-regulated substances may only be made when appropriate evidences are available (for example, test reports from accredited laboratories/testing facilities). The following organizations may provide accreditation for testing facilities: Taiwan Accreditation Foundation (TAF), (Asia Pacific Laboratory Accreditation Cooperation (APLAC), International Laboratory Accreditation Cooperation (ILAC) or ILAC Mutual Recognition Arrangement (ILAC MRA). For definitions of testing methodology and confirmations of regulated hazardous substances based on the accredited laboratories' product testing methods, please refer to IEC 62321 Standard.

4. Declared unit

The declared unit is defined as one unit of HNID (including power supply, accessories and packaging), as HNIDs are marketed and sold in such units.

5. System boundaries

The main system boundaries of the product system are presented as follows:

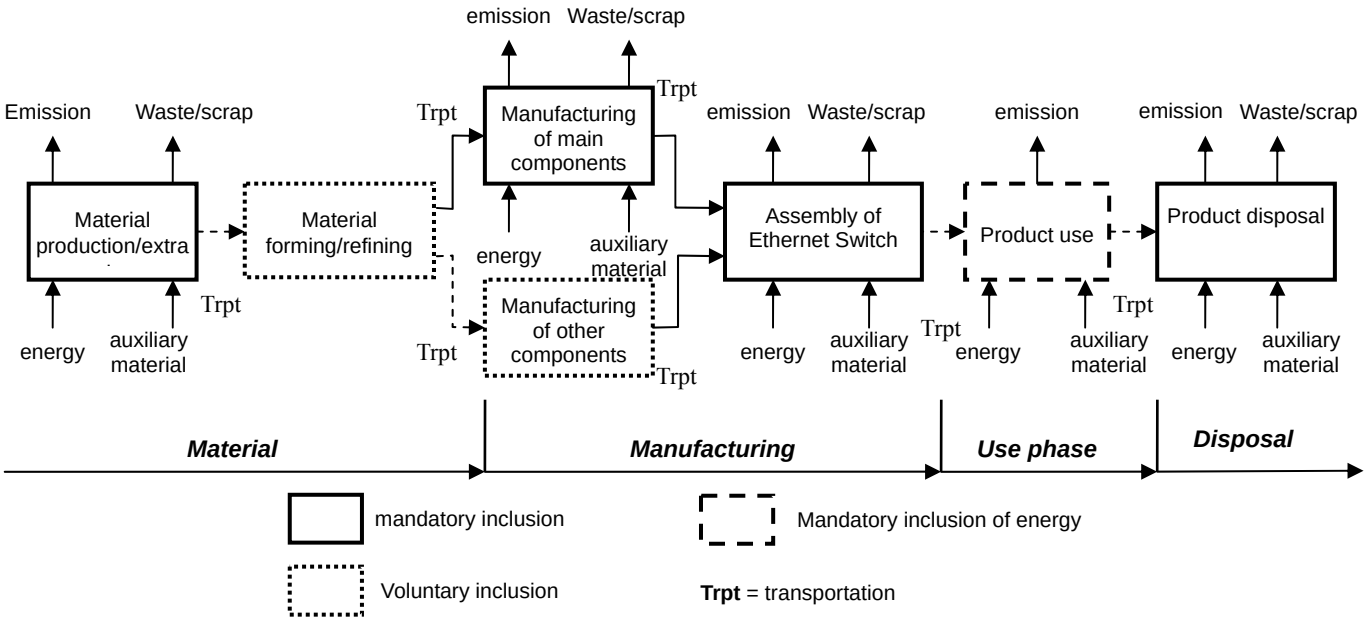

Figure 5 System boundary of the main product system

As described in Figure 5 above, the life cycle of a HNID covers the product manufacturing, distribution, use, and waste disposal phases, described as follows.

Raw material acquisition phase

The LCA shall include information for the following unit processes:

— Material extraction and manufacturing of main components and other small components;
— The manufacturing/generation of energy used for raw material production.

The inclusion in the LCA the information on the raw material forming and refining, and transportation of raw materials is of the voluntary reporting nature.

Manufacturing Phase

The LCA shall include information for the following unit processes:

— Manufacturing of main components;

— Product assembly;
— Transportation of waste from main components manufacturing process and product assembly process to waste disposal plants;
— Transportation of main components to product assembly plants.

The main components include: external casing, PCB, network core processor (IC), external power supply (if included), cables (network cable, phone cable), packaging, external wireless network antenna (if included), capacitors, connects, and resistors.

The inclusion in the LCA the information on the manufacturing of small components, and their transportation to the assembly plant is of the voluntary reporting nature.

The data quality requirements for the main components are described in Section 9 on calculation rules and data quality requirements. The EPD/CFP shall also include the other minor/smaller components of the product, but their data quality requirements are different from those of the main components.

Distribution phase

The LCA shall include information for the following unit processes:

— The transportation of product to the distributors/retailers.

The inclusion in the LCA the information on operations of the distributors/retailers and the transportation of product from the distributors/retailers to the users is of the voluntary reporting nature.

Use Phase

If the product is used at the user-end, the EPD shall declare the electricity consumption during Off State, Low Power State and On State, and the electricity consumption measurement shall be conducted with the test method stipulated for use at the product exported region, such as EN 62301. Based on the *Code of Conduct on Energy Consumption of Broadband Equipment Version 3 (Final)*, the product's energy consumption states are defined as follows:

Off State: The state in which the equipment is not performing any function. This state is entered when the equipment is turned OFF. During the OFF State, the only electricity consumption comes from the external power supply. The product can only leave the OFF state through manual switching to the ON state by the user.

Low Power State: The product is idling under this state, with all the components entering their respective low power state. Under this state, the product can not handle high data traffic but is capable of detecting activity.

On State: During the On State, all components of the product have entered their respective on state, and two-way data traffic exceeds 25% of the bandwidth (e.g., 25% Tx and 25% Rx).

Based on the types of interfaces, the low-power state and on-state of the HNID can be further defined as:

Table 1 Definition of Low-Power State and On-State for the HNID

Interface/components	Low Power State	On State
Ethernet port	Ethernet port under idle state (connected, but no data traffic) line length 5m.	Ethernet port under operating state (with data traffic) line length 5m.
Wi-Fi	Wireless network beacon on, but no data traffic.	Wireless network beacon on, with data traffic.
Alternative LAN technologies: (HPNA, MoCA, Powerline, optical LAN adapters etc.)	State with no data traffic.	State with data traffic.

As HNID only serves to connect the home network segments, its actual energy consumption will depend on the usage scenarios of the connected equipment and is less relevant to the types of HNID. In order to provide a uniform basis for calculation of HNID's energy consumption during the use phase, the following calculation equation for HNID use phase annual electricity consumption was developed based on EU's EuP Directive-Lot 26 Network Standby Losses, Draft Report Task 3, and Japan JEMAI's PBX PCR.

HNID usage scenario

Divide user's working behavior into work days and vacation days. Annual work days are: 5-day/week * ×4-week/month * ×12-month/year = 240-day/year; Annual vacation days are: 365-day/year-240-day/year=125-day/year.

Assuming HNID is connected to main power all year long. During work days, HNID is operated at 2-hour/day On State, and 22-hour/day Low Power State; during vacation days, the HNID is 4-hour/day On State, and 20-hour/day Low Power State.

Calculation Equation:

$$\text{Total energy consumption during use phase(KWh/yr)} = \frac{[\text{Energy consumption during on state (W)} \times 2\,\text{hr/day} + \text{Energy consumption during low power state (W)} \times 22\text{hr/day}] \times 240\ \text{day/yr}}{1{,}000\ (\text{W/kW})} + \frac{[\text{Energy consumption during on state (W)} \times 4\,\text{hr/day} + \text{Energy consumption during low power state (W)} \times 20\text{hr/day}] \times 125\ \text{day/yr}}{1{,}000\ (\text{W/kW})}$$

The reporting of information on maintenance during use phase and transportation from product end-of-life to waste disposal is optional.

Recycling/end of life

The reporting of transportation information from product end-of-life to waste disposal is optional.

In order to ensure the comprehensiveness of the LCA study, for B2C products included in the EPD, the inclusion of waste disposal or recycling information after product end-of-life is mandatory, such as recycling and disassembly report and information on recycling channels.

If the product recycler's recycling technology or recycling scenarios may have potential recycling/disposal benefits, they shall be explained in the EPD.

5.1 Specification of different boundary settings

Boundary in time

The validity period for the LCA results presented in the LCA report shall be defined.

Boundary towards nature

If the manufacturing processes are located within Taiwan, the waste categories as defined in Taiwan's Waste Disposal Act shall be adopted. If the processes are located in other countries, equivalent legal requirements shall be considered.

The natural boundary of the system shall describe the boundary where the materials and energy resources flow from nature into the system, and where the water and air emissions and waste are released out of the system.

Only the waste which is required to be disposed of needs to be considered. If the waste will be treated through water treatment or incineration, these processes need to be included; landfilling process does not need to be included.

Boundaries in the life cycle

The boundaries in the product life cycle are described in Figure 5. The construction of the site and infrastructure, as well as the production of manufacturing equipment and activities of the workers, does not need to be included.

Boundaries towards other technical systems

Boundaries towards other technical systems describe the inputs of material and other components towards other systems, as well as outputs of materials towards other systems. For the inputs of recycled materials and energy towards the product manufacturing phase, the transportation between the recycling process and use of recycled materials shall be included in the data set. For the production of recyclable products during the manufacturing phase, the transportation towards the recycling process shall be included.

(Note: Further explanations are provided in Section 7 on open-loop recycling)

Boundaries regarding geographical coverage

The manufacturing phase may cover manufacturing processes located on any sites around the world. For processes located in a specific region, the data used should be representative of the region. The data for the main components shall be the specific regional data for the region where the process takes place (see Section 9). For ease of comparison, no matter where the emissions are generated, the same parameters should be used for life cycle impact assessment (see Section 10).

6. Cut-off rules

For any impact category, if the sum of various impacts from a specific process/activity is less than 1% of the impact equivalent in that category, such a process/activity may be neglected during the inventory analysis. Nonetheless, the accumulated impact of neglected process/activity may not exceed 5%; i.e., at least 95% of the product's life cycle impacts shall be considered. Components/parts and materials omitted from the LCA shall be documented.

(Note: This judgment for this "1% Rule" is based on the environment relevance assessment of material input to the system, and does not consider special and exceptional environmental impacts.)

7. Allocation rules

The main allocation rules shall be valid for the entire product system. For other secondary processes, other allocation rules may be defined; however, the use of these rules should be justified. Product-specific information should be preferentially collected in order to avoid the need for allocation.

While selecting allocation rules, the following principles are recommended.

- Multi-output: The allocations are based on the changes in the resource consumption and pollutant emissions (for example, adopted quantity allocation for some main component, or surface allocation for some components), following the changes in the studied system's output product or function or economical relationship.

- Multi-input: The allocation is based on actual relationship. For example, the manufacturing process's emissions may be affected by the change in waste flow input.

- Open loop recycling: For the input of recycled materials or energy during the manufacturing phase of the product system, the transportation between the recycling process and the recycling to material use shall be included in the dataset. For the product which shall be recycled during the manufacturing phase, the transportation towards the recycling process shall be included.

Notes:

- *Allocation may be avoided through avoidance of dividing processes, for example as described in Section 6.3 of ISO/TR 14049; or through expansion of system boundary (for example as described in Section 6.4), so that the amended system shares the same product exchanges as the original system.*

8. Units

The base units and derived units of the International System of Units (SI, Système International d'unités) shall be used preferentially.

The following units shall be used:

Power & energy units:
- power unit: W
- energy unit: kWh

Specification units:
- length unit: m
- capacity unit: m^3
- area unit: m^2
- weight unit: kg

If necessary, prefixes may be used before the SI units.

10^9 = giga, symbol “G”
10^6 = mega, symbol “M”
10^3 = kilo, symbol “k”
10^{-2} = centi, symbol “c”
10^{-3} = milli, symbol “m”
10^{-6} = micro, symbol “μ”
10^{-9} = nano, symbol “n”

Preferentially used power and energy units:

- power units use W;
- energy units use kWh.

9. Calculation rules and data quality requirements)

Date quality requirements for the raw material acquisition phase:

- Generic data may be used in production, extraction, shaping, and refinement of the raw materials used in product production. See Appendix I for sources of generic data. The date of the generic data can not be older than 1990.

Date quality requirements for the manufacturing phase:

- Site-specific data (for example, specific factory data or transportation data for a specific manufacturing process) shall be used for the production of main components and main assembly. If other types of information are used, description of the information and rationale for using the information shall be provided. For site-specific data of electronic components, data from representative plant may be used as the site specific data for a specific component.
- Generic data may be used in the manufacturing process for the HNID’s smaller (not main) components. Commonly used international generic data may also be used as generic data (see Appendix I for sources of generic data).
- When using generic data, factors such as whether the same chemical or physical process is used, within the same technical scope or if the technical and systematic boundaries are appropriate shall be considered.
- When suppliers are unable to provide specific data; or when even if generic data are used in place of specific data, there is only minor impacts to the results, generic data may be used as substitute data. But their combined contribution of for all life cycle phases shall not greater than 10% of the total impact for any impact category.

- The data shall be representative for the average of a specific year. If the average date for less than one full year cycle is used, description of the data and rationale for using such data shall be provided.
- The electricity mix for the manufacturing phase should be site-specific data. If site-specific data cannot be obtained, the official electricity mix for the country where the site is located may be used as approximate value. The electricity mix should be documented.
- For the definition of hazardous waste, the definition as defined in Taiwan's Waste Disposal Act should be used for sites located in Taiwan. For sites located outside Taiwan, legal requirements for the host country shall be observed.
- For the transportation of main components from suppliers to the product assembly plant, the transportation modes and distances used by the suppliers shall be considered.

Date quality requirements for the use phase:

- Product's energy consumption during its usage states shall be determined in accordance with the testing method stipulated for the product exported country/region.
- The electricity mix for the use phase may adopt the official electricity mix for the country where the user is located as approximate value or generic data. See Appendix I for sources of generic data. The date of the generic data can not be older than 1990.

Date quality requirements for the end-of-life phase:

- If for special reason, site specific data for the waste disposal/recycling scheme can not be obtained, generic data may be used as substitute. See Appendix I for sources of generic data. The date of the generic data can not be older than 1990.

10. Parameters to be declared in the EPD

For the manufacturing phase, the following parameters shall be declared:

Energy Use MJ

Resource Use

Use of non-renewable resources:

- without energy content
- with energy content

Use of renewable resources:

- without energy content
- with energy content

Electricity consumption for the main assembly and assembly of main components (optional declaration information, as energy for production of electricity are already listed under renewable and non-renewable resources).

Impact equivalents expressed as potential environmental impacts

-Global warming	kg CO_2 equivalent
-Acidification	kg SO_2 equivalent
-Ozone depletion	kg CFC-11 equivalent
-Photochemical oxidant formation	kg C_2H_4 equivalent
-Eutrophication	kg PO_4^{3-} equivalent

Note:

1. For characterization factors of each impact category, please refer to *EPD Supporting Annexes*, Version 1.0 (2008-02-29), The International EPD Cooperation, downloadable from www.environdec.com.

2. CO2 emissions from biological carbon source (biogenic CO2) do not need to be disclosed. If biogenic CO2 emission is included in the report, it shall be segregated from the GHG impact category and explained; this requirement is not applicable to biomass electricity portfolio during the use phase.

Use Phase

For the use phase, the following parameters shall be declared:

- If the product is used by the user-end, the power consumption during on mode, low power mode and standby mode shall be provided.
- If the product is equipped with a main switch, the power consumption from the power supply during the power off mode shall be declared.
- The testing methods for determining the power consumption during each state.
- Product's annual electricity consumption (kWh/year) calculated using the equation listed in Section 5 and the associated potential global warming impact

(kg CO_2-eq/year).

Additional information

- Recyclable materials (optional)
- Information on secondary materials (optional)
- Waste (classification):
  - Hazardous waste as defined in Taiwan's Waste Disposal Act. Follow host countries' laws for sites outside Taiwan.
  - Other waste.

11. Recycling information

In order to ensure the comprehensiveness of the LCA study, the inclusion of information on recycling of B2C products is mandatory. The recycling information shall include information such as disassembly instructions, which parts/components are suitable for recycling (such as metal cases) or not suitable for recycling. For example, the information requirements for the final product manufacturers contained in the WEEE Directive may also be included in the HNID's EPD.

Information for the parts which can not be recycled and therefore should be disposed of properly during the end-of-life phase may also be included. When practical, this PCR encourages the inclusion of inventory and calculation data for the end-of-life phase.

12. Other environmental information (Optional)

The EPD may cover information including technology adopted, site of product manufacturing and assembly, as well as information on other working environment, health and risk-related aspects.

If this PCR is to be used for product carbon footprint declaration purpose, in the declaration, information regarding commitment on GHG reduction shall be included and shall ensure that the commitment is measurable, reportable and verifiable. The organization may also list environmental and energy management related information, such as awards, commendations and system certifications.

13. Information about the certification

The information on PCR review, EPD verification and verification organization shall be included.

EPD Certification is valid until 2013-__-__ According to the Requirements for the international EPD system. General Programme Instructions, version 1 (2008) – www.environdec.com. The PCR review for _____ (PCR 2010:) was administered by the Environment and Development Foundation and carried out by an LCA expert panel chaired by Dr. Ning Yu (ningyu@edf.org.tw) Independent verification of the declaration, according to ISO 14025:2006 □ Internal ■ External
Third party verifier：Environment and Development Foundation in Taiwan. Accredited by : Name: Title: Organization: Signature:_____ Name: Title: Organization: Signature:_____ Name: Title: Organization: Signature:_____
Environmental declarations from different programmes may not be comparable.

14. References

The EPD shall make reference to the following documents:

- EPD General Program Instructions, Version 1.0 (2008-02-29), The International EPD Cooperation, downloadable from http://www.environdec.com/.

- EPD Requirements, MSR 1999:2, downloadable from http://www.environdec.com/.

- Relevant PCR documents;
- The underlying LCA report.

When available, the following documents shall also be referenced:

- Other documents and recycling instructions which verify and complement the EPD.

The PCR shall make reference to the following documents:

— EUROPEAN COMMISSION, Code of Conduct on Energy Consumption of Broadband Equipment Version 3, 2008.11.

— Home Gateway Initiative, Requirements for Home Network Infrastructure Device (draft), 2009.7.

— International EPD System, PCR Basic Module-CPC Division 47-Radio, Television and Communication Equipment and Apparatus Version. 0.5, 2009.08.

— EuP Preparatory Studies Lot 26: Networked Standby Losses Draft Report Task 3-Consumer Behavior and Local Infrastructure, Fraunhofer Institute for Relicbility and Microintegration, IZM.

— 「PBXシステム」製品分類別基準(PSC番号：BS-01), JEMAI & Panasonic.

Appendix I – Generic Data Sources to Refer to

For processes located within Taiwan, Taiwan generic data or the data published by the commercial, industrial and energy competent authorities of the Republic of China (ROC) government, may be used. However, for other regions (such as EU), if there are more relevant generic data available, these data should be used instead.

When data from the following generic databases are used, the most current and updated data should be used:

Material/Process	Database	Published
Industrial processes	Ecoinvent 2nd edition	2007
Packaging materials, transport, waste treatments	BUwAL 250, 2nd edition	2004
Steel, Primary copper, Copper products, Electricity, Fuels, Aluminum, Chemicals, Transports, Waste management,	LCA Database for Taiwan：DoITPro	2008~2010
	PE-GaBi	2006
	ELCD version 2.0	2009
	Ecoinvent 2nd edition	2007
	The Boustead Model 5.0	2007
	EIME (Environmental Information and Management Explorer) EcoBilan	1998-2000
	ETH ESU 96	2004
	Boustead model 5.0	2007
Plastics	PE Plastic Europe (Association of Plastics Manufacturers in Europe)	1993-1998
	PE-GaBi	2006
	ELCD	2009
	Ecoinvent 2nd edition	2007
	The Boustead Model 5.0	2007
	EIME (Environmental Information and Management Explorer) EcoBilan	1998-2000
Electronic components	LCA Database for Taiwan：DoITPro	2008~2010
	PE-GaBi	2006
	ELCD	2009
	Ecoinvent 2nd edition	2007
	The Boustead Model 5.0	2007
	EIME (Environmental Information and Management Explorer) EcoBilan	1998-2000

Appendix II – Reporting Format for the EPD

This appendix provides guidance information for the titles of sections, types of data and required information to be reported in the mandatory reporting part of the EPD. As a generic reporting template, the following titles and sub-titles are recommended:

(Refer to the PCR manual for the section numbering, the information in Italics are the recommended data/information for inclusion)

Introductory part

Each EPD should have an introduction part on the top part of the EPD which includes the following information:

- *EPD system logo (LOGOTYPE)*

- *Company/organization name*
- *Product name*
- *EPD registration number*

Description of the company/organization and product/service

Company/Organization

- *Description of company/organization*
- *Description of overall working environment, existing quality system and environmental management system*

Product and services (see Section 2)

- *Product's main applications*
- *Description of product specification, manufacturing process, manufacturing sites (if there are several sites)*
- *For product's environmental performance aspects, characteristics which may improve the usefulness of product*
- *Other types of relevant information, for example, special manufacturing processes with special advantages to the environment*

List of materials and chemical substances

- *Content declaration (see Section 3)*

Presentation of the environmental performance

- *Outline of the LCA methodology, for example, period of LCA, declared units, system boundaries (graphical presentation), cut-off and allocation rules, and*

data sources.

Material acquisition phase *(see Section 10)*

Manufacturing phase *(see Section 10)*

Distribution, use, and waste disposal phases *(see Section 10)*

-Geographical region for product delivery
-Transportation data
- Design service life
- Distribution of use state and energy consumption
- Annual electricity consumption and annual global warming impact during use phase
-End-of-life information

Information about Company and Certification Organization

Recycling information *(see Section 11)*

Other environmental information *(see Section 12)*

Information regarding certification

- Names of certification and verification organizations

- Validity of certification certificates

- Compliance with legal and relevant requirements

References *(see Section 13)*

- relevant PCR documents

- EPD Requirements, MSR 1999:2

- underlying LCA study

- other supporting documents for LCA information

- other relevant documents regarding company/organization's environmental activities

Appendix III Abbreviations

Abbreviations	Common Name
APLAC	Asia Laboratory Accreditation Cooperation
CFP	Carbon Footprint of Product
EPD	Environment Product Declaration
ILAC	International Laboratory Accreditation Cooperation
MRA ILAC	International Laboratory Accreditation Cooperation Mutual Recognition Arrangement
ISO	International Organization for Standardization
LCA	Life Cycle Assessment
PCR	Product Category Rule
RoHS	The Restriction of the use of certain Hazardous Substances in Electrical and Electronic Equipment Directive
TAF	Taiwan Accreditation Foundation
Trpt	Transportation
WEEE	The Waste Electrical and Electronic Equipment Directive
CPU	Central Processing Unit
DNS	Domain Name System
FTP	File Transfer Protocol
GSM	Global System for Mobile Communications
CPE	Customer Premises Equipment
COE	Central Office Equipment
NT	Network Termination
AL	Access Line
LT	Line Termination
HNID	Home Network Infrastructure Device
ATA	Analogue Terminal Adapter
ACL	Access Control Line
NA(P)T	Network Address (Port) Translation
Mapping	Mapping
QoS	Quality of Service
SS	Service Support
PSTN	Public Switched Telephone Network