GENERAL PRINCIPLES FOR AN ENVIRONMENTAL COMMUNICATION ON MASS-MARKET PRODUCTS

PART 26: METHODOLOGY REPOSITORY FOR THE ENVIRONMENTAL IMPACT ASSESSMENT OF MOBILE PHONES

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Preamble

The aim of this draft repository is to provide a methodological framework for assessing the environmental impacts of "*mobile telephony*" products.

It constitutes a version of the repository of good practices BP X 30-323. The repository of good practices BP X 30-323-0 lays down the guiding principle that the assessment of product environmental impacts shall be executed in accordance with the lifecycle approach and the multicriteria approach. The environmental communication indicators will be deemed compliant with the rules of the repository of good practices for communication on convenience goods provided they comply with the general principles and cross-disciplinary methodological rules laid out in repository BP X 30-323 and its annex, as well as the rules specified in this sector-specific guide.

Note that it has been drafted within the framework of sector-specific working group WG2's Orange and SFR environmental communication pilot projects—one for Orange led by BIO Intelligence Service and one for SFR led by Bureau Veritas CODDE. It is an extension of the approach impelled and coordinated by the ADEME/AFNOR to deliver product environmental information.

1. Reference data

1.1. Scope

This guideline applies to mobile phones. The associated CPA code is: “26.30.22 Telephones for cellular networks or for other wireless networks”.

An illustrative example of a mobile phone can be found in Annex E.

1.2. Functional unit

In the case of the product under study, the primary function of a mobile phone is making and receiving calls. Other secondary functions are not covered under this study as they are not common functions spanning the entire mobile phone category. The mobile phone market is basically segmented as follows. Entry-level mobile phones with basic 2G connectivity, classed as “feature phones” as they carry the core features of voice calling, SMS/MMS messaging, reading /video multimedia content, and photo and video capture. Smartphones with 3G/4G connectivity can also browse the web, send and receive email, or download apps.

The **lifetime** considered here for the “*mobile telephony*” category is 2 years.

This lifetime is based on the average useful life of a mobile phone in France. Product can be cycled away to disposal and/or end-of-life processing at the end of two years or after a period in storage without use, but the difference between the two has no impact on the mobile phone’s environmental performance evaluation. This lifetime as defined does not take into account reliability or warranty factors as these variables are both unpredictable and highly functionality-dependent between different mobile phone models.

The **functional unit** adopted for the “*mobile phone*” category is as follows:

“Use of a mobile phone in France during 2 years”.

- the function(s)/services(s) provided: “what?”: depends on the functionalities delivered by the phone (voice calls, SMS/MMS, data, camera, media player, etc.)
- the magnitude of the function or service: “how much?”; based on a full charge-up every two days (regardless of phone model)
- the desired level of quality: “how?”; in France
- the product’s life (time): “how long?”; for 2 years.

NOTE A clear opportunity to improve this repository would be to devise a functional unit capable of internalizing the impacts tied to the extra energy used by secondary functions (exchanging data over the 2G/3G/4G network, using apps, reading audio/video multimedia content, taking photographs, etc.). The barriers to internalizing these factors into the functional unit are the definition of a use-case scenario pulling these feature functions together and the collection of data on the mobile phone’s different battery-life figures.

Note however that the impacts tied to the functional energy demand of a mobile phone in use in France are insignificant relative to the impacts generated over the entire life cycle of a mobile phone.

1.3. Reference flow

The reference flow is the measure of the outputs from processes in a given product system required to fulfil the function expressed by the functional unit.

A reference flow shall encompass:

- the reference product that serves to perform the function describing the service delivered to the customer by the product system;
- all accessories and consumables necessary to use of the product;
- all reference product packaging.

In this study, the unit of measure for the reference flow is a mass weight expressed in g.

Table 1 – Description of the reference flow for the "mobile telephony" category

Description of the "Mobile phone" reference flow		
Product	Description of the product	– 1 terminal – 1 battery
	Loss rate	Unknown
Accessories	Description of the accessories	– 1 charger – 1 headset
	Loss rate	Unknown
Consumables	Description of the consumables	N/A
Packaging	Description of the packaging	– 45 g paper-copy user guide – 10 g LDPE film – Secondary cardboard boxing and cushioning
	Scrap rate	Unknown
Reference flow: Mass weight of the product, accessories and packaging contained in the functional unit		XX g per functional unit

1.4. Reference scenario

The reference scenario is defined based on the mean monthly consumption figures for French consumers[1]. The lifespan has been defined based on an LCA study of a mobile phone conducted for the ADEME[2].

Number and duration of phone recharge cycles has not been assigned an average use-case scenario but will be linked to phone and charger properties (battery life and power) to deliver the service required to fulfil the primary function.

Total energy use by the charger is computed as the sum of the following three modes of energy use:

- Energy used by the charger to charge the battery from 0% to 100%;
- Energy used by the charger when connected to the phone with battery charged at 100%;
- Energy used by the charger when connected to the power grid but not to the mobile phone.

The mean usage scenario adopted to fit the functional unit is as follows:

- the mobile phone is charged-up every two days, regardless of phone model;
- each charge-up is from 0% to 100% of battery capacity;
- once the battery has charged to 100%, the mobile phone stays connected to the charger for 5 hours after each charge cycle;
- the charger, once unplugged from the phone, stays connected to the power grid for 5 hours after each charge cycle;

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[1] ARCEP report giving mean call time in France in 2013 as 2h50min, i.e. 5h40min for inbound plus outbound calls.

[2] In reference to ADEME-sponsored report *"Life cycle assessment of a mobile phone"*, April 2008, pp.13-14 and footnotes:

"In the case of a mobile phone [the functional unit] is defined by mode (time, power demand) of battery recharge with average-intensity usage of the telephone's features and over a given period of life of the telephone.

Based on our review of the literature, we elected to adopt the following baselines as they are common denominators to the majority of relevant studies, and notably the NOKIA study *"Life Cycle Environmental Issues of Mobile Phones*", NOKIA, April 2005:

– Moderate use of the phone's functionalities and a mean talk-time of 11 minutes a day over, i.e. 5.5 hours of calls (incoming and outgoing) per month,

– Battery recharge mode as described below, regardless of intensity of phone usage:

* 45 minutes/day in active (charge) mode 3.125% of the time

* 10 hours/day in off mode: no charge, charger plugged 41.7% of the time

* 13 hours 15 minutes/day disconnected: charger unplugged 55.175% of the time

The LCA considers that a phone is used **for 2 years in Europe**. ".

The functional unit has been recalculated for use **in France**.

— for the rest of the time, the charger is not plugged in.

The method for calculating number and duration of phone recharge cycles is given in clause 4.4.

NOTE The repository does not take battery ageing into account.

2. Environmental impact indicators

2.1. Environmental impact indicators adopted

The environmental impacts adopted to calculate environmental communication for the "*mobile telephony*" category are[3]:

— global warming potential;

— depletion of non-renewable natural resources.

2.2. Justification for the environmental impact indicators adopted

The environmental indicators adopted to calculate environmental information for the "mobile telephony" category were chosen on the basis of studies sponsored by the ADEME, SFR and Orange. The indicators adopted are the indicators on which the studies by the ADEME, SFR and Orange found consensus.

Justification and rationales for the indicators adopted is given in Annex A Environmental indicators chosen.

2.3. Lifecycle inventory data at the source of the environmental impacts

The environmental assessments available and current state of knowledge have pinpointed and modelled the data at the source of the environmental impacts of mobile phones.

The ADEME study[4] has established that:

— The manufacturing phase is the biggest contributor to all the life cycle impacts (global warming potential and depletion of natural resources).

  — In the manufacturing phase, the LCD screen, the motherboard and its subcomponents, the battery and the charger are the big contributors to the impact indicators.

— The use phase, distribution phase and end-of-life phase are relatively negligible contributors to all the life cycle impact indicators calculated (global warming potential and depletion of natural resources).

LCA studies led by Orange as part of an initiative to harmonize the SFR and Orange environmental labelling methodologies emerged two new significant environmental aspects on top of those detected by the ADEME assessment:

[3] Future revisions to this repository may well adopt a third indicator.

[4] *"Life Cycle Assessment of a mobile phone – Study sponsored by the ADEME"*, CODDE, April 2008, p.11 and footnotes

— Airfreight transportation of sub-assemblies in the manufacturing and/or distribution phase

— Production of silicon chips bundled with the integrated circuit packages layered onto the handset's electronics boards.

The full set of life cycle inventory data at the source of the environmental impacts of mobile phones is listed, with model estimates, in the table below. Impact variations depend on the mobile phone's technical specs.

Table 2 – Estimated contributions of environmental aspects to impact indicators for a mobile phone

Environmental impact contributors	Environmental impact indicators	
	Global warming potential	Depletion of non-renewable natural resources
Production of the screen	+++ to ++++	+++ to ++++
Production of the electronic boards (including the printed circuit board, the finish processes, the electronics components other than integrated circuits > 12 pins, the solder pads.	++	++ to +++
Production of the integrated circuits > 12 pins	+++	++
Production of the battery	+ to ++	+
Production of the charger	+	++
Production of the casings	+	+
Production of other subcomponents (screw hardware, glue, plastic parts, etc.)	+	+
Production of the packaging	+	+
Upstream transport (from raw materials extraction to the assembly site)	+	+
Assembly of subassemblies	Unknown	Unknown
Downstream transport (from assembly site to point-of-sale)	+ to ++	+
Production of the electricity needed to recharge the battery	+	+
Collection, recycling and incineration	+	+

Key

+: 0% to 5% of aggregate impacts over the entire product life cycle

++: 5% to 20% of aggregate impacts over the entire product life cycle

+++: 20% to 50% of aggregate impacts over the entire product life cycle

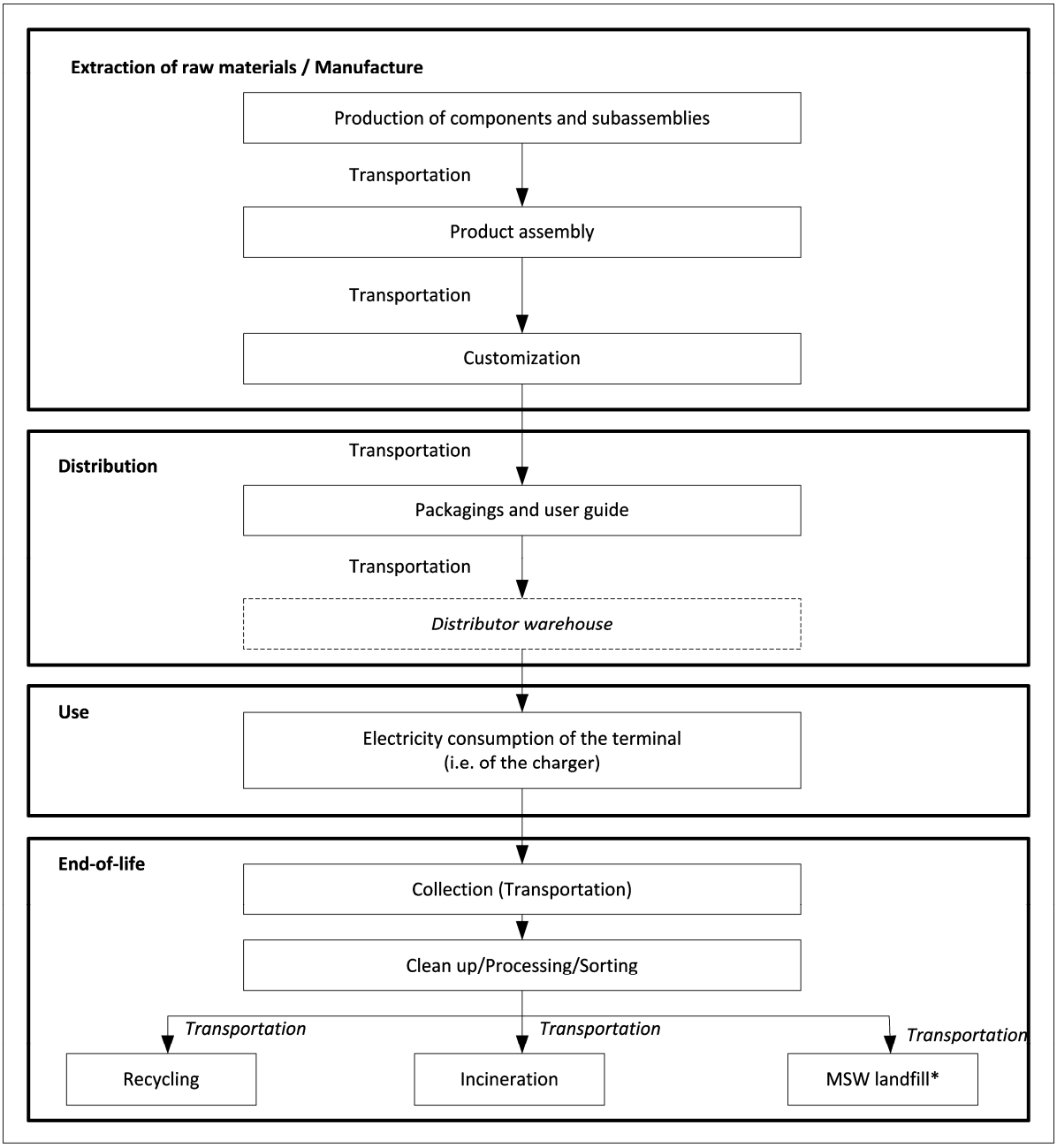
++++: 50% to 100% of aggregate impacts over the entire product life cycle

3. Scope of assessment for environmental indicators

3.1. Environmental impact indicators adopted

3.1.1. Stages and flows included

The repository covers the analysis of the big 4 stages in the mobile phone life cycle, i.e. manufacture (including the extraction of raw input materials), distribution, use, end-of-life. The figure below schematizes the stages accounted for here.



** MSW landfill : Municipal solid waste landfills*

Figure 1 – Flow diagram charting the stages in the product life cycle accounted for in this repository

For each of these stages in the life cycle, the factors accounted for are:

- the production of input materials;
- procurement;
- energy, water and other resource uses associated with the manufacturing processes;
- the emissions to air;
- the emissions to water;
- the production of waste and how that waste is handled.

3.1.2. Exclusions

The following phases have been excluded from the scope of this study based on the rationale that their impacts are too difficult to model:

a) Flows tied to R&D are not accounted for due to the difficulties involved in pinpointing the R&D share assignable to the product or system under study.

b) Flows tied to employee transport from home to work and back are not covered in the environmental impact assessment. This is also the case for out-of-office missions.

c) Flows tied to services allied to a product or system, such as advertising, canvassing and marketing, are considered as falling outside the system boundaries.

Note that other mobile phone-specific operations have also been excluded from the scope of this repository:

a) Manufacture of the mobile telephony network and its operational function (transferring data across the network).

The LCA databases do not yet have information available on the manufacture and use of 2G, 3G or 4G mobile telephony network infrastructures.

b) Resource uses associated with functions other than making and taking calls: text messaging, MMS, web browsing, mp3 media playback, digital photography, and more (non-exhaustive list).

The functionality studied here is the basic mobile phone services function, i.e. making and taking phonecalls. Accounting for other functions other than voice would entail defining separate functional units specific to each class of mobile phone devices (feature phones, smartphones, phablets, and so on). Creating several different methodology-specific repositories (one for each mobile phone class) would not help end-consumers to compare mobile phones across different classes, which runs counter to what consumers want or need.

c) Manufacture of infrastructure such as building space or roadways, and manufacture of machinery, moulds, vehicles handling product transportation, and other toolware factors of production.

As mobile phones are mass-market products (1.8 billion mobile phones were sold worldwide in 2013), the impacts associated with these operations are depreciated over their operational service life.

d) Any process waste/scrap tied to the production of mobile phones.

Process waste/scrap is excluded from the study as manufacturers do not release this kind of confidential data.

e) Phone terminal takeback and repair (under warranty) by the manufacturer's after-sales service.

The rate of phone terminal takeback and repair by the manufacturer's after-sales service is not integratable as data since each phone terminal gets engineering-checked before it is released to market. It is not deemed relevant to account for a theoretical takeback rate value.

f) Manufacture of any box-packed accessories other than the charger and headset is excluded from the scope of the study.

The charger is an accessory that is vital part of mobile phone system function. The headset is now a standard accessory boxed with any and every mobile phone. Other accessories are not studied here as they are not a vital part of mobile phone system function and are not standard accessories.

As stated in BP X 30-323-0, information related to the impacts of customer transportation to a product retail outlet is not directly integrated into the environmental communication indicators, although it can be offset and made available to the consumer.

3.2. Allocation rules for products and co-products

The vast majority of mobile phones sold today come directly with their own battery charger. However, with the advent of universal battery chargers, certain phonemakers are offering chargers separately in an effort to incentivize re-use.

The battery charger is thus a co-product associated with the mobile phone. In cases where a battery charger is re-used, the impacts of the charger manufacturing phase are depreciated over the use of several mobile phones. To define the co-product rule for allocation-splitting between headset and charger, it is necessary to get hold of the following information:

- mean percentage of mobile phones sold without a charger;
- mean percentage of old chargers reused when a user buys a mobile phone without charger;
- mean percentage of new chargers bought when a user buys a mobile phone without charger.

As things stand, without reliable values to put on these percentages, we are forced to define the following coproduct allocation rules:

Case 1: mobile phone sold with a charger

The impacts of the charger manufacturing phase are 100%-allocated to the impacts of the mobile phone over its 2-year period of use. The impacts tied to production of the electricity needed to recharge the battery must therefore be factored in.

Case 2: mobile phone sold without a charger

The user is considered as re-using an old charger. The impacts of the charger manufacturing phase are not factored in as they had already been accounted for in a previous mobile phone unit. The impacts tied to production of the electricity needed to recharge the battery must therefore be factored in.

NOTE The co-product rule thus defined fits with the stock method (cut-off approach) and benefits those phonemakers who opt not to supply a charger.

4. Data qualification and sources for input data to environmental assessments

4.1. Types of data

The input data to the environmental assessment of a mobile phone are sourced through three types of data:

- "primary" (or "specific") data, which is data that is specific to the mobile phone and provided by the manufacturer;
- "secondary" (or "generic") data, which generic inventory data borrowed from the IMPACTS® database, as well as fixed data, i.e. data that is common to all mobile phones or has no significant influence on phone's environmental performance evaluation (e.g. number of layers on an LCD circuit board package);
- "semi-specific" data, which are values determined from a representative panel of handsets and used to simplify the mobile phone modelling process for parameters making a non-significant contribution to the impacts. Where no primary data is available, semi-specific data is used. The values given to these semi-specific data items are made purposely pessimistic so as to incentivize the collection of primary data.

The data that needs to be collected and compiled in order to apply the methodology-guide repository for "mobile telephony" is listed in clauses 4.2, 4.3, 4.4 and 4.5.

4.2. Stage 1 – Manufacture

4.2.1. Primary, secondary and semi-specific data

The manufacturing phase covers all the stages in production from the mining and extraction of the input materials through to the finished product leaving the factory. This means that it also spans the upstream transport phases (transport of subassemblies to the assembly site, and transport of assembled products to the customization site).

Analysis of the findings of the first waves of completed environmental performance assessments (led between 2008 and 2010) concluded that it was only necessary to model the transport stages with potentially significant impact (chiefly the airfreight of certain components): consequently, included in-scope are airfreight transport steps carrying the motherboard, LCD board, screens, casings, battery and charger to the assembly site, and airfreight transport of the assembled product to the customization site.

Based on this same feedback, other transport steps and other non-airfreight modes of transport have relatively negligible impacts and so are not accounted for.

The primary, secondary and semi-specific data to account for in the analysis concern the parameters set out in Annex B Data qualification and sources for input data to environmental assessments.

4.3. Stage 2 - Distribution

4.3.1. Primary, secondary and semi-specific data

The distribution phase covers manufacture of the packaging and transport of the finished product (in its packaging) from customization site to distributor platform.

Finished product transport from distributor platform to phone stores is not accounted for at this point in time, as it is not a factor of differentiation between devices.

The primary, secondary and semi-specific data to account for in the analysis concern the parameters set out in Annex B Data qualification and sources for input data to environmental assessments.

4.4. Stage 3 - Use

4.4.1. Primary, secondary and semi-specific data

The primary, secondary and semi-specific data to account for in the analysis concern the parameters set out in Annex B Data qualification and sources for input data to environmental assessments.

4.4.2. Method of calculating the mobile phone's energy consumption in its use-phase

Total energy consumption E_{tot} of the mobile phone, expressed in mWh in accordance with the reference scenario (see clause 1.4) is calculated as follows:

$$E_{tot} = N_{charges} \times (E_{charge} + P_{c+m} \times t_{c+m} + P_{cs} \times t_{cs})$$

where

$N_{charges}$ Number of charges every 2 days for 2 years, i.e. 365 charge cycles;

E_{charge} Mains energy used by the charger to charge the battery from 0% to 100%, in mWh;

P_{c+m} Mains power absorbed by the charger, mobile phone connected to the power grid, battery charged at 100%, in mW;

P_{cs} Mains power absorbed by the charger alone, in mW;

t_{c+m} Time after each charge with charger plugged into the power grid, connected to the phone, with battery charged at 100%, i.e. 5 hours per charge cycle;

t_{cs} Time after each charge with charger connected to the power grid without the phone, i.e. 5 hours per charge cycle.

4.5. Stage 4 – End-of-life

4.5.1. Primary, secondary and semi-specific data

The primary, secondary and semi-specific data to account for in the analysis concern the parameters set out in Annex b Data qualification and sources for input data to environmental assessments.

4.5.2. End-of-life scenario

The end-of-life scenario accounts for the end-of-life of the mobile phone (including battery, charger and headset) and the end-of-life of the primary packaging.

Mobile phone

In the absence of specific data, the end-of-life scenario to be taken into account is as follows:

- Users bring the mobile phones (including battery, charger and headset) back to a store from where they get forwarded on to Ateliers du Bocage—a welfare-to-work scheme facility in France specializing the collection and recycling of consumer and desktop electronics equipment.
- After a series of tests led at Ateliers du Bocage, a number of the mobile phones get refurbished ready for re-use. The refurbishing process is considered out-of-scope.
- The rest of the mobile phones are dismantled and split into three main waste streams:
  - Handsets (without battery), which are reprocessed at UMICORE in Belgium
  - Batteries, which are reprocessed in France
  - Charger, cables and accessories, which are reprocessed in France
  - The reprocessing treatments recover the tiny amounts of precious metals (gold, silver, copper, lithium, etc.) contained. The other materials go to incineration without waste-to-energy recovery.

The environmental impacts tied to recycling the mobile phone shall be calculated following the procedures detailed in best practices repository BP X 30-323-0 on the basis of the materials inventory breakdown for the mobile phone.

Primary packaging

For packaging, the baseline end-of-life scenario is the end-of-life scenario of each packaging material in France. The end-of-life of the primary packaging is modelled and its environmental impacts calculated in accordance with the methodology set out in BP X 30-323-0 and its specific annexes.

4.6. Validation method for environmental information

Information related to the elaboration of labelling shall be made free, transparent and accessible to all, via appropriate channels (reports, websites, etc.). This information relates to the hypotheses, the data acquisition methods, the articulation between primary and secondary data, the emissions factors and the assessment's limitations. There is no obligation to communicate the primary data to consumers.

This data shall, however, be kept for the inspection authorities. It shall specify and retain:

- the primary data;
- the sources of the secondary data;
- the default values adopted.

The data retention period will be set later.

4.7. Accounting for embodied time-horizon

It is not relevant to account for embodied emissions for mobile phones as they have a low lifespan and low end-of-life (phones plus packaging) GHG emissions.

Carbon accounting is therefore done according to the default approach proposed in BP X 30-323-0.

Annex A

Selected environmental indicators

	Water depletion (WD)	Energy depletion (ED)	Hazardous waste production (HWP)	Atmospheric acidification (AA)	Atmospheric toxicity (AT)	Global warming potential (GWP)
Relevance						
Evaluation of an environmental issue in the product category and attributable to product	Yes	Yes	Yes	Yes	Yes	Yes
Importance of the issue	+++	++	+++	+	+++	+++
Differentiation for a majority of products on the market	+++ Varies strongly with LCD screen size and silicon chip area	+++ Varies strongly with LCD screen size, surface area of electronic boards, distance travelled for distribution and mode of transport used	+ Little variation	+ Little variation	+ Little variation	+++ Varies strongly with LCD screen size, surface area of electronic boards, distance travelled for distribution and mode of transport used
Redundancy with other indicators		Varies just as iso-proportionally as for the GWP indicator.	Varies significantly and just as iso-proportionally with screen size as for the GWP and OD indicators			Varies significantly and just as iso-proportionally with screen size as for the HWP and OD indicators
Makes it possible to highlight eco-design opportunities	+++ for production of LCD screens	+++ for production of the screen and production of the electronic boards				+++ for production of the screen, production of the electronic boards, and transport

Implementation, feasibility						
Possibility/implementability for the database	+++ via the use of dedicated LCA software and an electricals/electronics-specialized database	+++ via the use of dedicated LCA software and an electricals/electronics-specialized database	+++ via the use of dedicated LCA software and an electricals/electronics-specialized database	+++ via the use of dedicated LCA software and an electricals/electronics-specialized database	+++ via the use of dedicated LCA software and an electricals/electronics-specialized database	+++ via the use of dedicated LCA software and an electricals/electronics-specialized database
Access to the primary data required for the company to characterize the indicator	+++ The primary data required is freely accessible for the manufacturer	+++ The primary data required is freely accessible for the manufacturer	+++ The primary data required is freely accessible for the manufacturer	+++ The primary data required is freely accessible for the manufacturer	+++ The primary data required is freely accessible for the manufacturer	+++ The primary data required is freely accessible for the manufacturer
Consistency						
Consistency with the recommendations of the ADEME/AFNOR platform	Compliant to the BP X recommendations	Noncompliant to the BP X recommendations	Noncompliant to the BP X recommendations	Compliant to the BP X recommendations	Compliant to the BP X recommendations	Compliant to the BP X recommendations
		+++ indicator recommended by WG2				+++ compulsory indicator
Life cycle scope	Impacts estimated over all phases of the product life cycle	Impacts estimated over all phases of the product life cycle	Impacts estimated over all phases of the product life cycle	Impacts estimated over all phases of the product life cycle	Impacts estimated over all phases of the product life cycle	Impacts estimated over all phases of the product life cycle
Product–packaging scope	Impacts estimated for the product–packaging combination	Impacts estimated for the product–packaging combination	Impacts estimated for the product–packaging combination	Impacts estimated for the product–packaging combination	Impacts estimated for the product–packaging combination	Impacts estimated for the product–packaging combination

Robustness, reliability						
Scientific and international recognition	Indicators used under the PEP ecopassport® Programme	Indicators widely used in LCAs	Indicators used under the PEP ecopassport® Programme	Indicators used under the PEP ecopassport® Programme	Indicators used under the PEP ecopassport® Programme	Indicators widely used in LCAs and environmental declaration programmes
Methodological robustness	++ Water resource-related impact indicators (accounting for water scarcity) are in the process of being consolidated at international level	+++	+++	+++	++ The UseTox methods are more comprehensive	+++
Reliability of the modelling component (computation rule)	+++	+++	+++	+++	+++	+++
Expected reliability of primary data	+++ The primary data required is freely accessible for the manufacturer	+++ The primary data required is freely accessible for the manufacturer	+++ The primary data required is freely accessible for the manufacturer	+++ The primary data required is freely accessible for the manufacturer	+++ The primary data required is freely accessible for the manufacturer	+++ The primary data required is freely accessible for the manufacturer
Reliability of available secondary data	+++ Based on the sectoral E&E-specialized EIME database	+++ Based on the sectoral E&E-specialized EIME database	+++ Based on the sectoral E&E-specialized EIME database	+++ Based on the sectoral E&E-specialized EIME database	+++ Based on the sectoral E&E-specialized EIME database	+++ Based on the sectoral E&E-specialized EIME database
Conclusion						
Indicator selected	No	No	No	No	No	**Yes**

	Destruction of the ozone layer (ODP)	Photochemical ozone creation potential (POCP)	Depletion of non-renewable natural resources (RMD)	Water eutrophication (WE)	Water toxicity (WT)	Recyclability potential	Ecodesign
Relevance							
Evaluation of an environmental issue in the product category and attributable to product	Yes	Yes	Yes	Yes	Yes	No, as not directly related to a FU and not an environmental impact indicator	No, as it bundles together issues (and not impacts) and data not just on the product but also on the company
Importance of the issue	+	+	+++	+	+++	+++	+++
Differentiating factor for a majority of products on the market	+ Little variation	+ Little variation	+++ Varies strongly with size of the printed wiring boards	+++ Varies strongly with size of the printed wiring boards	+ Little variation	+ Little variation	++ Moderate variation
Redundancy with other indicators	Varies significantly and just as iso-proportionally with screen size as for the GWP and HWP indicators		Varies strongly with size of the printed wiring boards and iso-proportionally with the WE indicator	Varies strongly with size of the printed wiring boards and iso-proportionally with the RMD indicator			
Makes it possible to highlight eco-design opportunities		+++ for the transportation component	+++ for the restrictions on non-renewable resource material			+++ for the packaging (preferential use of paper/cardboard) ++ (no foam, glue, bioplastic, etc., but not all the options are detailed (e.g. disassemblability)	+++ for all the issues

Implementation, feasibility							
Possibility/implementability for the database	+++ via the use of dedicated LCA software and an electricals/electronics-specialized database	+++ via the use of dedicated LCA software and an electricals/electronics-specialized database	+++ via the use of dedicated LCA software and an electricals/electronics-specialized database	+++ via the use of dedicated LCA software and an electricals/electronics-specialized database	+++ via the use of dedicated LCA software and an electricals/electronics-specialized database	++ via the use of recyclability hypotheses modelled for the different types of materials based on data held by the ADEME and Orange, in principle easily available	N/A
Accessibility to primary data required for the company to characterize the indicator	+++ The primary data required is freely accessible for the manufacturer	+++ The primary data required is freely accessible for the manufacturer	+++ The primary data required is freely accessible for the manufacturer	+++ The primary data required is freely accessible for the manufacturer	+++ The primary data required is freely accessible for the manufacturer	+++ for the material composition of the mobile phone + for the real-world recycling rate of the materials	+++ except for presence of hazardous substances
Consistency							
Consistency with the recommendations of the ADEME/AFNOR platform	Compliant to the BP X recommendations	Compliant to the BP X recommendations	Compliant to the BP X recommendations	Compliant to the BP X recommendations	Compliant to the BP X recommendations	No, not an environmental impact indicator	No, qualitative indicator
			+++ Indicator recommended by WG2				
Life cycle scope	Impacts estimated over all phases of the product life cycle	Impacts estimated over all phases of the product life cycle	Impacts estimated over all phases of the product life cycle	Impacts estimated over all phases of the product life cycle	Impacts estimated over all phases of the product life cycle	NA	NA
Product–packaging scope	Impacts estimated for the product–packaging combination	Impacts estimated for the product–packaging combination	Impacts estimated for the product–packaging combination	Impacts estimated for the product–packaging combination	Impacts estimated for the product–packaging combination	Impacts estimated for the product–packaging combination	Impacts estimated for the product–packaging combination

Robustness, reliability							
Scientific and international recognition	Indicators used under the PEP ecopassport® Programme	Indicators used under the PEP ecopassport® Programme	Indicators used under the PEP ecopassport® Programme	Indicators used under the PEP ecopassport® Programme	Indicators used under the PEP ecopassport® Programme	Indicator assessed on the basis of product recycling patterns and practices in France.	Not on the methodology (qualitative and makes use of 'subjective' weighting factors)
Methodological robustness	+++	+++	++ Certain methods do not chart the contributive flows	+++	++ The UseTox methods are more comprehensive		
Reliability of the modelling component (computation rule)	+++	+++	+++	+++	+++	++	N/A
Expected reliability of primary data	+++ The primary data required is freely accessible for the manufacturer	+++ The primary data required is freely accessible for the manufacturer	+++ The primary data required is freely accessible for the manufacturer	+++ The primary data required is freely accessible for the manufacturer	+++ The primary data required is freely accessible for the manufacturer	+++ (material balances only)	+++ except for presence of hazardous substances
Reliability of available secondary data	+++ Based on the sectoral E&E-specialized EIME database	+++ Based on the sectoral E&E-specialized EIME database	+++ Based on the sectoral E&E-specialized EIME database	+++ Based on the sectoral E&E-specialized EIME database	+++ Based on the sectoral E&E-specialized EIME database	Moderate (practices subject to change and heavily tied to economic benefits)	N/A
Conclusion							
Indicator selected	No	No	**Yes**	No	No	No	No

The two indicators adopted for environmental communication on this category are:

- Global warming potential: this is the core indicator prescribed by the ADEME/AFNOR platform. It serves to capture production of the screen, production of the electronic boards, and the transport stages.

- Depletion of non-renewable natural resources: this is an indicator that has already been utilized in the environmental communication project (e.g. for the TVs product category). It serves to capture environmental performance challenges that end-consumers can readily understand, and is particularly appropriate for electronics goods that require the use of rare and precious metals (such as gold, silver, tin, tantalum, etc.).

Water resource depletion is a third indicator in the frame to complete the first two indicators once the assessment methods for the environment impacts on water have been properly consolidated.

Annex B

Data qualification and sources for input data to environmental assessments

Stage	Sub-stage	Primary data		Semi-specific data		Secondary data				
		Activity-related data, to be linked to the inventory database	Elementary flows and data without direct links to the inventory database	Activity-related data, to be linked to the inventory database	Elementary flows and data without direct links to the inventory database	Activity-related data, to be linked to the inventory database	Elementary flows and data without direct links to the inventory database	Generic inventory data		
								Processes	Technical representativeness	Geographical representativeness
Manufacture	Manufacture of the screens	– Surface area of the main screen (in cm^2) – Type of main screen (LCD/OLED and touchscreen/non-touchscreen) – Surface area of the second screen (in cm^2) – Type of second screen (LCD/OLED and touchscreen/non-touchscreen)						LCI for the production of 1 cm^2 of screen (excluding gold, silver, tin, tantalum and indium input flows)	– Colour LCD – Colour OLED – Colour LCD display with capacitive panel – Colour OLED display with capacitive panel Production of the screens shall account for the use of indium.	China

Stage	Sub-stage	Primary data		Semi-specific data		Secondary data				
		Activity-related data, to be linked to the inventory database	Elementary flows and data without direct links to the inventory database	Activity-related data, to be linked to the inventory database	Elementary flows and data without direct links to the inventory database	Activity-related data, to be linked to the inventory database	Elementary flows and data without direct links to the inventory database	Generic inventory data		
								Processes	Technical representativeness	Geographical representativeness
Manufacture	Manufacture of the printed wiring boards	– Surface area of the motherboard (in cm^2) – Surface area of the LCD board (in cm^2) – Surface area of the keypad board (in cm^2) – Surface area of the touchpanel key board (in cm^2) – Total surface area of other rigid circuit boards (in cm^2) – Total surface area of flex circuit boards (including the flex component of any flex-rigid board) (in cm^2)		– Number of layers of the motherboard – Type of LCD PCB (rigid or flex) – Type of keypad PCB (rigid or flex) – Type of touchpanel key PCB (rigid or flex)		– Number of layers of the LCD board – Number of layers of the keypad board – Number of layers of the touchpanel key board – Number of layers of other rigid circuit boards – Number of layers of other flexible circuit boards		LCI for the production of 1 cm^2 of printed circuit board (excluding gold, silver, tin, tantalum and indium input flows)	– 1-layer FR4 – 2-layer FR4 – 4-layer FR4 – 6-layer FR4 – 8-layer FR4 – 10-layer FR4 – 12-layer FR4 – 2-layer polyimide flexible	China

Stage	Sub-stage	Primary data		Semi-specific data		Secondary data				
		Activity-related data, to be linked to the inventory database	Elementary flows and data without direct links to the inventory database	Activity-related data, to be linked to the inventory database	Elementary flows and data without direct links to the inventory database	Activity-related data, to be linked to the inventory database	Elementary flows and data without direct links to the inventory database	Generic inventory data		
								Processes	Technical representativeness	Geographical representativeness
Manufacture	Manufacture of electronic components	– Area of integrated circuits > 12 pins (in cm^2) – Silicon chip area in the integrated circuits > 12 pins (in cm^2) – Flash memory capacity (in Mb)						LCI for the production of 1 cm^2 of typical integrated circuits > 12 pins (silicon chip excluded) (excluding gold, silver, tin, tantalum and indium input flows) LCI for the production of 1 cm^2 of silicon chip (excluding gold, silver, tin, tantalum and indium input flows)	LFBGA or VFQFPN integrated circuit packages Reference unit: 1 cm^2 Silicon chips mounted up to manufacture LFBGA or VFQFPN integrated circuit packages. Reference unit: 1 cm^2	China

Stage	Sub-stage	Primary data		Semi-specific data		Secondary data				
		Activity-related data, to be linked to the inventory database	Elementary flows and data without direct links to the inventory database	Activity-related data, to be linked to the inventory database	Elementary flows and data without direct links to the inventory database	Activity-related data, to be linked to the inventory database	Elementary flows and data without direct links to the inventory database	Generic inventory data		
								Processes	Technical representativeness	Geographical representativeness
Manufacture	Manufacture of electronic components					Quantity of electronic components < 12 pins typically found in electronic board packages: 1 component per 1 cm² of board area		LCI for the production of electronic components < 12 pins typically found in electronic board packages* (excluding gold, silver, tin, tantalum and indium input flows)	Subcomponents: ceramic capacitor, film capacitor, tantalum capacitor, SMD inductor, SMD resistor, generic SMD components, LFBGA semiconductor, SOT23 semiconductor, VFQFPN semiconductor; SnAgCu reflow solder (0.6539 mg per solder pad)	China

Stage	Sub-stage	Primary data		Semi-specific data		Secondary data				
		Activity-related data, to be linked to the inventory database	Elementary flows and data without direct links to the inventory database	Activity-related data, to be linked to the inventory database	Elementary flows and data without direct links to the inventory database	Activity-related data, to be linked to the inventory database	Elementary flows and data without direct links to the inventory database	Generic inventory data		
								Processes	Technical representativeness	Geographical representativeness
Manufacture	Manufacture of the casings	– Mass weight of the plastic casings (in g) – Mass weight of the steel casings (in g) – Mass weight of the aluminium casings (in g)						– LCI for the production of 1 g of plastic casing – LCI for the production of 1 g of steel casing (excluding gold, silver, tin, tantalum and indium input flows) – LCI for the production of 1 g of aluminium casing (excluding gold, silver, tin, tantalum and indium input flows)	– Production of an ABS or PC-based plastic casing for mobile telephony. Presence of flame retardant and paints. – Production of a stainless steel casing for mobile telephony – Production of an aluminium casing for mobile telephony	China

Stage	Sub-stage	Primary data		Semi-specific data		Secondary data				
		Activity-related data, to be linked to the inventory database	Elementary flows and data without direct links to the inventory database	Activity-related data, to be linked to the inventory database	Elementary flows and data without direct links to the inventory database	Activity-related data, to be linked to the inventory database	Elementary flows and data without direct links to the inventory database	Generic inventory data		
								Processes	Technical representativeness	Geographical representativeness
Manufacture	Production of the battery	Mass weight of the Li-ion battery (in g)						LCI for the production of 1 g of Li-ion battery (excluding gold, silver, tin, tantalum and indium input flows)		China
Manufacture	Manufacture of the charger	Mass weight of the charger (in g)						LCI for the production of 1 g of charger (excluding gold, silver, tin, tantalum and indium input flows)		China
Manufacture	Manufacture of the headset							LCI for the production of 1 headset (excluding gold, silver, tin, tantalum and indium input flows)		China

Stage	Sub-stage	Primary data		Semi-specific data		Secondary data				
		Activity-related data, to be linked to the inventory database	Elementary flows and data without direct links to the inventory database	Activity-related data, to be linked to the inventory database	Elementary flows and data without direct links to the inventory database	Activity-related data, to be linked to the inventory database	Elementary flows and data without direct links to the inventory database	Generic inventory data		
								Processes	Technical representativeness	Geographical representativeness
Manufacture	Manufacture of the rest of the device	Mass weight of the device (in g)						LCI for the production of 1 g of the rest of the device (screw hardware, glue, seal) (excluding gold, silver, tin, tantalum and indium input flows)	Production of PET, production of PMMA, production of PC, production of EPDM, injection moulding process, production of steel, production of copper, production of PBT, production of TBBA, production of a speaker	
Manufacture	Manufacture of the device		– Amounts of gold, silver, tin, tantalum and indium found in the phone				– Losses tied to tin extraction and production: 20%			
Manufacture	Transport of subassemblies from their production site to the assembly site			– Mass weight of the motherboard (in g) – Distance covered by plane to the assembly site (in km)				LCI of 1 kg.km of transport by cargo plane		International

Stage	Sub-stage	Primary data		Semi-specific data		Secondary data				
		Activity-related data, to be linked to the inventory database	Elementary flows and data without direct links to the inventory database	Activity-related data, to be linked to the inventory database	Elementary flows and data without direct links to the inventory database	Activity-related data, to be linked to the inventory database	Elementary flows and data without direct links to the inventory database	Generic inventory data		
								Processes	Technical representativeness	Geographical representativeness
Manufacture	Transport of subassemblies from their production site to the assembly site			– Mass weight of the LCD board (in g) – Distance covered by plane to the assembly site (in km)				LCI of 1 kg.km of transport by cargo plane		International
Manufacture	Transport of subassemblies from their production site to the assembly site			– Mass weight of the main screen (in g) – Distance covered by plane to the assembly site (in km)				LCI of 1 kg.km of transport by cargo plane		International
Manufacture	Transport of subassemblies from their production site to the assembly site			– Mass weight of the casings (in g) – Distance covered by plane to the assembly site (in km)				– LCI of 1 kg.km of transport by cargo plane		International
Manufacture	Transport of the assembled product to the	Mass weight of the battery (in g)		Distance covered by plane to the customization site				LCI of 1 kg.km of transport by		International

Stage	Sub-stage	Primary data		Semi-specific data		Secondary data				
		Activity-related data, to be linked to the inventory database	Elementary flows and data without direct links to the inventory database	Activity-related data, to be linked to the inventory database	Elementary flows and data without direct links to the inventory database	Activity-related data, to be linked to the inventory database	Elementary flows and data without direct links to the inventory database	Generic inventory data		
								Processes	Technical representativeness	Geographical representativeness
	customization site			(in km)				cargo plane		
Manufacture	Transport of the assembled product to the customization site	Mass weight of the charger (in g)		Distance covered by plane to the customization site (in km)				LCI of 1 kg.km of transport by cargo plane		International
Manufacture	Transport of the assembled product to the customization site	Mass weight of the assembled product (in g)		Distance covered by plane to the customization site (in km)				LCI of 1 kg.km of transport by cargo plane		International
Distribution	Production of the packaging	Mass weight of the packaging carton (in g)				– Mass weight of the paper-copy user guide (in g) – Mass weight of the plastic films (in g)		– LCI for the production of 1 g of cardboard – LCI for the production of 1 g of paper – LCI for the production of 1 g of plastic film		

Stage	Sub-stage	Primary data		Semi-specific data		Secondary data				
		Activity-related data, to be linked to the inventory database	Elementary flows and data without direct links to the inventory database	Activity-related data, to be linked to the inventory database	Elementary flows and data without direct links to the inventory database	Activity-related data, to be linked to the inventory database	Elementary flows and data without direct links to the inventory database	Generic inventory data		
								Processes	Technical representativeness	Geographical representativeness
Distribution	Transport of the product from customization site to country of distribution (France)	Mass weight of the finished product in its packaging (in g)		– Distance covered by plane from customization site to country of distribution (in km) – Distance covered by truck from customization site to country of distribution (in km) – Distance covered by train from customization site to country of distribution (in km) – Distance covered by ship from customization site to country of distribution (in km)				– LCI of 1 kg.km of transport by cargo plane – LCI of 1 kg.km of transport by 16-32t truck – LCI of 1 kg.km of transport by train – LCI of 1 kg.km of transport by cargo ship		International

Stage	Sub-stage	Primary data		Semi-specific data		Secondary data				
		Activity-related data, to be linked to the inventory database	Elementary flows and data without direct links to the inventory database	Activity-related data, to be linked to the inventory database	Elementary flows and data without direct links to the inventory database	Activity-related data, to be linked to the inventory database	Elementary flows and data without direct links to the inventory database	Generic inventory data		
								Processes	Technical representativeness	Geographical representativeness
Use	Production of the electricity utilized (see 4.4.2)	– Total energy consumption of the mobile phone	– Energy needed to charge a battery from 0% to 100% (in mWh) – Stand-by time of the mobile phone (in h) – Talk time of the mobile phone (in h) – Time needed to charge a battery from 0% to 100% (in min) – Mains power absorbed by the charger alone, connected to the power grid (in mW)				– Total number of charge-ups over 2 years – Time after each charge with charger plugged into the power grid, connected to the phone, with battery charged at 100% (in h) – Time after each charge with charger connected to the power grid without the phone (in h)	LCI for the production of 1 kWh of electricity generated in France	220V mains electricity generated in France. Reference unit: 1 kWh	France

Stage	Sub-stage	Primary data		Semi-specific data		Secondary data				
		Activity-related data, to be linked to the inventory database	Elementary flows and data without direct links to the inventory database	Activity-related data, to be linked to the inventory database	Elementary flows and data without direct links to the inventory database	Activity-related data, to be linked to the inventory database	Elementary flows and data without direct links to the inventory database	Generic inventory data		
								Processes	Technical representativeness	Geographical representativeness
			– Mains power absorbed by the charger, connected to the phone, with battery charged at 100% (in mW)							
End-of-life						– Distance travelled by truck between the collection points and the materials recycling facilities (in km) – Rates of incorporation of end-of-life waste into the various waste processing channels (recycling, landfilling, incineration) per material stream		– LCI of 1 kg.km of transport by 7.5 t truck – LCI of recycling per material stream		– International – Europe

*The electronic components < 12 pins and associated weld pads are modelled proportionally to surface area of the motherboard PWB 1. Every 1 cm² of PWB 1 counts the following components:

SMD inductor, axial ferrite	Mass weight	0.022109	g
Ceramic capacitor	Area	1.4706	mm^2
PWB circuit interconnect	Mass weight	0.082929	g
High-power SMD LED	Mass weight	0.001954	g
Low-power LED	Mass weight	0.001440	g
Flat-chip SMD resistor	Mass weight	0.015013	g
Flip-chip semiconductor CSP package	Mass weight	0.001925	g
Generic SMD components	Mass weight	0.00052	g
Quartz crystal oscillator, metal body	Mass weight	0.001487	g
SOT23 - SOT89 - SOT223 diode package	Mass weight	0.002216	g
SOT23 - SOT89 - SOT223 transistor package	Mass weight	0.000777	g
PWB finish, gold	Area	13.8749	mm^2
SnAgCu reflow solder (0.0519 mg per solder pad)	Item	21.7344	
Tantalum capacitor	Mass weight	0.003276	g
VFQFPN semiconductor	Mass weight	0.001806	g

Steel electromagnetic shielding	Mass weight	0.0638845	g

Annex C

Standard-template waste collection inventory survey

Product name		
Mass of the mobile phone		*in grams, excluding packaging and including battery mass*

Product power consumptions (during the use phase)

Please make sure you use the right UNITS

Parameter	Quantity	Unit
Absorbed energy to charge the battery from 0% to 100%		mWh
Time to charge the battery from 0% to 100%		minutes
Absorbed power, mobile phone connected to the power grid, battery charged at 100%		mW
Stand-by time of the mobile phone (battery charged at 100%)		h
Talk time of the mobile phone (battery charged at 100%)		h
Power absorption of the battery charger when connected to the power grid but not to the mobile phone		mW

Technical characteristics

Please make sure you use the right UNITS

Parameter		Quantity	Unit	
Display	Specify type of display HERE			
	Total surface area of the display		cm²	*Do not give diagonal size, nor number of pixels. Only area is required. Give the total surface area of the display, non-active area included.*
	Mass weight of the display module		g	
	Total distance covered by plane to transport the display		km	
For flip-phones, external display	Specify type of display HERE			
	Total surface area of the external display		cm²	*Do not give diagonal size, nor number of pixels. Only area is required. Give the total surface area of the display, non-active area included.*
	Mass weight of the display module		g	*Total mass of the module transported from the production site to the assembly site*
	Total distance covered by plane to transport the external display		km	
Printed circuit board 1 (main)	Specify type of printed circuit board HERE			
	External area of the printed circuit board		cm²	
	Mass weight		g	
	Total distance covered by plane to transport the main PCB		km	
Printed circuit board 2 (display)	Specify type of printed circuit board HERE			
	External area of the printed circuit board		cm²	
	Mass weight		g	
	Total distance covered by plane to transport the display PCB		Km	

Printed circuit board 3 (keypad)	Specify type of printed circuit board HERE		
	External area of the printed circuit board		cm²
For a tablet, printed circuit board 4 (touchpanel keys)	Specify type of printed circuit board HERE		
	External area of the printed circuit board		cm²

Parameter		Quantity	Unit	
Printed circuit board 5 (other rigid(s))	Sum of external area of printed circuit board(s).		cm²	
Printed circuit board 5 (other flex(s))	Sum-total external area of printed circuit board(s).		cm²	
Integrated circuits > 12 pins (12-pin semiconductors)	Integrated circuit area		cm²	*Give the total area of integrated circuits mounted on the electronic boards*
	Silicon chip area		cm²	
	Flash memory capacity		Mo	
Valuable metals	Gold		g	
	Silver		g	
	Tin		g	
	Indium		g	
	Tantalum		g	
Casing	Plastic		g	
	Aluminium		g	
	Steel		g	
	Total distance covered by plane to transport the casing		km	
Battery	Mass weight		g	
	Total distance covered by plane to transport the battery		km	
Charger	Mass weight		g	
	Total distance covered by plane to transport the charger		km	
Transport (from assembly site to customization site)	Country where the product is assembled		N/A	
	Total distance covered by plane to transport the assembled product to the customization site		km	

Distribution

Please make sure you use the right UNITS

Parameter		Quantity	Unit	
Total mass (mobile phone + charger + accessories + packaging)	Total mass		g	*includes the mobile phone, cardboard, paper-copy user guides, CD and any additional items contained in the package*
Packaging	Mass weight of cardboard		g	
Customization site	Country where the product is customized		N/A	
Mode(s) of transport and distance(s) travelled from the customization site to the country of distribution	select at least 1 mode of transport		km	
	select another mode of transport		km	
	select another mode of transport		km	

Annex D

Default values for semi-specific data

Manufacture

Subassembly	Parameter	Quantity	Unit
Display	Mass weight of the display module	48	g
	What is the total distance covered by plane to transport the display?	9,000	km
For flip-phones, external display	Surface density of the display panel module	0.9	g/cm²
	What is the total distance covered by plane to transport the external display ?	9,000	km
Printed circuit board 1 (main)	Type and number of layers	Rigid, 14 layers	
	Mass weight	40.6	g
	What is the total distance covered by plane to transport the main PCB?	9,859	km
Printed circuit board 2 (display)	Type and number of layers	Rigid, 6 layers	
	Mass weight	32.8	g
	What is the total distance covered by plane to transport the display PCB?	9,999	km
Printed circuit board 3 (keypad)	Type and number of layers	Rigid, 4 layers	
For a touchscreen phone, printed circuit board 4 (touchpanel keys)	Type and number of layers	Rigid, 4 layers	
Printed circuit board 5 (other rigid(s))	Type and number of layers	Rigid, 4 layers	
Casing	Mass weight of plastics	50	g
	Mass weight of aluminium	50	g
	What is the total distance covered by plane to transport the casing?	11,000	km
Battery	Type	Lithium-ion	
	What is the total distance covered by plane to transport the battery?	4,668	km
Charger	What is the total distance covered by plane to transport the charger?	9,675	km

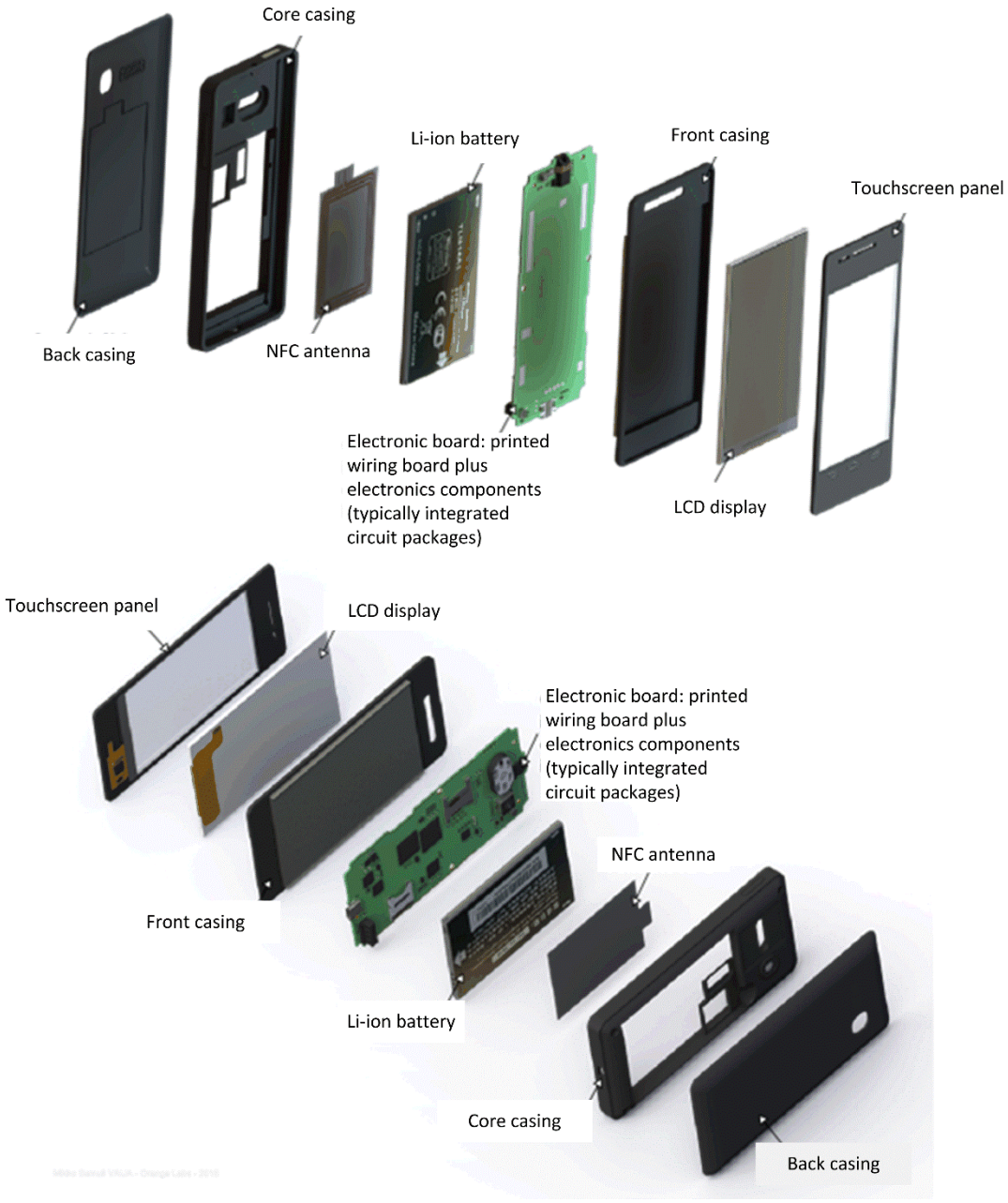
Transport (from assembly site to customization site)	What is the total distance covered by plane to transport the assembled product to the customization site?	9,656	km

Distribution back to mainland France

Parameter		Quantity	Unit
Transport means and distance from customisation site to country of distribution (France)	What is the total distance covered by ship by the packaged finished product?	0	km
	What is the total distance covered by train by the packaged finished product?	0	km
	What is the total distance covered by plane by the packaged finished product?	12,500	km
	What is the total distance covered by road by the packaged finished product?	2,250	km

Annex E

Example of a mobile phone



List of the people involved in the follow-up, drafting and/or making of this guide

3 SUISSES FRANCE

ABCVERT

ACDLEC - ASSO CTRES DISTRIBUTEURS E LECLERC

ACV PLUS

ADEIC

ADEME

AFNOR

AFNOR CERTIFICATION

AFNOR DEVELOPPEMENT

AIGLE INTERNATIONAL SA

AIR - AGENCE INNOVATION RESPONSABLE

AIRELE

ALSATEXTILES

ALTADEV

ALTERNATIVE CARBONE

ANNE MARIE JOANNES DESPAUX

APESA INNOVATION

APTE SYSTEM

ASQUAL

ASSOCIATION UNIVERSAL LOVE

ASTEKA SARL

ATTITUDE DEVELOPPEMENT SAS

BABOLAT VS SA

BELMART SAS - DAMART

BENOIT DANDINE

BIENS COMMUNS

BIO INTELLIGENCE SERVICE

BLONDIN FLORENT

BNITH

BOSSA VERDE

BUREAU VERITAS

BUREAU VERITAS CPS FRANCE

BUYYOURWAY

C2MTEX

CACHE CACHE

CAMPINGAZ - SOCIETE APPLICATION DES GAZ

CARBONETEX

CAROLINE SOREZ - CAECO

CARREFOUR CMI

CARTON ONDULE DE FRANCE

CCD - CENTRE DE LA CONSOMMATION DURABLE

CCI DE SEINE ET MARNE

CCI REGION PARIS ILE DE FRANCE - BIOP

CEC - CIE EUROPEENNE DE LA CHAUSSURE

CELIO INTERNATIONAL

CGDD - COMMISSARIAT GEN DEVELOPPEMENT DURABLE

CHANEL COORDINATION SAS

CHANTELLE

CHRISTIAN DIOR COUTURE

CHRISTOPHE NADAL

CLIMAT MUNDI

CMC

CODDE - CONCEPTION DVPT DURABLE ENVT

COFRA PARIS

COFREET

COMPTOIR DES COTONNIERS FRANCE

COOPERATIVE MU

CRP HENRI TUDOR

CSO CNRS

CTC

CTP - CENTRE TECHNIQUE DU PAPIER

CWF CHILDREN WORLDWIDE FASHION

CYCLECO

DAMART SERVIPOSTE

DBAPPAREL

DECATHLON

DECATHLON SA - B TWIN

DELAPLACE CONSULTING

DELTA PLUS GROUP SA

DEVANLAY SA - DIV LACOSTE

DGCCRF

DGE / SEN

DHJ INTERNATIONAL SAS

DIRAMODE-PIMKIE

DMC

ECO CONCEVOIR

ECOACT

ECO-ADAPT

ECOEFF

ECOPULSE SARL

ECOVER FRANCE

EFFICIENT INNOVATION

EMINENCE SAS

ENVEHO

ERM FRANCE

ERNST&YOUNG AND ASSOCIATES EYES

ESPRIT EUROPE SERVICES GMBH

ETABLISSEMENTS PIERRE ROCLE

ETHIC AND LIFE

EVEA

EVEIO

FCBA

FCD - FEDE COMMERCE DISTRIBUTION

FCJT - FEDERATION CHAUSSURES JOUETS & TEXTILES

FED FSE TANNERIE MEGISSERIE

FEDERATION DE LA MAILLE ET DE LA LINGERIE

FEU VERT

FFC - FED FRANCAISE CHAUSSURE

FIFAS

FIZIANS ENVIRONNEMENT

FLORENT CHALOT

FLY

FPS - FED PRO ENTREPRISES SPORTS LOISIRS

GENERATION PLUME

GINGKO 21

GIRARDOT CEDRIC - CEDD

GISBERT ANNE FLORENCE

GREEN CAPITAL - LE CHEQUIER VERT

GREENEXT SERVICE

GROUP HYGIENE

GSA - GROUPE SALMON ARC EN CIEL SAS

H&M HENNES & MAURITZ

H3C-CARAIBES

HACOT COLOMBIER SA

HARP & ASSOCIES

HERMES INTERNATIONAL

HOLDING TEXTILE HERMES

HOP CUBE

I CARE ENVIRONNEMENT

IFM - INSTITUT FRANCAIS DE LA MODE

IFTH

IISG - ISTITUTO ITALIANO SICUREZZA DEI GIOCATTOLI

INTERTEK SUSTAINABILITY SOLUTIONS

JULES

KIABI EUROPE

KINDY

KOREA INSTITUTE FOR TECHNOLOGY - KITECH

LABELIA CONSEIL ENVIRONNEMENT

LES TISSAGES DE CHARLIEU

LIFE CYCLE STRATEGIES PTY LTD

MAISONS DU MONDE

MARIA FORTUNATO

MARION HUET

MAXIME CHOISEL

MEV - MAITRISE DE L'ENERGIE EN VILLE

MOET HENNESSY

MONOPRIX SA

MOUZON TULLE GESTION

OIA SNC - AUCHAN

OKAIDI

OLIVIER RAYNAUD

OUTDOOR SPORTS VALLEY

OXYBUL EVEIL & JEUX

PATAGONIA EUROPE

PHILIPPE SONNETTE

POLE TEXTILE ALSACE

PPR - PINAULT PRINTEMPS REDOUTE

PROMOD

PROMOD SA

QUANTIS

RAUTUREAU APPLE SHOES

RDC ENVIRONNEMENT

RHOVYL SAS

ROGER WILLI

SALOMON SAS

SAMSON SAS

SAS CORDERIE MEYER SANSBOEUF

SC GALEC - GROUPEMENT EDOUARD LECLERC

SGS ICS

SGS MANAGEMENT SERVICES

SGS NORTH AMERICA INC.

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