

# **Basic Criteria for Award of the Environmental Label**

## **Routers**

### **RAL-UZ 160**



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RAL gGmbH

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## 1 Introduction

### 1.1 Preface

The Environmental Label Jury has set up these Basic Criteria for Award of the Blue Angel Eco-Label in co-operation with the Federal Minister for the Environment, Nature Conservation, Building and Nuclear Safety, the German Umweltbundesamt (Federal Environmental Agency) and considering the results of expert hearings conducted by RAL gGmbH. RAL gGmbH has been tasked with awarding the Environmental Label. Upon application to RAL gGmbH and on the basis of a Contract on the Use of the Environmental Label to be concluded with RAL gGmbH, permission to use the Blue Angel eco-label may be granted for all products, provided that they meet the requirements specified hereinafter.

### 1.2 Background

Private households without access to the Internet are hard to imagine today. 72% of all Germans use the Internet (with a tendency to rise) almost 70 percent of whom use broadband access. The devices covered by these Basic Criteria are **routers** that may provide additional functions, as, for example, wireless LAN (WLAN routers) as well as so-called **broadband routers**. Routers and broadband routers are a key technology to allow access to the Internet and to make it available to the home network connected.

A router is a network device. Its main function is to transmit data packets on the best possible path between networks. An additional function can be, for example, a WLAN access which provides additional terminal equipment with wireless access to the local network as well as, for example, to the Internet. Broadband routers combine the functions of a router and that of another component, the modem. The modem is a device for transmitting data using a specific technology on a specific carrier medium. It represents the network termination point for the DSL or cable line / the UMTS or LTE wireless data network or for WLAN reception at the subscriber's end.

Besides the basic function of serving as an internet access system, many routers and broadband routers provide various additional functions to meet the requirements for a modern home network (e.g. WLAN, interfaces for corded network devices, telephone system). The rapidly developing and thus fast changing connection technology of broadband access may have a negative impact on the technological life of broadband routers (e.g. transition from ADSL to VDSL access technology). That is why the technological adaptability of these devices may be a key determinant of their sustainability.

The additional functions (interfaces for network devices or telephone systems, USB ports, etc.) may result in an increased energy demand of routers and broadband routers which can be optimized through intelligent power management. Thus, it is possible that a device with enhanced functions and optimized power management consumes only half as much power as a device with fewer functions and without optimized power management. This makes it difficult for the user to assess and compare the environmental friendliness of these products.

Hence, these criteria for routers and broadband routers provide the user with orientation information for his/her purchase decision to promote the increased use of environmentally friendly products with the lowest possible energy consumption and the longest possible technical service life. In addition, these criteria may encourage the industry to design its products in line with the ecological criteria for the Blue Angel and to have its routers Blue Angel eco-labelled.

### **1.3 Environmental Objectives**

The Blue Angel eco-label for routers is to signal the buyer of a device that – in comparison with others - the Blue Angel eco-labelled product gives higher priority to precautionary environmental, health and consumer protection. Thus, the Blue Angel can help consumers make more informed decisions when purchasing new equipment.

As a voluntary label, the Blue Angel's task is to motivate manufacturers to develop devices with optimized, lowest-possible energy consumption as well as to allow them to inform customers about this aspect of product properties in an easy-to-understand way. The minimization of electric power consumption is a major goal of environmental protection in order to preserve energy resources and to protect the climate. Modern routers and broadband routers with telephone system function work 24 hours a day 7 days a week to ensure user's telephone availability.

For the purpose of promoting environmental protection, the energy consumption of the devices should be reduced to the technologically achievable minimum, especially in power-saving modes and by power management of the additional functions. This can be achieved by intelligent circuits on the board as well as through intelligent programming (power save modes). Another goal is to improve the technological adaptability of routers and broadband routers to avoid the unnecessary replacement of a properly functioning device.

Further major goals of environmental protection are to avoid waste and emissions during manufacture, use and disposal of products. Environmental impacts can also be reduced by creating durable high-quality products.

Hence, the Blue Angel eco-label may be awarded to routers and broadband routers that meet the following environmental criteria:

- Low energy consumption, especially in low-power mode and for the power supply of non-activated functions
- Preservation of resources (longevity, recyclable design of the device, spare parts supply, updateable and expandable software).
- Avoidance of environmentally harmful materials
- Low electromagnetic radiation

#### 1.4 Basic Legal Standards

The legal requirements have been taken into consideration in developing these Basic Award Criteria and shall be complied with by the label user. This includes, in particular, the requirements for hazardous substance content, waste collection as well as treatment and disposal under the German Elektro- und Elektronikgesetz (ElektroG)<sup>1</sup>, transposing Directives 2002/96/EC<sup>2</sup> and 2002/95/EC<sup>3</sup> into German law, as well as the requirements for energy efficiency under Regulations (EC) Nos 1275/2008<sup>4</sup> and 278/2009.<sup>5</sup> With regard to the energy efficiency requirements (Regulation (EC) No 1275/2008) it is pointed out that following the publication of the August 2011 edition of these Basic Criteria the routers have been adopted in the scope of Regulation (EC) 801/2013<sup>6</sup>, thereby introducing standards for networked standby.

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<sup>1</sup> Gesetz über das Inverkehrbringen, die Rücknahme und die umweltverträgliche Entsorgung von Elektro- und Elektronikgeräten, (Act governing the placing on the market, return and environmentally sound disposal of waste electrical and electronic equipment), Federal Law Gazette 2005, Part I, No.17 Bonn (23 March 2005)

<sup>2</sup> Directive 2002/96/EC of the European Parliament and of the Council on waste electrical and electronic equipment (WEEE) of 27 January 2003

<sup>3</sup> Directive 2002/95/EC of the European Parliament and of the Council of on the restriction of the use of certain hazardous substances in electrical and electronic equipment (Official Journal of the European Union L 37, 13 February 2003)

<sup>4</sup> Commission Regulation (EC) No 1275/2008 of 17 December 2008 implementing Directive 2005/32/EC of the European Parliament and of the Council with regard to ecodesign requirements for standby and off mode electric power consumption of electrical and electronic household and office equipment, Official Journal EU L 339 of 18 December 2008, p. 45, as well as COMMISSION REGULATION (EU) No 801/2013 of 22 August 2013 amending Regulation (EC) No 1275/2008 which includes the routers in the scope of the „Standby Regulation“.

<sup>5</sup> Commission Regulation (EC) No 278/2009 of 6 April 2009 implementing Directive 2005/32/EC of the European Parliament and of the Council with regard to ecodesign requirements for no-load condition electric power consumption and average active efficiency of external power supplies, Official Journal EU L 93 of 7 April 2009, p. 3.

<sup>6</sup> Commission Regulation (EC) No 1275/2008 of 17 December 2008 implementing Directive 2005/32/EC of the European Parliament and of the Council with regard to ecodesign requirements for standby and off mode electric power consumption of electrical and electronic household and office equipment, Official Journal EU L 339 of 18 December 2008, p. 45, as well as COMMISSION REGULATION (EU) No 801/2013 of 22 August 2013 amending Regulation (EC) No 1275/2008 which includes the routers in the scope of the „Standby Regulation“.

## 1.5 Definitions

### Active-Mode

One or more key functions are active in this operating mode. Generally, energy consumption in this mode can vary a lot depending on how many of the functions available are actively being used. An optimized power management reduces the power supply for currently unused interfaces and functions to the technically lowest possible levels.

### Low-Power-Mode

When in low power mode, all devices and functions of the router are in their respective stand-by modes. Only small amounts of data are exchanged but the device is able to recognize activity. In the case of activity, the system will resume operations within milliseconds. This mode is referred to as “idle mode” in the EU-EuP Preparatory Studies “Lot 26” of the EU Commission on the Eco-Design Directive 2009/125/EC.

### Deep-Sleep-Mode

All functions will enter low power mode after a pre-set length of time without use not only on the side of the router. Also, on the side of the provider company, energy supply will be reduced in the intermediate network node. In the case of reuse, the systems will be restart the function within 2 - 5 seconds.

## 1.6 Glossary

- WAN (Wide Area Network): networks that are managed and operated by providers and telecommunication service providers.
- DSL (Digital Subscriber Line) – non-wireless data transmission standard
- FTTH (Fibre To The Home) - glass fibre system for data communication
- Cable: Coaxial cable system for data communication, above all, as broadband cable for radio and TV programme transmission
- FXS (Foreign eXchange Station) – connection interface for communication terminal equipment
- Hybrid device – a router the functioning of which requires the simultaneous use of landline and mobile interface
- LTE (Long Term Evolution) - mobile communication standard – LTE is regarded as the successor to UMTS

- Modem: a device for data transmission using a certain technology via a certain carrier medium.
- Powerline Communication (PLC) – a technology that allows the transmission of data packets over the mains (e.g. as an alternative to WLAN for home networks)
- Router - a network device that forwards incoming data packets to one or more target networks over the shortest possible path („routing“).
- UMTS (Universal Mobile Telecommunications System): mobile radio communication standard
- VDSL (Very High Speed Digital Subscriber Line) – DSL technology that offers a higher data transmission rate
- Intermediate network node (Central Office) – an intermediate network node is a central data transmission point in the network of the provider company where data exchange and data transmission devices may be located.
- Broadband routers are routers with built-in DSL or cable modem that provide access to the Internet via UMTS/LTE or FTTH (glass fibre cable).

## **1.7 Outlook on Possible Future Requirements**

From January 2015, the so-called Standby Regulation ((EC) 1275/2008 and (EC) 801/2013) introduces power consumption limits for routers in networked standby mode. Following the introduction of these limits, the revised Blue Angel criteria for power consumption are expected to require an averaging of the operating modes “active mode” and “networked standby” (low-power mode and deep sleep mode, if applicable) instead of, as it is now, setting only limits for power consumption in active mode (see para. 3.3.1). Adequate limits for power consumption in networked standby shall be determined in 2015 according to the state of the art. The aim is to achieve a greater appreciation of efficient power management and, as a consequence thereof, greater energy efficiency.

At the time when these criteria were developed no valid data were available on the power consumption of routers with access to the Internet via UMTS/LTE or glass fibre cable (FTTH). Since, however, broadband routers with these access technologies fall within the scope of these criteria a future revision of these criteria shall take into account the data available by then.

## **2 Scope**

These Basic Criteria apply to routers primarily designed for home networks.

They may provide various additional functions. For example, routers within the scope of these Basic Criteria may be additionally equipped with a telephone system for analogue or ISDN phones and allow Voice-over-IP calls.

These Basic Criteria do not apply to modems that are externally connected to a router, nor do they apply to a combination of devices consisting of a router and an externally connected modem.

## **3 Requirements and Compliance Verifications**

### **3.1 General Requirements**

#### **3.1.1 Built-in DECT Stations**

If the router or broadband router comes with a built-in DECT station the device shall meet for this function the additional requirements of RAL UZ 131 (Digital Cordless Phones) - edition of April 2014, paras. 3.2, 3.3 and 3.4. Provided that the said version of RAL UZ 131 is revised the device shall meet the revised requirements set forth in the above-mentioned paragraphs, as well as additional new requirements regarding a router-integrated DECT station that may have been added in a revision.

#### ***Compliance Verification***

*The applicant shall declare compliance with the requirements in Annex 1 to the Contract. If routers come with built-in DECT stations the applicant shall present the compliance verifications required under the RAL-UZ 131 Basic Criteria, paras. 3.2, 3.3 and 3.4.*

### **3.2 Material Requirements for the Plastics used in Housings and Housing Parts**

The plastics must not contain as constituent parts any substances that are classified as:



- a) carcinogenic of category 1 or 2 according to table 3.2 of Annex VI to Regulation (EC) 1272/2008<sup>7</sup>
- b) mutagenic of category 1 or 2 according to table 3.2 of Annex VI to Regulation (EC) 1272/2008
- c) toxic to reproduction of category 1 or 2 according to table 3.2 of Annex VI to Regulation (EC) 1272/2008
- d) being of very high concern for other reasons according to the criteria of Annex XIII to the REACH Regulation, provided that they have been included in the List (so-called Candidate List<sup>8</sup>) set up in accordance with REACH, Article 59, paragraph 1.
- e) Very toxic to aquatic organism with long-term adverse effect (Hazard Statement H 410 or Risk Statement R 50/53).

Halogenated polymers shall not be permitted. Nor may halogenated organic compounds be added as flame retardants. Moreover, no flame retardants may be added which are classified pursuant to Table 3.1 or 3.2 in Annex VI to Regulation (EC) 1272/2008 as very toxic to aquatic organisms with long-term adverse effect and assigned the Hazard Statement H 410 or Risk Statement R 50/53.

The following shall be exempt from this rule:

- process-related, technically unavoidable impurities;

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<sup>7</sup> Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006, Annex VI Harmonised classification and labelling for certain hazardous substances, Part 3: Harmonised classification and labelling – Tables, Table 2.3 List of harmonised classification and labelling of hazardous substances from Annex I to Directive 67/548/EEC,

short: GHS Regulation [http://www.reach-info.de/ghs\\_verordnung.htm](http://www.reach-info.de/ghs_verordnung.htm), as amended.

The GHS Regulation (Global Harmonization System), that has come into force on January 20, 2009, replaces the old Directives 67/548/EEC and 1999/45/EC. According to the said regulation, substances are classified, labelled and packed until December 1, 2010 according to Directive 67/548/EEC (Dangerous Substances Directive) while mixtures are classified, labelled and packed until June 1, 2015 according to Directive 1999/45/EC (Dangerous Preparations Directive). Notwithstanding this, substances and preparations may be classified, labelled and packed according to the provisions of the GHS Regulation already before December 1, 2010 or June 1, 2015, respectively. In such case, the provisions of Dangerous Substances Directive or Dangerous Preparations Directive shall not be applicable.

<sup>8</sup> Link to the Candidate List in Regulation (EC) No. 1907/2006 concerning the Registration, Evaluation, Authorization, and Restriction of Chemicals (REACH):

- fluoroorganic additives (as, for example, anti-dripping agents) used to improve the physical properties of plastics, provided that they do not exceed 0.5 weight percent;
- plastic parts less than 25 grams in mass ;

### **Compliance Verification**

*The applicant shall declare compliance with the requirements in Annex 1 to the Contract and present a written declaration from the plastic manufacturers or ensure the submission of such declaration to RAL gGmbH. Such declaration in Annex P-M shall confirm that the banned substances have not been added to the plastics and give the chemical designation of the flame retardants used, including CAS No. and classifications.*

*The applicant shall name the housing plastics used for parts  $\geq$  25 grams in mass and present a list of the housing plastics used pursuant to Annex P-L25.*

## **3.3 Special Requirements for the Devices**

### **3.3.1 Power Consumption in Active Mode**

Type and number of the energy-relevant functions of a router as well as the type of the modem integrated into a broadband router are key determinants of the energy consumption of such device. Table 1, below, lists the corresponding base components (routers and broadband routers) while Table 2 lists possible added functions. These two tables assign calculated power consumption levels to the base components and the individual added functions the total of which corresponds to the maximum allowed power consumption of this particular router according to the structure of a certain (broadband) router.

This system of basic functionality and added functions allows the determination of a maximum power consumption for a correspondingly equipped (broadband) router in active mode. The power is measured upstream of the device's power supply connected to the mains (230 volts ~). It shall not be necessary for a device to stay below the specified maximum power consumption for each *individual* function. Instead, it shall be very-

fied that the total power consumption of the device in active mode does not exceed the maximum allowed value.

Altogether, the nominal power consumption in active mode shall not exceed 18 watts regardless of possible extra functions.

Table 1: Power Consumption Limits for the Base Component in Active Mode: Router or Broadband Router, respectively

Router Components	Power Consumption in Active Mode
Base Router with: Fast Ethernet WAN (100Base-T)	1.2 W
Base Router with: Gigabit Ethernet WAN (1000Base-T)	3.0 W
DSL	3.4 W
VDSL2	4.0 W
ISDN S0	0.2 W
DOCSIS 3.0	5.5 W
FTTH	5.0 W
UMTS/LTE	4.0 W

If the device comes with multiple WAN interfaces for parallel or alternative use the interface with the higher consumption shall be taken into account first. A one-time maximum of additional 2.0 watts may be added for additional interfaces.

Table 2: Power Consumption of possible energy-relevant additional functions in Active Mode

Router Components	Power Consumption in Active Mode
per Fast Ethernet port	0.3 W
per Gigabit Ethernet port	0.4 W
WLAN 802.11n single band <sup>9</sup> , total EIRP 23 dBm (2x2)	2.0 W
WLAN 802.11n single band, total EIRP 30 dBm (2x2)	3.0 W
WLAN 802.11n/802.11ac dual band <sup>10</sup> , total EIRP 23 dBm (2x2)	5.0 W
WLAN 802.11ac, single band, total EIRP 23 dBm (2x2)	2.5 W
WLAN 802.11ac single band, total EIRP 30 dBm (2x2)	5.5 W
Per additional booster and max. 23dBm: 0.3W per booster	0.3 W
Per additional booster and max. 30dBm: 1.6W per booster	1.6 W
Power Line High Speed <30MHz	1.5 W
Power Line High Speed >30Mhz and <68 MHz	2.0 W
PLC High Speed Smart Metering ("Green Phy")	1.0 W
DECT (including Cat iq)	0.6 W
Per USB port for external device connection	0.1 W
FXS interface per port (may be counted twice at the most)	0.5 W

<sup>9</sup> The device allows the use of only one frequency band each. Measurement shall be conducted on the frequency where maximum power consumption is observed (see Appendix 1, Measurement Instructions).

<sup>10</sup> The device allows the simultaneous use of both frequency bands (concurrent).

A relevant factor in calculating the maximum allowed power consumption of a (broadband) router is the number of additional functions provided by the device (e.g. the number of Gigabit ports or USB ports).

Appendix 1 includes the measurement instructions on the basis of the power consumption values listed in Table 1.

Example 1: A DSL router (3.4 watts) is equipped with a Fast Ethernet port with four interfaces ( $4 \times 0.3 \text{ W} = 1.2 \text{ W}$ ) and single-band WLAN access (**total EIRP 23 dBm (2x2)**) compliant with the 802.11n Standard (2.0 W) as well as 2 USB ports ( $2 \times 0.1 \text{ W} = 0.2 \text{ W}$ ). To meet the requirements this broadband router must not exceed a maximum power consumption in active mode of a total of 6.8 watts (all watt values assigned to the specified functions added up).

Example 2: A VDSL router (4.0 watts) is equipped with a Gigabit Ethernet port with four interfaces ( $4 \times 0.4 \text{ W} = 1.6 \text{ W}$ ) and dual-band WLAN access with two radio modules that allow the simultaneous use of both frequency bands (5.0 W), a built-in DECT base station (0.6 W) as well as 2 USB ports ( $2 \times 0.1 \text{ W} = 0.2 \text{ W}$ ). To meet the requirements this broadband router must not exceed a maximum power consumption in active mode of a total of 11.8 watts.

### **Compliance Verification**

*The applicant shall declare compliance with the requirement in Annex 1 to the Contract. For this purpose, the applicant shall specify the device's relevant functions according to Tables 1 and 2, the maximum allowed as well as the measured power consumption in active mode and present a test protocol prepared by testing laboratory accredited for the measurement according to DIN EN ISO/IEC 17025 as Annex 2.*

### **3.3.2 Power Management**

The devices shall feature the best possible energy efficiency control (power management) in every operating mode.

To ensure the best possible energy efficiency the following properties shall be guaranteed, provided that the device provides the functionalities mentioned:

- Deep Sleep mode: After a period of not using the functions, the router (ATU-R) must be able to send data to the telecommunication provider's intermediate net-

work node (ATU-C) which can also place the power supply on the side of the central office into a corresponding idle state. The CPU power must also be automatically reduced to the necessary level. This requirement shall not apply to VoIP devices.

- When in Active mode, unused interfaces must be automatically shut off or placed into low-power mode. The preset period before shut-off must not exceed 20 minutes.
- The user shall be allowed to individually shut off functionalities that are not needed.
- The user shall be allowed to permanently deactivate the WLAN radio module by programming or a mechanical switch.
- The user shall be allowed to permanently deactivate the powerline interface by programming or a mechanical switch.
- The user shall be allowed to program the router so that the WLAN radio module can be switched on and off following a time schedule.
- The user shall be allowed to enable/disable the respective unused WLAN radio frequency 2.4 GHz or 5 GHz by either programming or by means of a mechanical switch.
- The router must reduce the transmission power when no WLAN client is logged in.
- The router must feature a user-adjustable WLAN range limitation that can be implemented by reducing the maximum transmission power.
- The user shall be allowed to enable/disable a UMTS/LTE interface by either programming or by means of a mechanical switch, unless the UMTS/LTE interface forms part of the key function of the router (hybrid devices).
- With the UMTS/LTE wireless interface enabled the router shall provide information on the quality of the radio link to the mobile communications network to allow the user to place the device in a proper location in terms of radio technology.
- The user shall be allowed to enable/disable a DECT interface by either programming or by means of a mechanical switch.
- The device shall be able to display the current status (On/Off) of the respective interface(s) on the device or on the user interface.
- The automatic power-saving modes must be enabled by factory setting.

- The user information shall provide clear and useful information on the energy efficiency control settings (power management) and highlight the respective most energy-efficient setting.

#### **Compliance Verification**

*The applicant shall declare compliance with the requirements in Annex 1 to the Contract and submit the pages of the user information providing details on energy efficiency control (power management) (Annex 3).*

### **3.3.3 Security**

The (broadband) router shall come with a built-in firewall to ensure basic data and transmission security. The firewall shall allow a personalised firewall configuration (e.g. child safety lock). The firewall shall support port forwarding.

The factory settings of a built-in WLAN shall provide for an encryption according to the WPA2-standard with a personal password. The router shall additionally support WPA and WEP encryption.

Moreover, the user shall be allowed to assign a personal device password.

#### **Compliance Verification**

*The applicant shall declare compliance with the requirements in Annex 1 to the Contract.*

### **3.3.4 Minimum Performance Requirements**

The product shall comply with the following mandatory performance standards, if any, to ensure a good functionality of the (broadband) router:

- Minimum data transmission rate: 100 Mbit/s (Ethernet interface),
- Minimum WLAN transmission rate (if the device features built-in WLAN): 150 Mbit/s (gross),
- WLAN radio frequencies (if the device features built-in WLAN): 2.4 GHz and 5 GHz (dual band) – can be used either alternatively or simultaneously.

#### **Compliance Verification**

*The applicant shall declare compliance with the requirements in Annex 1 to the Contract.*

### **3.4 Radiation Emissions**

#### **3.4.1 Electromagnetic Radiation**

Devices to be Blue Angel eco-labelled with one or more wireless interfaces and a total transmission power of 10 mW or more shall be so designed as to make sure that the specific absorption rate (SAR) caused in exposed persons by the emitted high-frequency electromagnetic radiation does not exceed 0.60 watts per kg locally averaged over 10 grams of tissue mass. The maximum SAR value shall be determined in accordance with DIN EN 62209-2 and the position of the test sample relative to the body phantom used for measurement purposes ("measurement phantom") shall be chosen in accordance with paras. 6.1.4.7 „Desktop devices“ and, if applicable, 6.1.4.5 „Device with hinged or swivel antenna(s)“. The assessment shall be based on the maximum value resulting when there is with no distance between device and body phantom.

##### ***Compliance Verification***

*The applicant shall declare compliance with the requirements in Annex 1 and present a test protocol. Testing shall be done in accordance with DIN EN 62209-2 (Annex 4). Testing laboratories hired to perform these measurements shall be affiliated with a notified body appointed by Bundesnetzagentur in accordance with R&TTE (Directive 1999/5/EC on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity).*

### **3.5 Preservation of Resources**

#### **3.5.1 Repair Guarantee**

The applicant undertakes to make sure that the availability of spare parts for device repair and the infrastructure for repair is guaranteed for at least 3 years from the time that production ceases and that the customer is informed about this guaranteed availability of spare parts. Replaceable parts are those parts which, typically, may break down within the scope of the ordinary use of a product - whereas those parts which normally exceed the average life of the product need not be kept available as replacement parts.

##### ***Compliance Verification:***

*The applicant shall declare compliance with the requirement in Annex 1 to the Contract.*



### 3.5.2 Adaptability to Technical Progress

Routers and broadband routers shall allow the user to update the software via the router menu.

#### ***Compliance Verification:***

*The applicant shall declare compliance with the requirement in Annex 1 to the Contract.*

### 3.5.3 Recyclable Design

The products to be Blue Angel eco-labelled shall meet the following requirements for a recyclable design:

- The devices shall be so designed as to allow an easy disassembly for recycling purposes in order to make sure that housing plastics and metals can be separated as fractions from materials of other functional units and, if possible, be recycled.
- The devices shall be so designed as to support specialist disassembly by means of intelligently designed connections or allow disassembly by use of ordinary tools.
- Specialist firms hired by the manufacturer to recycle the devices shall receive information for device disassembly.
- The manufacturer shall publish the recycling strategy developed for the devices with respect to the above points on the Internet.

#### ***Compliance Verification***

*The applicant shall declare compliance with the requirement and give the link to the recycling strategy in Annex 1. Also, the applicant shall present the published recycling strategy (Annex 5).*

### 3.6 User Information

The device shall come with operating instructions and a short guide. The short guide shall be enclosed with the device as a paper copy. Printed product literature enclosed with the product should preferably be printed on recycled paper, if possible on Blue Angel eco-labelled paper.

The Short Guide shall at least include the following information - presented in a well-organized and easy-to-read form:

- A note on where the status of the operating modes or individual functions (On/Off) of the device is shown (e.g. on the device or on the user interface) and instructions on how the user can find this information, according to para. 3.3.2.

Operating Instructions and Short Guide of routers equipped with a wireless interface shall additionally inform the user of the fact,

- that the use of the device may involve exposure to high-frequency electromagnetic fields that depends, among other things, on the distance from the transmitting antennas.
- that the exposure can be individually reduced by not placing the device or the transmitting antenna(s) in the direct vicinity of bedrooms and children's rooms or in places where people spend much of their time, for example, at the workplace.
- that the technically best-possible location can be found with the help of the router display showing the quality of the radio link (e.g. UMTS/LTE devices).

The Operating Instructions or product literature shall include the information included in the Short Guide and, at least, the following additional information which must be presented in a well-organized and easy-to-read form:

- Information on the take-back and disposal of the devices
- A note stating that an enabled WLAN consumes power and, therefore, should be disabled if, in principle, the user does not need this function
- If the device comes with a UMTS/LTE interface: a note on where the quality of the radio link of an enabled UMTS/LTE interface to the mobile communications network is shown according to para. 3.3.2 (e.g. on the device or on the user interface) and directions for the user on how to get to this information via the menu
- Repairability and repair guarantee according to para. 3.5.1
- Capacity extension options according to para. 3.5.2.

### **Compliance Verifications**

*The applicant shall declare compliance with the requirement in Annex 1 and present the relevant pages of the Short Guide (Annex 6) and of the Operating Instructions (Annex 3).*

## **4 Applicants and Parties Involved**

**4.1** Manufacturers and distributors of products under paragraph 2 shall be eligible for application.

**4.2** Parties involved in the award process:

- RAL gGmbH to award the Blue Angel eco-label,
- the federal state being home to applicant's production site,
  - Umweltbundesamt (Federal Environmental Agency) which after the signing of the contract receives all data and documents submitted in application for the Blue Angel in order to be able to further develop the Basic Criteria,

## **5 Use of the Blue Angel Environmental Label**

**5.1** The terms governing the use of the Environmental Label by the applicant are stipulated by a Contract on the Use of the Environmental Label to be concluded with RAL gGmbH.

**5.2** Within the scope of such contract the applicant undertakes to meet the requirements under paragraph 3 for as long as the Blue Angel eco-label is used.

**5.3** Contracts on the Use of the Environmental Label are concluded to fix the terms for the certification of products under paragraph 2. Such contracts shall run until December 31, 2018.

They shall be extended by periods of one year each, unless terminated in writing by March 31, 2018 or March 31 of the respective year of extension.

After the expiry of the contract the Environmental Label may neither be used for labelling nor for advertising purposes. This regulation shall not affect products being still in the market.

**5.4** The applicant (manufacturer) shall be entitled to apply to RAL gGmbH for an extension of the right to use the eco-label to the product entitled to the label if it is to be marketed under another brand/trade name and/or other marketing organizations.

**5.5** The Contract on the Use of the Environmental Label shall specify:

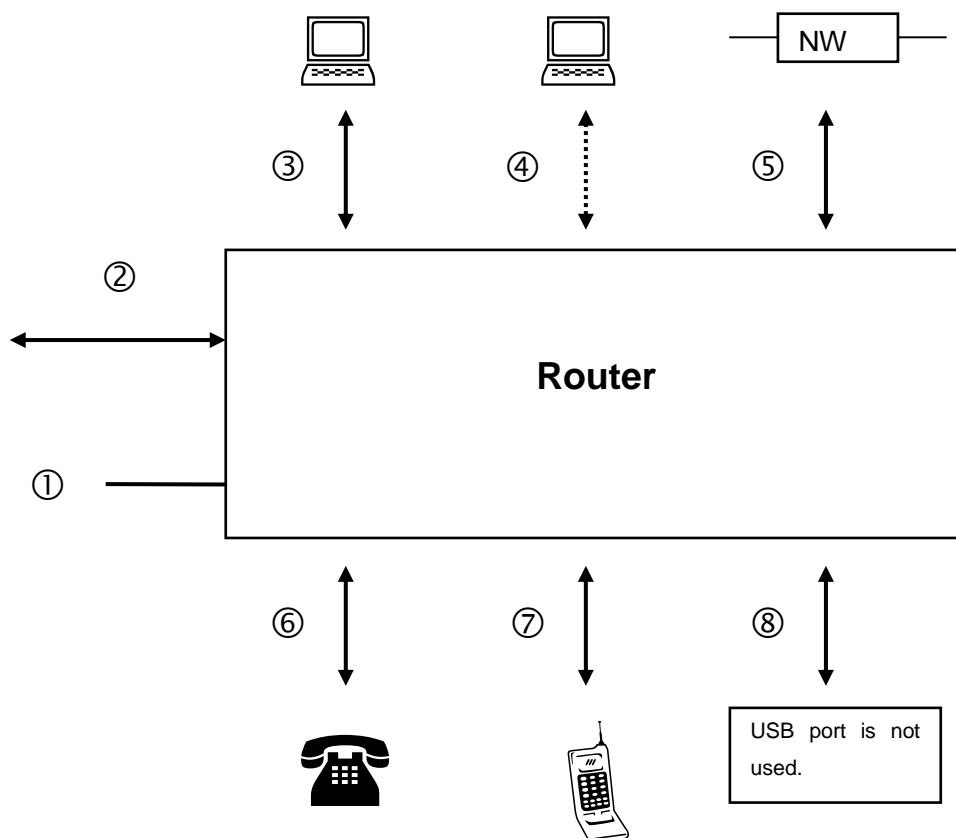
**5.5.1** Applicant (manufacturer, distributor)

**5.5.2** Brand / trade name, product designation

**5.5.3** Distributor (label user), i.e. the marketing organisation according to para. 5.4

## Appendix 1: Measurement Instructions for Determination of Power Consumption

### Test Setup



### Measurement of Power Consumption in Active Mode

The power consumption is measured taking into account the measurement conditions and procedures under DIN EN 62301 (above all, paras. 4 and 5.3).

- ① The router is connected to the voltage supply by means of the power supply provided with the device.
- ② The router is connected to the designated transmission medium (DSL/ TV cable, etc.). A data link is set up.
- ③ All existing LAN interfaces of the router are connected to a notebook/PC by LAN cable via the fastest router-supported link. If existing, energy-saving functions for the LAN interfaces are disabled. The download of a sufficiently large file is started via a single LAN interface.
- ④ Preliminary tests are conducted to determine the WLAN radio network (type of network b/g, a/n, etc.) which involves maximum power consumption. Besides, a measurement is to be made either on the radio frequency involving maximum power

consumption (2.4 GHz or 5 GHz) or, provided that the router supports this function, by using both bands simultaneously. A connection to a notebook/PC is set up via the determined WLAN radio network. The WLAN radio network is configured for the fastest speed provided by the router at maximum transmission power. A sufficiently large file is downloaded. WPA2 encryption is used.

- ⑤ If the router allows the connection of analogue telephones a switchable reference impedance according to ETSI ES 203 021-1, para. A.2.1 is connected to each analogue telephone extension. The power consumption is measured with the reference impedance switched on.
- ⑥ If the router has an internal ISDN bus this bus is used for connecting an ISDN telephone with a power supply of its own. Afterwards, a telephone connection is set up.
- ⑦ If the router is equipped with a DECT phone interface this interface is connected to a DECT phone with a power supply of its own. Afterwards, a telephone connection is set up. The DECT phone interface is configured for maximum transmission power.
- ⑧ Existing USB ports are not used during measurement.

Power consumption is to be measured during the download via the LAN and WLAN interface and during the implementation of all other measures mentioned above. The contents of the downloaded file is of no interest to the power measurement. The file downloaded from the Internet must, however, be large enough to allow a power consumption measurement according to the requirements set forth in DIN EN 62301, para. 5.3.