Zyxel WEEE 3R REPORT

Zyxel WEEE program – Evaluation of Recyclability and Recoverability rate for Zyxel Networked equipment EU Directive 2012/19/EU

Company name.. .....:	Zyxel Communications Corporation
Address .....:	No. 2, Gongye E. 9th Road, Hsinchu Science Park, Hsinchu, Taiwan, R.O.C.
Department .....:	Quality Management Department
Report No. .....:	ZQ20170517003
Version.....:	1.0
Issue date .....:	2017-05-17
Reporting period .....:	2016-12-12 to 2017-05-17
Product category .....:	IT and Telecommunications equipment
Test Object .....:	28 port GbE L3 managed Switch with 4 SFP+ uplink
Model name .....:	XGS4600-32
P/N no. .....:	XGS4600-32-ZZ0102F
Trademark .....:	ZYXEL
Power supply (I/O) .....:	Internal Power Supply
Rating(s) .....:	AC 100-240V, 50/60Hz, 0.87A max.
Standard .....:	Zyxel WEEE program is based on following: **Directive 2012/19/EU (WEEE Recast)** **A guide to the marketing, product development and manufacturing actions you need to take IEC 62635**
Test Report Form No. .....:	Zyxel TRF52001_2013-02-06 / Ver. 1

Number of pages (Contents) : 17 pages

Number of pages (Attachments) : 3 pages

Reported by: Cardine Chen Approved by : Emma Bao

INDEX

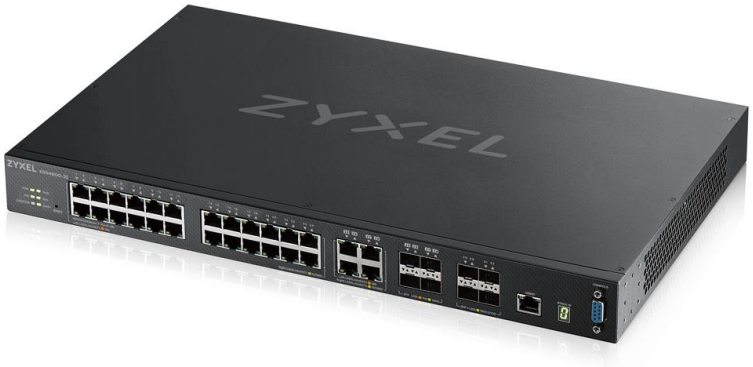
ATTACHMENT

1. Abbreviations used in the report

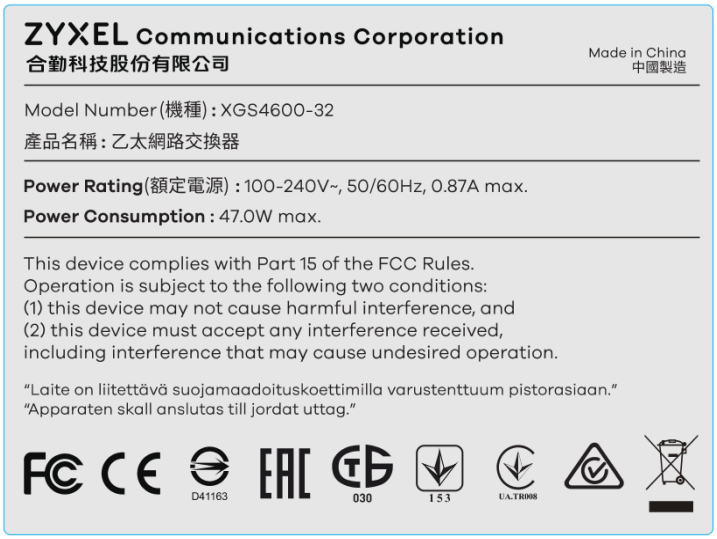
Abbr.	Full name
QMD	Quality Management Department
3R	Reused, Recycle, Recovery
MB	MotherBoard
PSU	Power supply unit
$M_{(i)}$	Mass of ith part (ref.: IEC/TR 62635:2012)
$RCR_{(i)}$	Recycling rate of the ith part in the corresponding end-of-life treatment scenario (ref.: IEC/TR 62635:2012)
$RVR_{(i)}$	Recovery rate of the ith part in the corresponding end-of-life treatment scenario (ref.: IEC/TR 62635:2012)
m_{EEE}	Total product mass (ref.: IEC/TR 62635:2012)
Recyclability	Ability of waste product to be recycled, based on actual practices
Recoverability	Ability of a waste product to be recovered, based on actual practices
EoL	End-of-life

2. General description of Product

Picture of Product:



Copy of Marking plate:



Characteristic data:

Product total weight : 4032.98g

Product dimension : L:441mm * W:270mm * H:44mm

Normative reference:

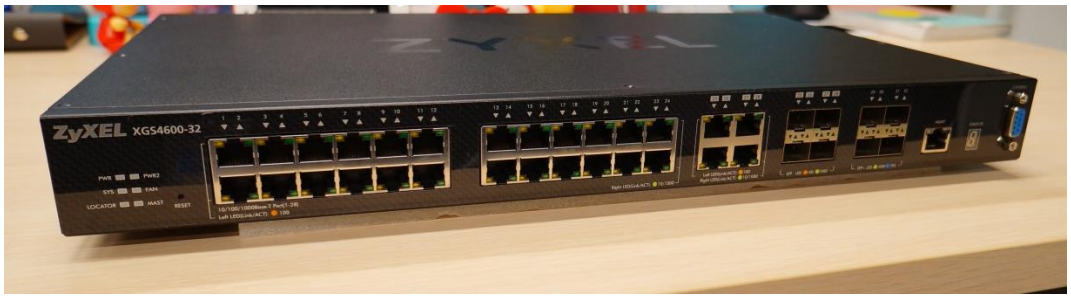
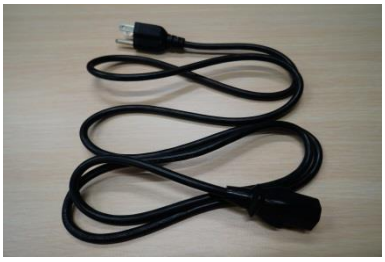
Directive 2012/19/EU
IEC/TR 62635:2012, Ed.1
ISO 11469:2000 Plastics — Generic identification and marking of plastics products
ISO 1043 Plastics — Generic identification and marking of plastics products
Part 1: Basic polymers and their special characteristics
Part 2: Fillers and reinforcing materials
Part 3: Plasticizers
Part 4: Flame retardants

General Remarks:

"(see remark #) refers to a remark appended to the report.
" (see appended table)" refers to a table appended to the report.
Throughout this report a point is used as the decimal separator.
The test results presented in this report relate only to the object tested.

3. Disassembling information

3.1 Disassembling object:

<table>
<tr><td colspan="3">Device</td></tr>
<tr><td colspan="3"> 
</td></tr>
<tr><td colspan="3">Accessaries & Assemblies</td></tr>
<tr><td>Power cord</td><td>/</td><td>/</td></tr>
<tr><td>  </td><td>/</td><td>/</td></tr>
<tr><td>/</td><td>/</td><td>/</td></tr>
<tr><td>/</td><td>/</td><td>/</td></tr>
</table>

3.2 Derivation tree of Product

- Device

- Enclosure

  - Cover case x 1
  - Bottom case x 1
  - Name plate x 1

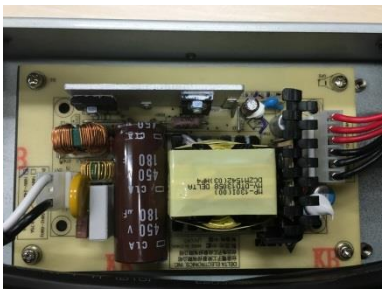
- Enclosure assemblies

  - Screw x 14
  - AC inlet socket x 2
  - Fan x 3

- MB PCBA

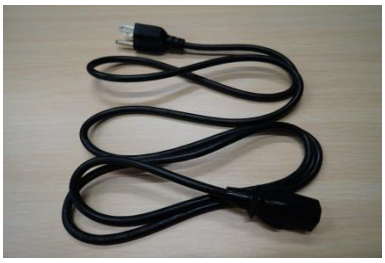
  - PCBA x 1
  - PCBA screw x 8
  - Heat sink x 2
  - RJ45 x 28 port
  - SFP cage x 2
  - Console port x 1
  - MGMT port x 1
  - 20 Pin x 1
  - 8 Pin x 1
  - 3 Pin x 1

- PA PCBA



  - PA PCBA x 2
  - PA PCBA screw x 8
  - Transformer x 2
  - PA PCBA Cap x 2

- Accessory
  - Power Cord
    - Power cord x 1



4. Calculation result

Basic information:

Brand name	Zyxel	Recycling scenario	IT & telecommunication
Model name	XGS4600-32	Product total weight	4032.98g

Calculation information:

EoL info	No	Name of part	Mass (g)	Material	Recyclability mass (g)	Recoverability mass (g)
Reusable parts	–	–	–	–	–	–
Parts for selective treatment	2.1	PA PCBA	11.22	PCBA	1.12	10.10
	2.4	Capacitor-1	6.90	Capacitor (PCB)	3.45	6.21
	2.5	Capacitor-2	18.75	Capacitor (PCB)	9.38	16.88
	3.1	Main PCBA	393.27	PCBA	39.33	353.94
	3.7	Capacitor-3	9.60	Capacitor (PCB)	4.80	8.64
Parts with single recyclable material	1.1	Cover case	1032.00	Steel	980.40	980.40
	1.2	Bottom case	1350.00	Steel	1282.50	1282.50
	1.3	Screw-1	2.03	Steel	1.93	1.93
	1.4	Screw-2	1.98	Steel	1.88	1.88
	1.5	Screw-3	1.90	Steel	1.81	1.81
	1.6	Ground screw hole (metal)	2.30	Steel	2.19	2.19
	2.2	Metal sheet (PA PCBA)	8.95	Steel	7.44	7.44
	2.3	Screw-4	2.00	Steel	1.90	1.90
	2.6	Inductor-1 (metal)	7.84	Stainless steel (magnetic)	7.45	7.45
	2.7	Inductor-1 (copper wire)	10.08	Copper	9.88	9.88

EoL info	No	Name of part	Mass (g)	Material	Recyclability mass (g)	Recoverability mass (g)
	2.8	Inductor-2 (metal)	2.28	Stainless steel (magnetic)	2.17	2.17
	2.9	Inductor-2 (wire)	0.74	Copper	0.73	0.73
	2.10	Inductor-2 (copper wire)	0.68	Copper	0.67	0.67
	2.12	Screw-5	1.76	Steel	1.67	1.67
	2.15	Screw-6	6.00	Steel	5.70	5.70
	2.19	Transformer (plastic)	13.80	EP(Epoxy resin)	0.00	12.42
	3.3	6 Pin header (metal, MB)	1.14	Copper	1.11	1.11
	3.4	Inductor-3 (plastic)	57.00	Stainless steel (magnetic)	54.15	54.15
	3.5	Inductor-3 (wire)	4.00	Copper	3.92	3.92
	3.10	3 Pin header-1 (metal)	0.15	Copper	0.14	0.14
	3.13	Screw-7 (fix heat sink-1)	5.70	Steel	5.42	5.42
	3.14	Screw-8 (fix heat sink-2)	1.98	Steel	1.88	1.88
	3.15	24 port LAN jack connector (metal)	23.98	Steel	22.78	22.78
	3.16	24 port LAN jack connector (pin)	138.24	Copper	135.48	135.48
	3.18	4 port LAN jack connector (metal)	6.49	Steel	6.17	6.17
	3.19	4 port LAN jack connector (pin)	6.48	Copper	6.35	6.35
	3.22	Switch button (metal)	0.28	Steel	0.27	0.27
	3.25	20 pin header (metal)	0.75	Copper	0.74	0.74

EoL info	No	Name of part	Mass (g)	Material	Recyclability mass (g)	Recoverability mass (g)
	3.27	8 pin header (metal)	0.30	Copper	0.30	0.30
	3.28	SFP cage shield	4.00	Steel	3.80	3.80
	3.29	MGMT (metal)	2.16	Steel	2.05	2.05
	3.30	MGMT (pin)	0.17	Copper	0.17	0.17
	3.32	Stack ID (metal pin)	0.48	Copper	0.47	0.47
	3.34	Stack ID (display)	0.21	EP(Epoxy resin)	0.00	0.19
	3.35	Screw-9 (fix main PCBA)	6.00	Steel	5.70	5.70
	4.6	cable connector block (metal)	3.60	Copper	3.53	3.53
	4.10	Screw-10 (fix grounding cable)	2.40	Steel	2.28	2.28
	4.12	AC inlet socket (black plastic)	35.56	Steel	33.78	33.78
	4.13	Screw-11 (AC inlet socket)	1.40	Steel	1.33	1.33
	6.2	AC terminal-Pin	5.00	Steel	4.75	4.75
	7.1	Metal sheet	60.00	Steel	57.00	57.00
	7.2	Screw-12	22.00	Steel	20.90	20.90
	7.3	Screw-13	2.64	Steel	2.51	2.51
Parts difficult to process	–	–	–	–	–	–
Separation Process	1.7	Mylar	11.60	PC (Polycarbonate)	8.12	10.44
	2.11	3 Pin header (white plastic)	1.59	PA (Polyamide)	1.11	1.43
	2.13	Isolation layer (plastic)	13.80	PA (Polyamide)	9.66	12.42
	2.14	6 Pin header (plastic, PA)	0.40	PA (Polyamide)	0.28	0.36

EoL info	No	Name of part	Mass (g)	Material	Recyclability mass (g)	Recoverability mass (g)
	2.16	Insulation mats (black)	21.60	PC (Polycarbonate)	15.12	19.44
	2.17	Transformer (copper)	23.50	Copper	21.86	21.86
	2.18	"Transformer (metal core)	46.20	Stainless steel (magnetic)	42.97	42.97
	3.2	6 Pin header (plastic, MB)	0.78	PA (Polyamide)	0.54	0.70
	3.6	Inductor-3 (black)	8.00	PA (Polyamide)	5.60	7.20
	3.8	Fix plastic-2 (black)	9.60	PA (Polyamide)	6.72	8.64
	3.9	3 Pin header-1 (black plastic)	0.16	PA (Polyamide)	0.11	0.14
	3.11	Heat sink-1	210.00	Aluminum	189.00	189.00
	3.12	Heat sink-2	47.90	Aluminum	43.11	43.11
	3.17	24 port LAN jack connector (black plastic)	102.88	PA (Polyamide)	72.02	92.59
	3.20	3 Pin header-2 (plastic)	0.05	PA (Polyamide)	0.04	0.05
	3.21	3 Pin header-2 (metal)	0.11	Copper	0.11	0.11
	3.23	Switch button (black plastic)	0.03	PA (Polyamide)	0.02	0.03
	3.24	20 pin header (plastic)	0.31	PA (Polyamide)	0.22	0.28
	3.26	8 pin header (plastic)	0.15	PA (Polyamide)	0.10	0.13
	3.31	Stack ID (white plastic)	0.07	PP (Polypropylene)	0.05	0.06

EoL info	No	Name of part	Mass (g)	Material	Recyclability mass (g)	Recoverability mass (g)
	3.33	Stack ID (shield)	0.10	PP (Polypropylene)	0.07	0.09
	3.36	Console port (black plastic)	2.30	PBT	1.61	2.07
	3.37	Console port (white plastic)	1.45	PVC	0.00	1.31
	3.38	Console Port (metal screw)	1.70	Copper	1.58	1.58
	3.39	Console Port (blue plastic)	1.80	PBT	1.26	1.62
	4.1	PCBA cable (jacket)	8.74	PE_HD(High density)	6.12	7.87
	4.2	Red cable (jacket)	8.53	PVC	0.00	7.68
	4.3	Red cable (wire)	6.82	Copper	6.34	6.34
	4.4	Black cable (jacket)	8.53	PVC	0.00	7.68
	4.5	Black cable (wire)	6.82	Copper	6.34	6.34
	4.7	cable connector block (white plastic)	5.78	PA (Polyamide)	4.05	5.21
	4.8	Internal power cord	1.68	PVC	0.00	1.51
	4.9	AC inlet socket housing	9.40	PA (Polyamide)	6.58	8.46
	4.11	AC inlet socket ping (metal)	7.70	Copper	7.16	7.16
	4.14	Name plate	13.20	PC (Polycarbonate)	9.24	11.88
	5.1	Fan	27.00	PBT	18.90	24.30

EoL info	No	Name of part	Mass (g)	Material	Recyclability mass (g)	Recoverability mass (g)
	5.2	Fan connector (white plastic)	1.50	PA (Polyamide)	1.05	1.35
	6.1	AC power cord	150.00	PVC	0.00	135.00
Sum					$\sum(m_{(i)}xRCR_{(i)}) = 3230.35$	$\sum(m_{(i)}xRVR_{(i)}) = 3781.98$

Recyclability rate	$\frac{\sum(m_{(i)}xRCR_{(i)})}{m_{EEE}}$ x100% = 80.10%
Recoverability rate	$\frac{\sum(m_{(i)}xRVR_{(i)})}{m_{EEE}}$ x100% = 93.80%

ATTACHMENT A
PLASTIC MATERIALS MARKING

The equipment of "XGS4600-32" enclosure is made by metal which is outside of scope of ISO 11469 as well as ISO 1043 part 1 to part 4 on the requirement of the weight of plastic material equal and/or more than 25g shall be marked.

ATTACHMENT B
PLASTIC MATERIALS MARKING

In the light of Annex VII on the Directive 2012/19/EU (so called as WEEE recast), selective treatment for materials and components have been defined for further specifically treatment during the end-of-life electrical and electronic equipment, which are:

No	details
1	polychlorinated biphenyls (PCB) containing capacitors in accordance with Council Directive 96/59/EC of 16 September 1996 on the disposal of polychlorinated biphenyls and polychlorinated terphenyls (PCB/PCT) (1),
2	mercury containing components, such as switches or backlighting lamps,
3	batteries,
4	printed circuit boards of mobile phones generally, and of other devices if the surface of the printed circuit board is greater than 10 square centimetres,
5	toner cartridges, liquid and paste, as well as colour toner,
6	plastic containing brominated flame retardants,
7	asbestos waste and components which contain asbestos,
8	cathode ray tubes,
9	chlorofluorocarbons (CFC), hydrochlorofluorocarbons (HCFC) or hydrofluorocarbons (HFC), hydrocarbons (HC),
10	gas discharge lamps,
11	liquid crystal displays (together with their casing where appropriate) of a surface greater than 100 square centimetres and all those back-lighted with gas discharge lamps,
12	external electric cables,
13	components containing refractory ceramic fibres as described in Commission Directive 97/69/EC of 5 December 1997 adapting to technical progress for the 23rd time Council Directive 67/548/EEC on the approximation of the laws, regulations and administrative provisions relating to the classification, packaging and labelling of dangerous substances (2),
14	components containing radioactive substances with the exception of components that are below the exemption thresholds set in Article 3 of and Annex I to Council Directive 96/29/Euratom of 13 May 1996 laying down basic safety standards for the protection of the health of workers and the general public against the dangers arising from ionizing radiation (3),
15	electrolyte capacitors containing substances of concern (height > 25 mm, diameter > 25 mm or proportionately similar volume).
Remark: These substances, mixtures and components shall be disposed of or recovered in compliance with Directive 2008/98/EC.	

ATTACHMENT C
PLASTIC MATERIALS MARKING

According to Art. 12 & Art. 13 on the finacing in respect of WEEE from private households and non-private households. Recycling fees cover costs of collection, transportation, handling, maintenance of recycling Zyxel network and equipment as well as solvency required in the Decree.

Acoording to Art. 16 of Directive 2012/19/EU "*Registration, information and reporting*".Zyxel has completed and fulfilled EU registration responsibility requirement which shall be registered through their authorised representatives, for detail, please refer to the table below.

Coutry	Registration No.	Approved compliance scheme
UK	WEE/CC0067TX (CD01/00100)	Comply Direct Ltd.
DE	71587309	EAR
DK	21229237	DPA-System
…	…	…
For other countries registry information, please feel free to contact with Zyxel Communications Corporation. email to: Zyxel_Certification@zyxel.com.tw		