

Additional slides / examples for EPA/CBs/ITI/JEITA Discussion
9 July 2014

Dataset Creation Proposal

for the next revision of
ENERGY STAR Imaging Equipment specifications

July 08, 2014

JBMIA Copier/MFD Technology WG

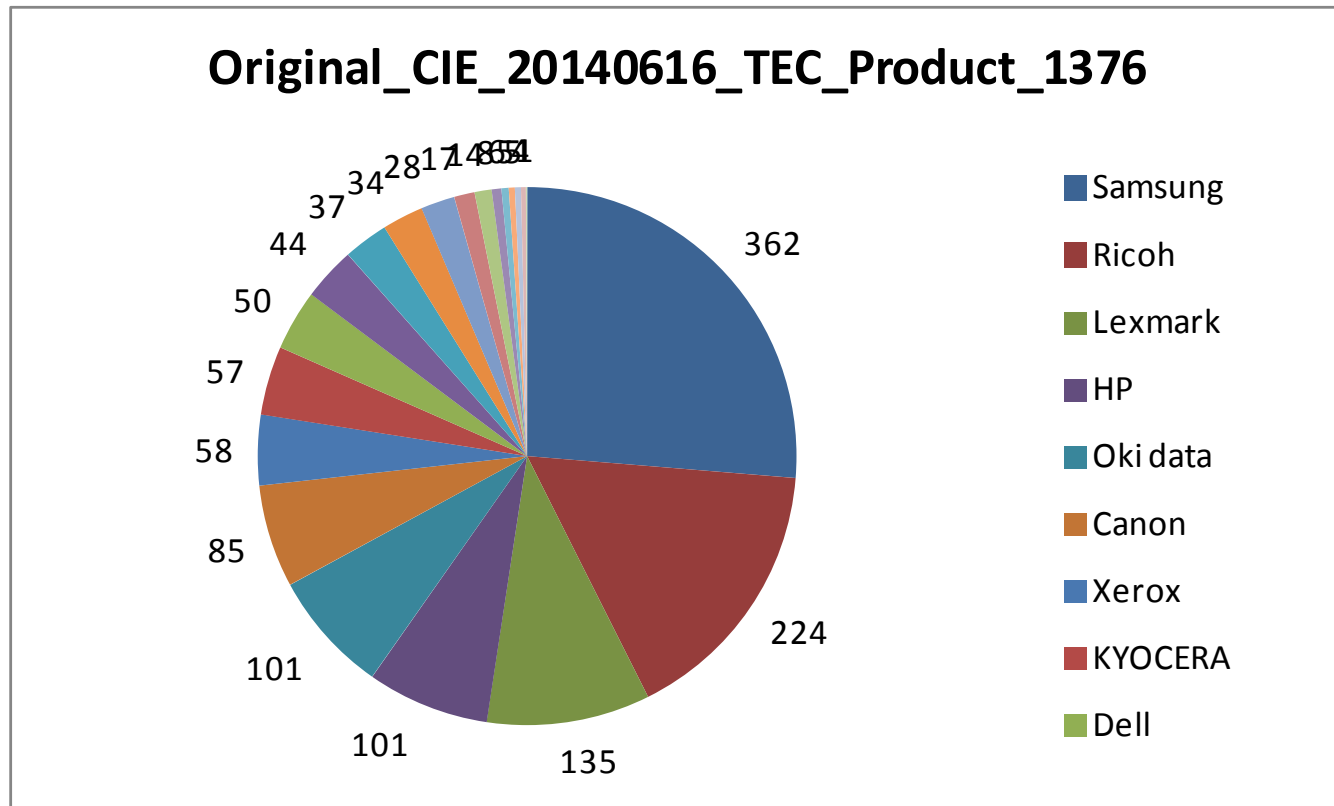
JEITA Printer Energy Saving WG

Dataset for the new specifications

- Database for the development of the next ENERGY STAR Imaging Equipment specifications would be based on CIE list. This database will be referred to as “dataset” in this PPT.
- The current CIE list includes duplicated lines of the same product and a variety of expressions of family-registered product and/or family data*. This situation does not enable accurate evaluation of qualification ratio, which is an important measure for the development of the new specification.

*Here we define “family data” as the data represented in plural lines of qualified products of the same partner carrying the same speed/TEC/Active data regardless of whether it is family-registered (with additional model information) or not.
- Therefore, we propose a creation of “dataset” different from CIE list, which deletes duplicated lines of the same product and collapses family data to one line.
- A procedure of creating “dataset” will be exhibited in the following slides, using the CIE list of June 16, 2014.

CIE 20160616 Partner Occupation Ratio



Three partners occupy more than half of registered TEC products (total 1376 lines) in the original CIE.

Duplicated data and family data included in its entirety are to be collapsed.

1. Procedure to delete duplicated data

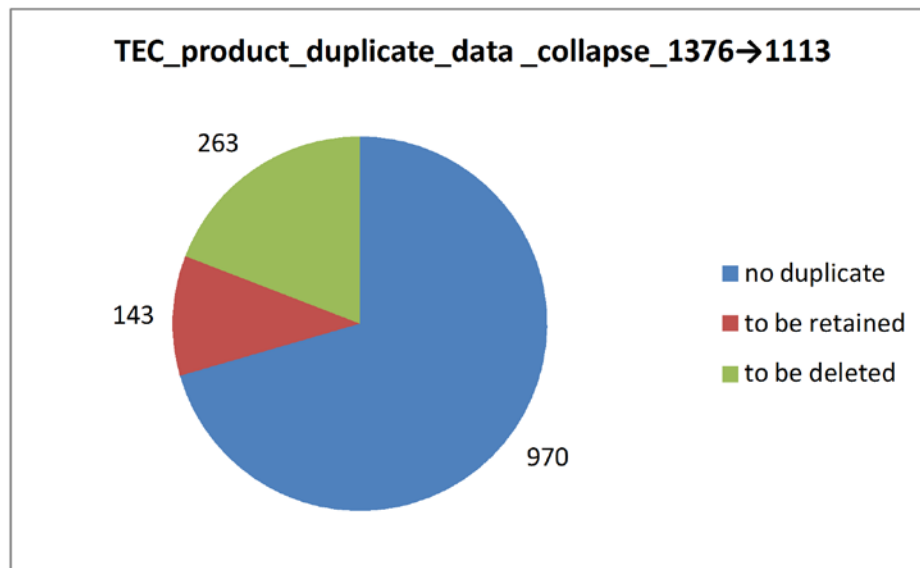
- Products with TEC data are sorted out from CIE list, then further sorted according to partners.
- "Duplicated data" is defined as the data of the same partner, which has the same model name/model number.
- Among TEC values of "duplicated data" there are the same values, values with seemingly small measurement error and values with big difference, either of which looks like wrong (ex. Xpress C410W---19ipm Samsung product---carries TEC values of 1.0 and 1.3 in different lines).
- As the representative of "duplicated data", the line with the largest TEC value is to be retained, other duplicated lines to be deleted.

Note: Duplicated Data

- There is a case found that the same “model name/model number” is registered for printer and MFD (Canon-case). It is made sure that these are different products, thus not counted as duplicated.
- As OEM product data of Ricoh (with the same “model name/model number”) can be assured that they represent different product in CIE list, they are not counted as duplicated. (OEM products --- with the same speed/TEC value--- will be collapsed as family data, as exhibited in the following slides.)

Result of Duplicate Removal

all TEC products	no duplicate	duplicated data		total
		to be retained	to be deleted	
total	970	143	263	1376



- Green-colored box in the upper table shows number of lines to be deleted. (This amounts to 19% of the total.)
- Red-framed boxes represent number of lines after duplicate removal. (1113 lines)

Example of duplicate removal (mono MFD)

Brother	MFC-7240	21	1.2
DELL	Dell B1163	21	0.9
DELL	Dell B1163	21	1
DELL	Dell B1163w	21	0.9
DELL	Dell B1163w	21	1
DELL	Dell B1165nfw	21	0.9
DELL	Dell B1165nfw	21	0.9
DELL	Dell B1165nfw	21	1
DELL	Dell B1165nfw	21	1
Hewlett-Packar	HP LaserJet Pro MFP M	21	0.5
Hewlett-Packar	HP LaserJet Pro MFP M	21	0.5
Hewlett-Packar	HP LaserJet Pro MFP M	21	0.5
Hewlett-Packar	HP LaserJet Pro MFP M	21	0.5
Hewlett-Packar	HP LaserJet Pro MFP M	21	0.5
Hewlett-Packar	HP LaserJet Pro MFP M	21	0.5
Hewlett-Packar	HP LaserJet Pro MFP M	21	0.5
Konica Minolta	bizhub 215	21	0.9
Samsung	SCX-3405FW	21	0.9
Samsung	SCX-3405FW	21	0.9
Samsung	SCX-3405FW	21	1
Samsung	SCX-3405FW	21	1
Samsung	SCX-3405W	21	0.9
Samsung	SCX-3405W	21	0.9
Samsung	SCX-3405W	21	1
Samsung	SCX-3405W	21	1
Samsung	SF-760P	21	1
Samsung	SF-760P	21	1
Samsung	Xpress M2070	21	0.9
Samsung	Xpress M2070	21	1
Samsung	Xpress M2070F	21	0.9
Samsung	Xpress M2070F	21	1
Samsung	Xpress M2070FW	21	0.9
Samsung	Xpress M2070FW	21	0.9
Samsung	Xpress M2070FW	21	1
Samsung	Xpress M2070FW	21	1
Samsung	Xpress M2070W	21	0.9
Samsung	Xpress M2070W	21	0.9
Samsung	Xpress M2070W	21	1
Samsung	Xpress M2070W	21	1



- 21ipm product list is extracted.
- Yellow/green boxes represent duplicated data; yellow to be deleted, green to be retained as collapsed representative data.
- No color boxes are original untouched data.
- See the table below showing the result of yellow-box removal.

Brother Industri	MFC-7240	21	1.2
Dell Inc.	Dell B1163	21	1
Dell Inc.	Dell B1163w	21	1
Dell Inc.	Dell B1165nfw	21	1
Hewlett-Packar	HP LaserJet Pro MFP M	21	0.5
Hewlett-Packar	HP LaserJet Pro MFP M	21	0.5
Hewlett-Packar	HP LaserJet Pro MFP M	21	0.5
Hewlett-Packar	HP LaserJet Pro MFP M	21	0.5
Hewlett-Packar	HP LaserJet Pro MFP M	21	0.5
Hewlett-Packar	HP LaserJet Pro MFP M	21	0.5
Hewlett-Packar	HP LaserJet Pro MFP M	21	0.5
Konica Minolta	fbizhub 215	21	0.9
Samsung Electr	SCX-3405FW	21	1
Samsung Electr	SCX-3405W	21	1
Samsung Electr	SF-760P	21	1
Samsung Electr	Xpress M2070	21	1
Samsung Electr	Xpress M2070F	21	1
Samsung Electr	Xpress M2070FW	21	1
Samsung Electr	Xpress M2070W	21	1

Original with duplicates

Brand Name	Model Name	Model Number	Print Speed (ipm)	Typical Electricity
Brother	MFC-7240	MFC-7240	21	1.2
DELL	Dell B1163	Dell B1163	21	0.9
DELL	Dell B1163	Dell B1163	21	1
DELL	Dell B1163w	Dell B1163w	21	0.9
DELL	Dell B1163w	Dell B1163w	21	1
DELL	Dell B1165nfw	Dell B1165nfw	21	0.9
DELL	Dell B1165nfw	Dell B1165nfw	21	0.9
DELL	Dell B1165nfw	Dell B1165nfw	21	1
DELL	Dell B1165nfw	Dell B1165nfw	21	1
Hewlett-Packard	HP LaserJet Pro MFP M125a	CZ172A	21	0.5
Hewlett-Packard	HP LaserJet Pro MFP M125nw	CZ173A	21	0.5
Hewlett-Packard	HP LaserJet Pro MFP M125r	CZ176A	21	0.5
Hewlett-Packard	HP LaserJet Pro MFP M125ra	CZ177A	21	0.5
Hewlett-Packard	HP LaserJet Pro MFP M125mw	CZ178A	21	0.5
Hewlett-Packard	HP LaserJet Pro MFP M126a	CZ174A	21	0.5
Hewlett-Packard	HP LaserJet Pro MFP M126nw	CZ175A	21	0.5
Konica Minolta	bizhub 215	bizhub 215	21	0.9
Samsung	SCX-3405FW	SCX-3405FW	21	0.9
Samsung	SCX-3405FW	SCX-3405FW	21	0.9
Samsung	SCX-3405FW	SCX-3405FW	21	1
Samsung	SCX-3405FW	SCX-3405FW	21	1
Samsung	SCX-3405W	SCX-3405W	21	0.9
Samsung	SCX-3405W	SCX-3405W	21	0.9
Samsung	SCX-3405W	SCX-3405W	21	1
Samsung	SCX-3405W	SCX-3405W	21	1
Samsung	SF-760P	SF-760P	21	1
Samsung	SF-760P	SF-760P	21	1
Samsung	Xpress M2070	Xpress M2070	21	0.9
Samsung	Xpress M2070	Xpress M2070	21	1
Samsung	Xpress M2070F	Xpress M2070F	21	0.9
Samsung	Xpress M2070F	Xpress M2070F	21	1
Samsung	Xpress M2070FW	Xpress M2070FW	21	0.9
Samsung	Xpress M2070FW	Xpress M2070FW	21	0.9
Samsung	Xpress M2070FW	Xpress M2070FW	21	1
Samsung	Xpress M2070FW	Xpress M2070FW	21	1
Samsung	Xpress M2070W	Xpress M2070W	21	0.9
Samsung	Xpress M2070W	Xpress M2070W	21	0.9
Samsung	Xpress M2070W	Xpress M2070W	21	1
Samsung	Xpress M2070W	Xpress M2070W	21	1

← n=39

n=19



Duplicates removed

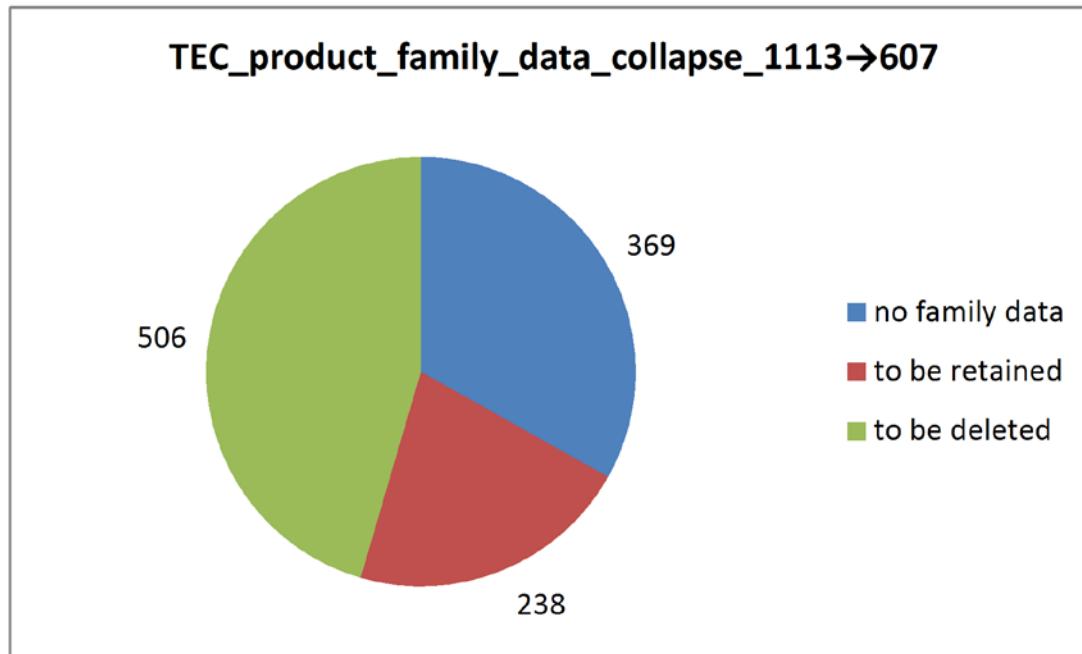
Brand Name	Model Name	Model Number	Print Speed (ipm)	Typical Electricity
Brother	MFC-7240	MFC-7240	21	1.2
DELL	Dell B1163	Dell B1163	21	1
DELL	Dell B1163w	Dell B1163w	21	1
DELL	Dell B1165nfw	Dell B1165nfw	21	1
Hewlett-Packard	HP LaserJet Pro MFP M125a	CZ172A	21	0.5
Hewlett-Packard	HP LaserJet Pro MFP M125nw	CZ173A	21	0.5
Hewlett-Packard	HP LaserJet Pro MFP M125r	CZ176A	21	0.5
Hewlett-Packard	HP LaserJet Pro MFP M125ra	CZ177A	21	0.5
Hewlett-Packard	HP LaserJet Pro MFP M125mw	CZ178A	21	0.5
Hewlett-Packard	HP LaserJet Pro MFP M126a	CZ174A	21	0.5
Hewlett-Packard	HP LaserJet Pro MFP M126nw	CZ175A	21	0.5
Konica Minolta	bizhub 215	bizhub 215	21	0.9
Samsung	SCX-3405FW	SCX-3405FW	21	1
Samsung	SCX-3405W	SCX-3405W	21	1
Samsung	SF-760P	SF-760P	21	1
Samsung	Xpress M2070	Xpress M2070	21	1
Samsung	Xpress M2070F	Xpress M2070F	21	1
Samsung	Xpress M2070FW	Xpress M2070FW	21	1
Samsung	Xpress M2070W	Xpress M2070W	21	1

2. Procedure to collapse family data

- As is shown in slide 7, the collapsed example after duplicate removal includes many products of the same partner which have the same speed/TEC values with a slight difference of model name/model number.
- So “family data” is defined as having the same speed/TEC/Active 0/1/2 values among products of the same partner.
- Concerning TEC data (1113 lines) after duplicate removal, family data will be collapsed according to the above definition.

Result of Family Data Collapse

all TEC products	no family data	family data		total
		to be retained	to be deleted	
total	369	238	506	1113



- Green-colored box in the upper table shows number of lines to be deleted. (This amounts to 45% of the total after duplicate removal.)
- Red-framed boxes represent number of lines after family data collapse. (607 lines)

Example of Family Data Collapse

Hewlett-Packar	HP LaserJet Pro MFP M	21	0.5
Hewlett-Packar	HP LaserJet Pro MFP M	21	0.5
Hewlett-Packar	HP LaserJet Pro MFP M	21	0.5
Hewlett-Packar	HP LaserJet Pro MFP M	21	0.5
Hewlett-Packar	HP LaserJet Pro MFP M	21	0.5
Hewlett-Packar	HP LaserJet Pro MFP M	21	0.5
Hewlett-Packar	HP LaserJet Pro MFP M	21	0.5
Konica Minolta	bizhub 215	21	0.9
DELL	Dell B1163	21	1
DELL	Dell B1163w	21	1
DELL	Dell B1165nfw	21	1
Samsung	SCX-3405FW	21	1
Samsung	SCX-3405W	21	1
Samsung	SF-760P	21	1
Samsung	Xpress M2070	21	1
Samsung	Xpress M2070F	21	1
Samsung	Xpress M2070FW	21	1
Samsung	Xpress M2070W	21	1
Brother	MFC-7240	21	1.2

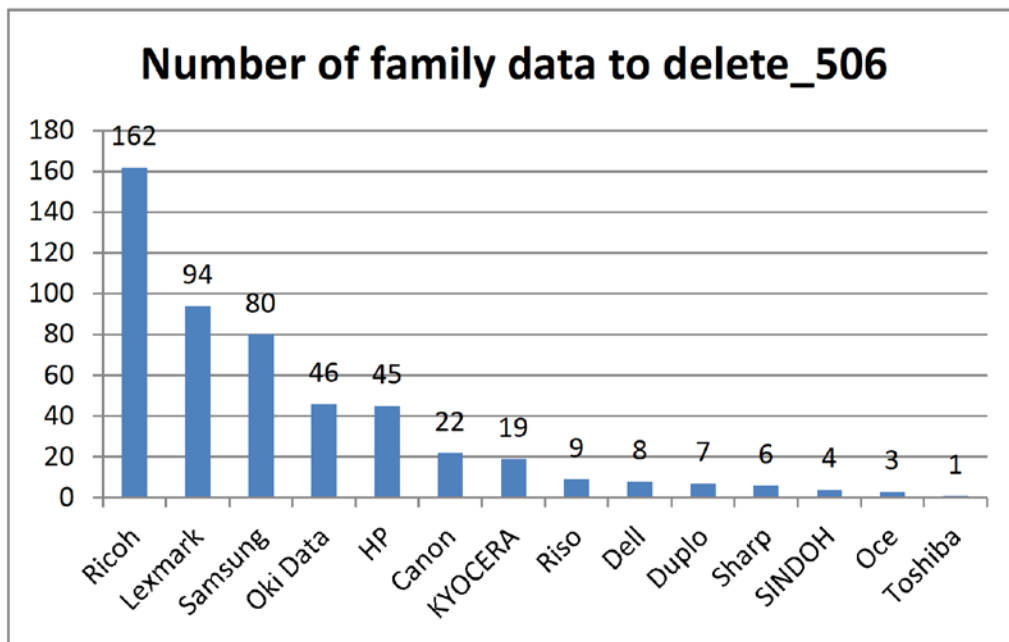


Hewlett-Packar	HP LaserJet Pro MFP M	21	0.5
Konica Minolta	bizhub 215	21	0.9
DELL	Dell B1165nfw	21	1
Samsung	Xpress M2070W	21	1
Brother	MFC-7240	21	1.2

- The upper table shows the data after duplicate removal in slide 7.
(Orange boxes to be deleted, blue boxes to be retained.)
- The lower table shows the result of collapsing family data to one line (blue box).
- Number of lines for 21ipm of mono MFD;
Original number of lines = 39
→ After duplicate removal = 19
→ After family data collapse = 5.

Observation of Family Data

- Family data are found for products of many partners.

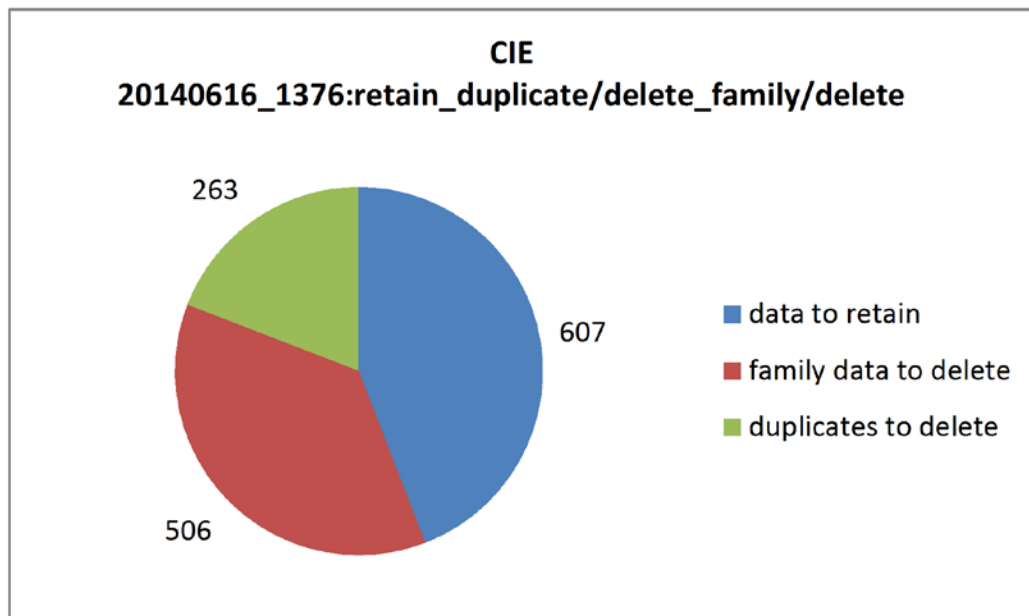


- Ricoh registers OEM products in different lines, which can be identified as different-brand products in CIE list.

- There are Lexmark examples which register individual products of a family in different lines. (ex. A family consisting of 14 products is registered in 14 lines, each representing individual product with other products shown in additional model box.)

3. Summary of duplicate/family data collapse

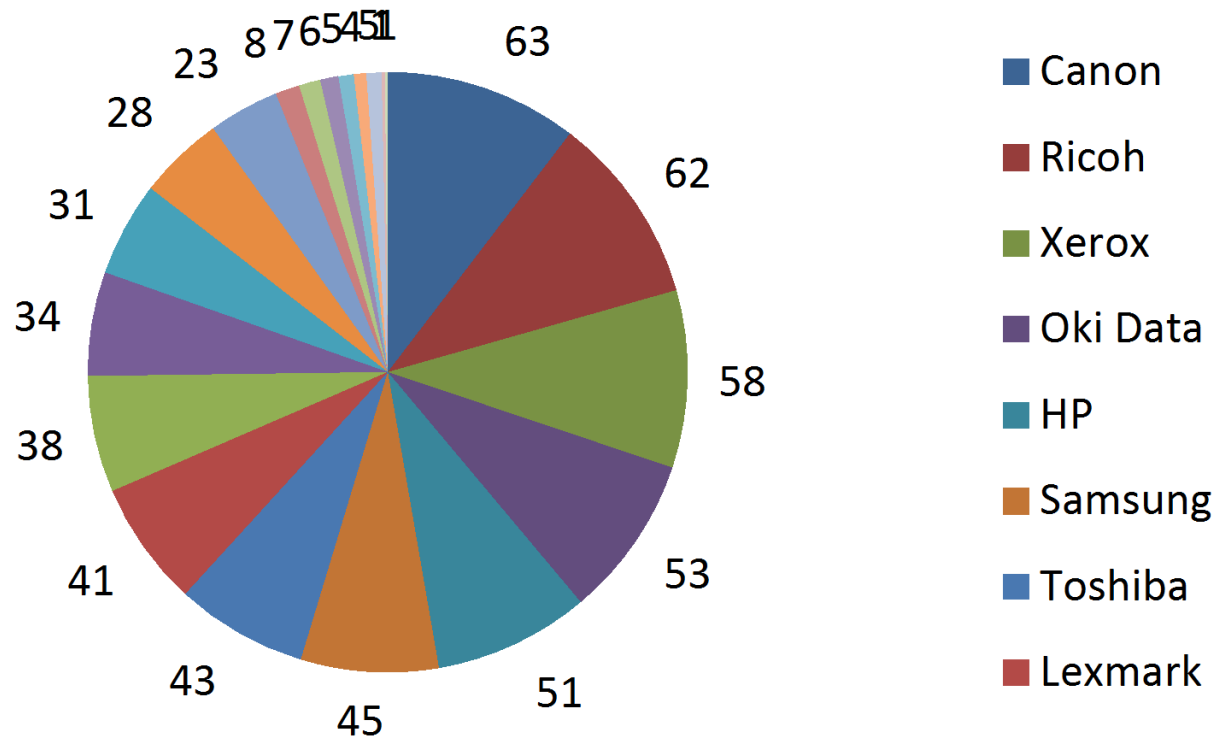
all TEC Products	data to retain	family data to delete	duplicates to delete	total
total	607	506	263	1376



- Among original 1376 lines; duplicates to delete = 263 lines, family data to delete = 506 lines.
- The data to be retained is reduced to 607 lines.

Partner occupation ratio after d/f collapse

CIE_20140616_TEC_after_d/f_collapse_607



Summary

CIE List

- Duplicated data and other errors should be corrected.
- Concerning family products, its expression on CIE list is inconsistent among partners. While some register individual products of a family in plural lines, others register family products in one line with family member products in additional model information box. Thus family products are expressed in either one line or plural lines on CIE list.

Dataset Creation

- If CIE list should be used as it is in developing new criteria, family products of the same TEC value may be counted as one product or plural products (ex. 14); both cases would coexist. Thus accurate evaluation of qualification rate cannot be guaranteed.
- Therefore, a creation of “dataset” is indispensable where possible duplicate data on CIE list is deleted and family data is collapsed to one line.

Why family data must be collapsed to one line in dataset creation?

- Product family: A group of product models that are
 - (1) made by the same manufacturer,
 - (2) subject to the same ENERGY STAR qualification criteria, and
 - (3) of a common basic design.

Product models within a family differ from each other according to one or more characteristics or features that either (1) have no impact on product performance with regard to ENERGY STAR qualification criteria, or (2) are specified herein as acceptable variations within a product family. For Imaging Equipment, acceptable variations within a product family include:

- a) Color,
- b) Housing,
- c) Input or output paper-handling accessories,
- d) Electronic components not associated with the marking engine of the Imaging Equipment product, including Type 1 and Type 2 DFEs.

⇒ This is the definition given in Eligible Criteria Ver2.0. Basically product family is a group of products with the same energy-saving performance. Thus,

- Apart from CIE registration, it should be evaluated from the standpoint of technology in developing new criteria.
- A group of product models with a common basic design and with the same-energy saving performance should be handled technically as one model in “dataset”.

Qualification Ratio with & without d/f collapse

- Here is an example how qualification ratio is affected by duplicated data/family data.

Before d/f collapse

Samsung Electro	MultiXpress K2200	20	0.9
Samsung Electro	MultiXpress K2200	20	0.9
Samsung Electro	MultiXpress K2200ND	20	0.9
Samsung Electro	MultiXpress K2200ND	20	0.9
Toshiba America	e-STUDIO2007	20	1.1
Toshiba America	e-STUDIO207L	20	1.2
Toshiba America	e-STUDIO206L	20	1.4
Xerox Corporatic	WorkCentre 5021D	20	1.4

This shows 20 ipm bin of MFD monochrome products.

After d/f collapse

Samsung	MultiXpress K2200ND	20	0.9
Toshiba	e-STUDIO2007	20	1.1
Toshiba	e-STUDIO207L	20	1.2
Toshiba	e-STUDIO206L	20	1.4
Xerox	WorkCentre 5021D	20	1.4

An imaginary qualification ratio against 1.0 is calculated as **50%** before d/f collapse. However, after d/f collapse it is **20%**, the latter representing more accurate estimation.

END