# DICOM Embedded Printing Function User's Guide

## OKI DICOM Embedded Printer Version 4 Series

**ES6410 DICOM**
**ES7411 DICOM**
**ES8431 DICOM**
**ES9410 DICOM**

## IMPORTANT:

This manual describes all the functionalities available in the full-option version of OKI DICOM **Embedded Printer V4.00**. Available functionalities of your product may be different from those described in this manual.



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# Introduction

This manual describes how to print from OKI DICOM Embedded Printer supporting DICOM Protocol.

Refer to the user manual of the standard printer model for instructions on tasks such as how to load paper and replace consumables in OKI DICOM Embedded Printer.

OKI DICOM Embedded Printer prints DICOM format images sent via a network from medical imaging applications and medical devices.

OKI DICOM Embedded Printer can generate pages in both grayscale and color.

**CAUTION!**

**This is not medical equipment. Do not use the printed images from this equipment for medical diagnosis.**

# Features of OKI DICOM Embedded Printer

- High quality printing with ProQ2400 © multi-level technology
- Compliant with the DICOM 3.0 standard
- Reliability
- Ergonomic features
- Achieves low-cost DICOM-compatible printing

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# 1. Setting up OKI DICOM Embedded Printer

## 1-1 Install the printer

The following procedures are performed in accordance with the Setup Guide/User's Guide/Network Guide supplied on CD/DVD with the printer.

(1) Unpack OKI DICOM Embedded Printer (hereinafter referred to as printer) from the packing box and install it.
(2) Remove the protective tapes and the protective sheets from the printer.
(3) Open the top cover, and remove the stopper (orange) of the fuser unit.
(4) Install the image drum.
(5) Load paper on the paper tray.
(6) Connect the AC cord to the printer, and turn on the power.

Note: Do not connect the network cable to the printer yet.

(7) Enter the IP address, which is provided by your network administrator, using the printer control panel.
(8) Perform test printing, and confirm that the IP address is set for the printer correctly.
(9) Connect the network cable to the printer.
(10) Shutdown the printer and turn off power.
(11) Turn on power. After finishing required process, the printer reboots automatically.

Next, set up the printer from your PC (Personal Computer) as instructed as follows.

Prepare a PC connected to the same network as the printer.



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# 1-2 Open DICOM Embedded Printer home page

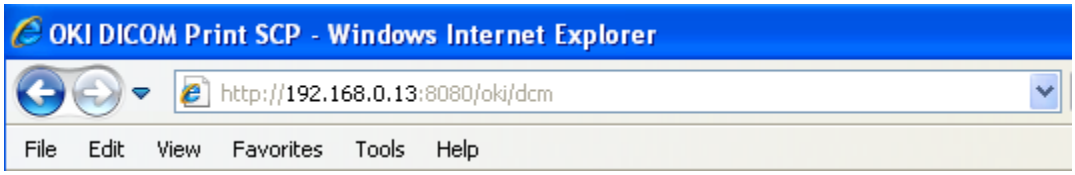
Open the web browser on your PC.

Note: This will work even if the PC is not connected to the Internet.

In the address bar of your web browser, enter the IP address set to the printer as follows.

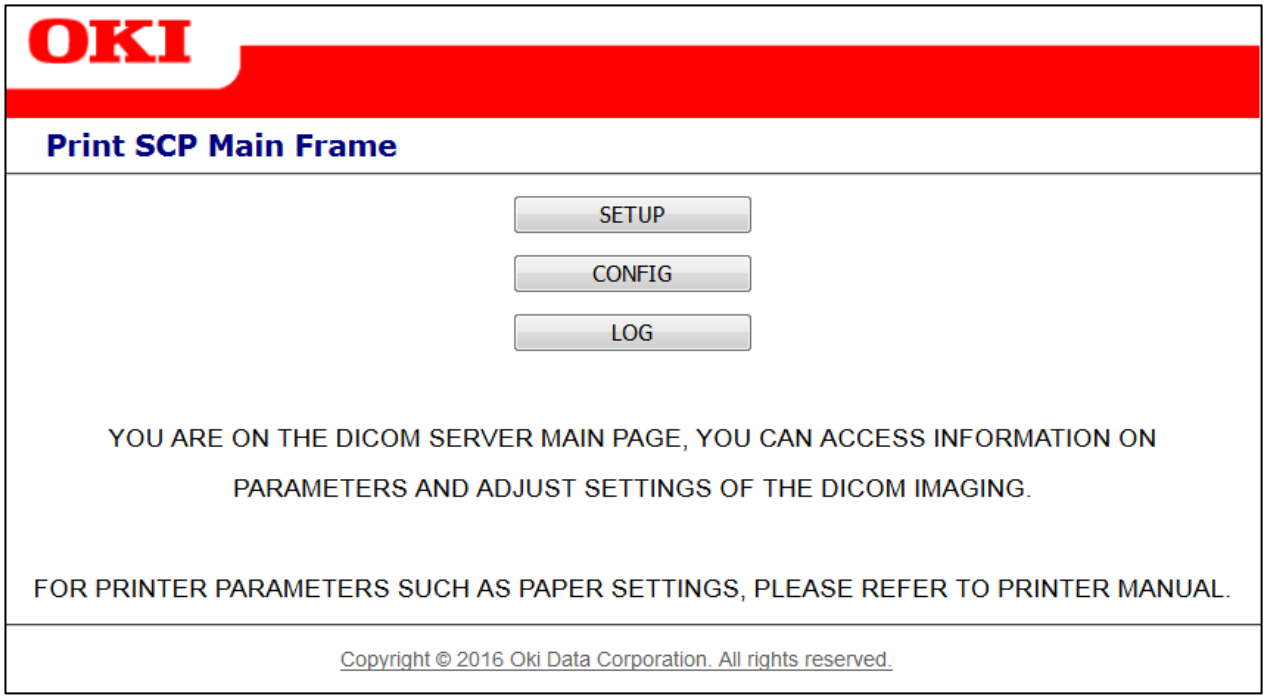
Example:

When the IP address set to the printer is 192.168.0.13, enter “http://192.168.0.13:8080/oki/dcm” in the address bar.




Note: This action might not be successful if done just after “Ready” is displayed on the printer control panel. In this event, wait for 5 to 10 seconds and try again.

DICOM Embedded Printer home page is displayed.



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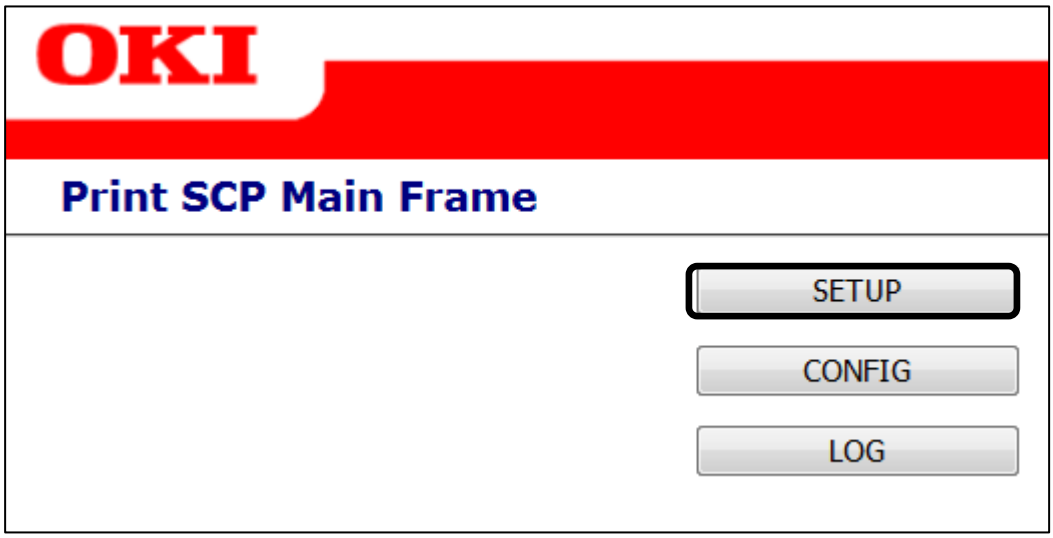
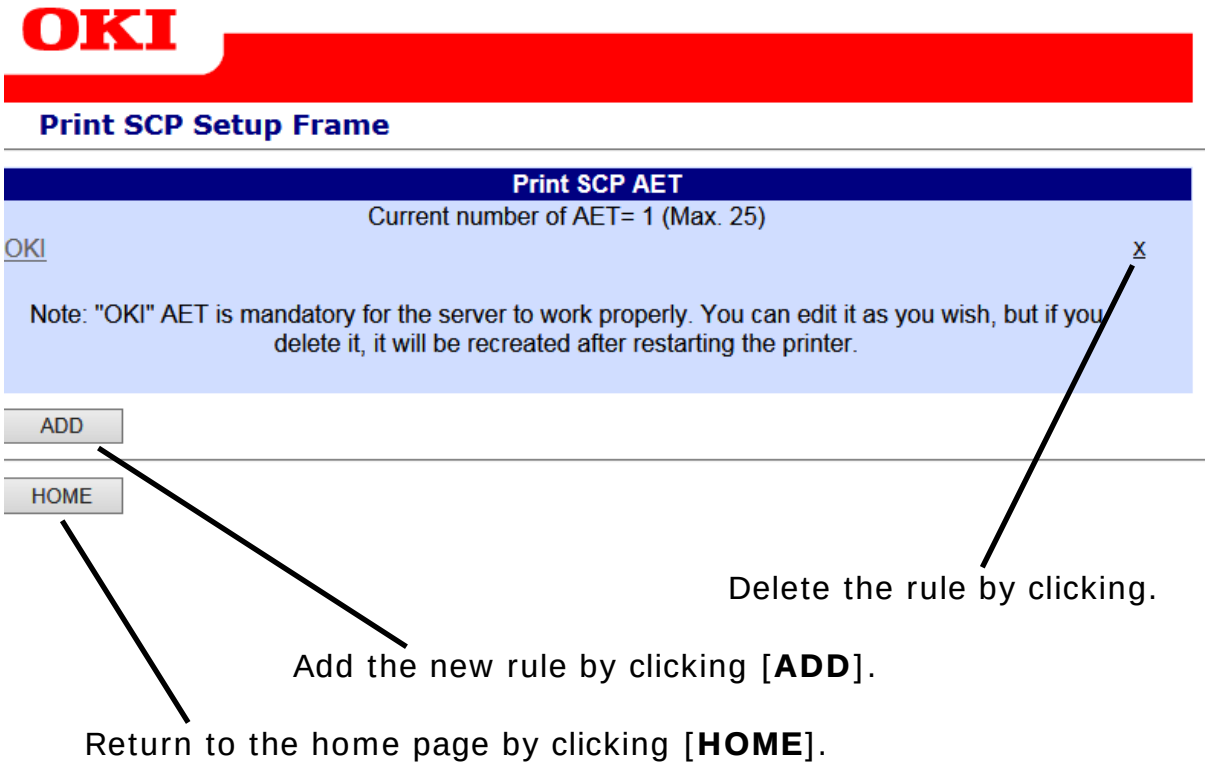
# 1-3 Setup of AETs

(1) Click [**SETUP**].




(2) The print rules represented by the AET (Application Entity Title) will be listed. You can create as many as 25 rules to match your requirements.

You can edit the rules by clicking the rule names (in this case [**OKI**]).



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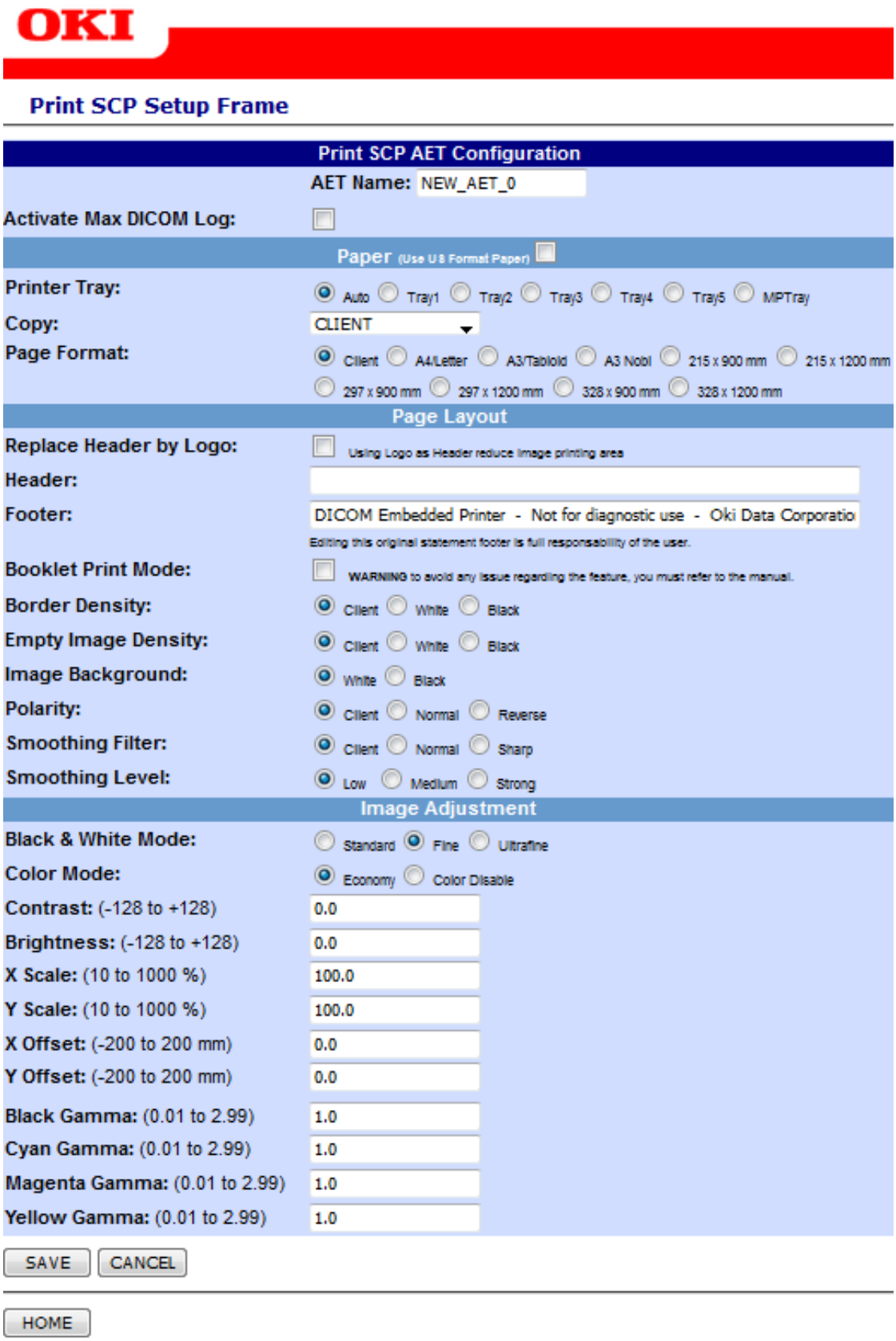
(3) Click [**ADD**] to get a new AET.

Example of new AET screen



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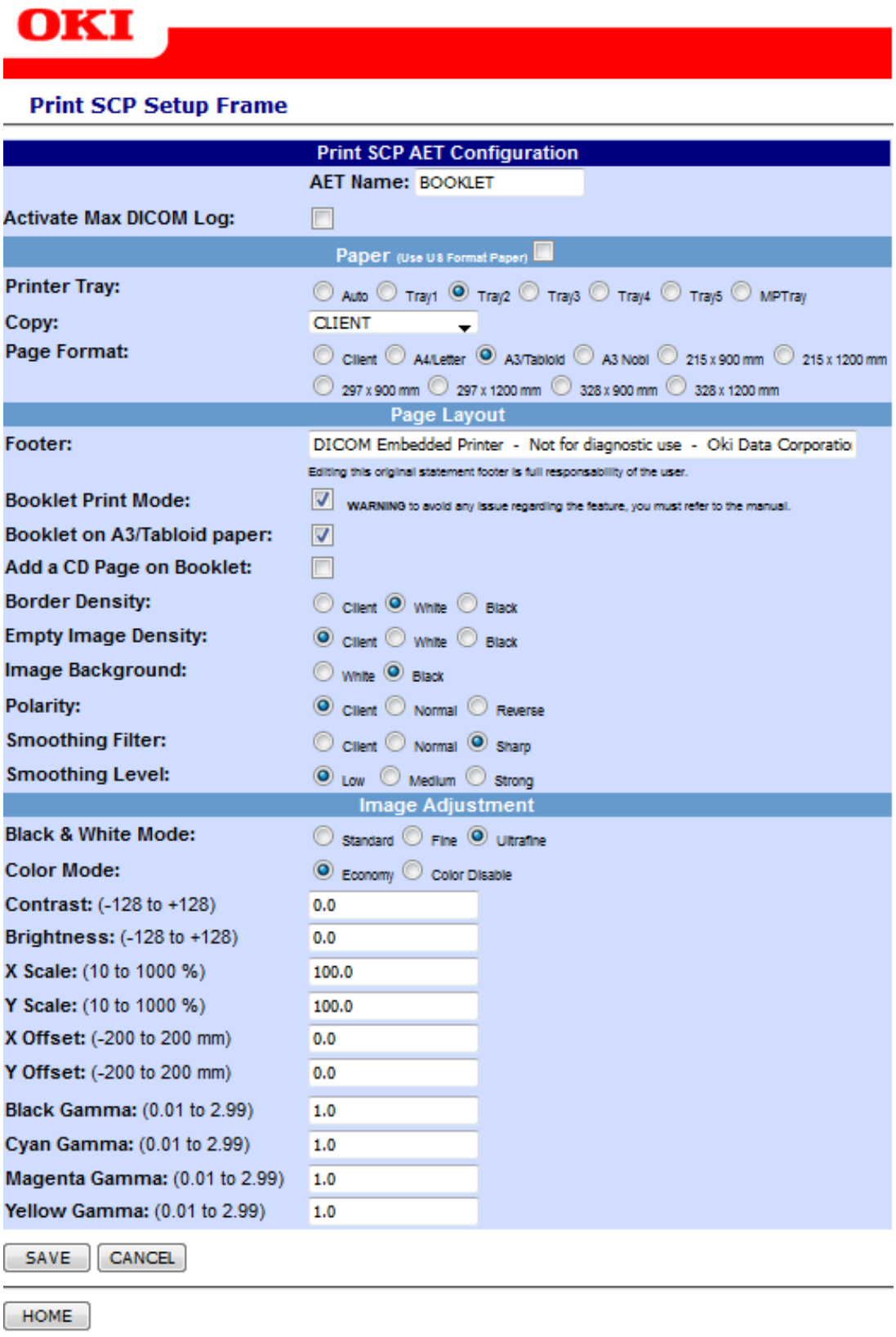
(4) Edit the parameters to fulfill your requirements.

Example of customized menu with all options activated



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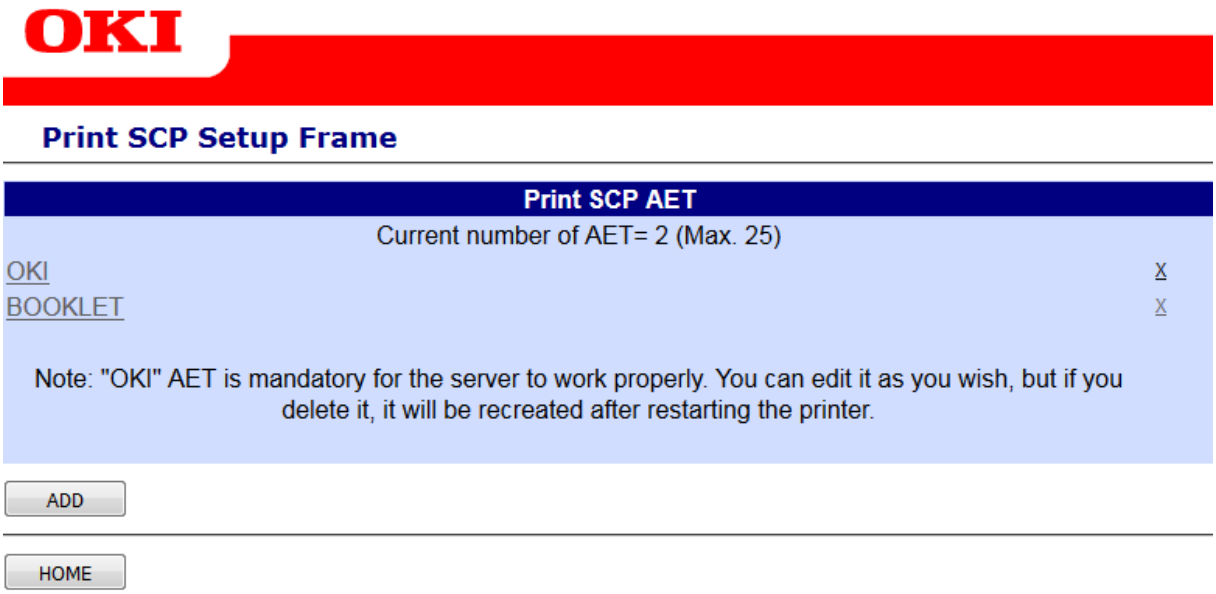
(5) Save the edited settings.

When you have finished editing the values, click [**SAVE**].

**Memo:** Click [**CANCEL**] to undo your editing.




(6) Click [**HOME**] on the AET list screen to return to the home page.



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# 1-4 Options for print rules on AETs (Table)

Here is presented the full set of options for print rules on AETs.
Depending on the model you purchased, some options may not be available.

| **Options for [OKI] print rules on AETs/Models** | | ES6410 DICOM | ES7411 DICOM | ES8431 DICOM | ES9410 DICOM | Remarks |
|---|---|---|---|---|---|---|
| AET Name | "OKI" *(Default)* | X | X | X | X | Maximum 25 AETs. |
| Activate Max DICOM Log | ***ON/OFF*** *(checkbox)* | X | X | X | X | |
| Use US format paper | ***ON/OFF*** *(checkbox)* | X | X | X | X | For LETTER and TABLOID. |
| Printer Tray | ***Auto*** | X | X | X | X | Auto Paper Size Selection. |
| | ***Tray1*** | | | | | Tray1 is standard cassette tray. |
| | ***Tray2 ~*** | | | | | Tray2 (and later) are optional tray(s). |
| | ***MPTray*** | | | | | Standard Multi-Purpose Tray (banner print). |
| Copy | ***Client*** | X | X | X | X | To use Print SCU's (sender's) indication. |
| | ***1 ~ 10*** | | | | | |
| Page Format | ***Client*** | X | X | X | X | To use Print SCU's (sender's) indication. |
| | ***A4 or Letter*** | X | X | X | X | Standard paper of OKI Printer. |
| | ***A3 or Tabloid*** | | | X | X | |
| | ***A3 Nobi*** | | | | X | |
| | ***215 x 900 mm*** | X | X | X | X | Banner paper for banner print.<br>Note: Only "Black & White Mode" is available for banner print. |
| | ***215 x 1200 mm*** | X | X | X | X | |
| | ***297 x 900 mm*** | | | X | X | |
| | ***297 x 1200 mm*** | | | X | X | |
| | ***328 x 900 mm*** | | | | X | |
| | ***328 x 1200 mm*** | | | | X | |
| Replace Header by Logo | ***ON/OFF*** *(checkbox)* | X | X | X | X | Please refer to "Graphic Elements Creation Manual for DICOM Embedded Printer". |
| Header | [text box] | X | X | X | X | Text header. |
| Footer | [text box] | X | X | X | X | Text footer. Default message is a caution. |
| Booklet Print Mode | ***ON/OFF*** *(checkbox)* | X | X | X | X | |
| | ***Booklet on A3/Tabloid*** | | | X | X | |
| | ***Add a CD page*** | | | | X | |
| Border Density | ***Client*** | X | X | X | X | To use Print SCU's (sender's) indication. |
| | ***White*** | | | | | |
| | ***Black*** | | | | | |
| Empty Image Density | ***Client*** | X | X | X | X | To use Print SCU's (sender's) indication. |
| | ***White*** | | | | | |
| | ***Black*** | | | | | |
| Image Background | ***White*** | X | X | X | X | |
| | ***Black*** | | | | | |



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| Options for [OKI] print rules on AETs/Models | | ES6410 DICOM | ES7411 DICOM | ES8431 DICOM | ES9410 DICOM | Remarks |
|---|---|---|---|---|---|---|
| Polarity | ***Client*** | X | X | X | X | To use Print SCU's (sender's) indication. |
| | ***Normal*** | | | | | |
| | ***Reverse*** | | | | | |
| Smoothing Filter | ***Client*** | X | X | X | X | To use Print SCU's (sender's) indication. |
| | ***Normal*** | | | | | |
| | ***Sharp*** | | | | | |
| Smoothing Level | ***Low*** | X | X | X | X | To adjust print quality of smoothing. |
| | ***Medium*** | | | | | |
| | ***Strong*** | | | | | |
| Black & White Mode | ***Standard*** | X | X | X | X | Mainly for X-Ray (K toner only). |
| | ***Fine*** | X | X | X | X | Mainly for X-Ray (K toner only). |
| | ***Ultrafine*** | X | X | X | X | Mainly for CT and MRI (K toner only). |
| Color Mode | ***Economy*** | X | X | X | X | Good quality at the lowest toner cost. |
| | ***Color Disable*** | X | X | X | X | To prevent color print. |
| Contrast | ***-128 ~ +128*** | X | X | X | X | To adjust contrast. |
| Brightness | ***-128 ~ +128*** | X | X | X | X | To adjust brightness. |
| X Scale | ***10 ~ 1000 (%)*** | X | X | X | X | To enlarge/reduce print image. |
| Y Scale | ***10 ~ 1000 (%)*** | X | X | X | X | |
| X Offset | ***-200 ~ 200 (mm)*** | X | X | X | X | To shift printed area of medical image. |
| Y Offset | ***-200 ~ 200 (mm)*** | X | X | X | X | |
| Black Gamma | ***0.01 ~ 2.99*** | X | X | X | X | To adjust print quality with gamma values. |
| Cyan Gamma | ***0.01 ~ 2.99*** | X | X | X | X | |
| Magenta Gamma | ***0.01 ~ 2.99*** | X | X | X | X | |
| Yellow Gamma | ***0.01 ~ 2.99*** | X | X | X | X | |



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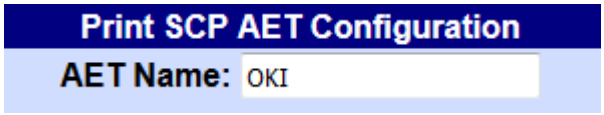
# 1-5 Options for [OKI] print rules on AETs (Description)

A number of rules can be added to the system. The maximum number of AETs is 25. The following information can be configured for each rule:

## (1) AET Name:




AET is an abbreviation for Application Entity Title. The call method is assumed to be compliant with DICOM Print SCU Protocol.

The AETs defined in this rule have a maximum length of 16 characters (a - z, A - Z, 0 - 9).

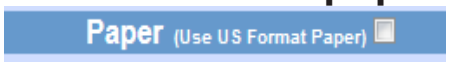
Note: ● The names are case-sensitive.

● In the event of an error or if a name is not present, the printer will use the default setting.

## (2) Activate Max DICOM Log:

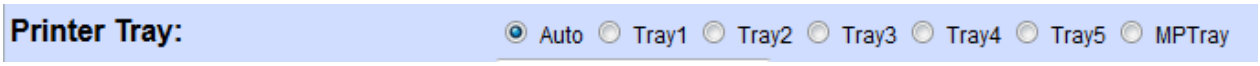
Check this box if you want DICOM Embedded Printer to report all details of DICOM exchange. This is useful in case of trouble.

## (3) Use US format paper:




Check this box if you want DICOM Embedded Printer to print in Letter/Tabloid size.

## (4) Printer Tray:




Auto: Allows DICOM Embedded Printer to select the suitable tray up to the needed size.

Tray#: Forces the printer to use the selected tray regardless of the needed format. This is useful when paper of different quality is loaded in the different trays.



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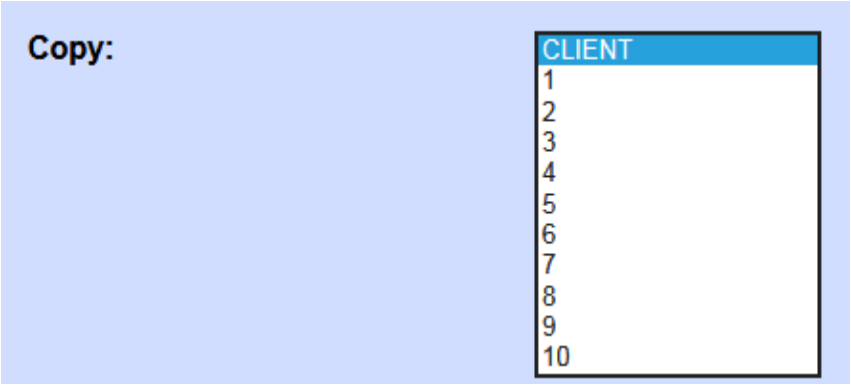
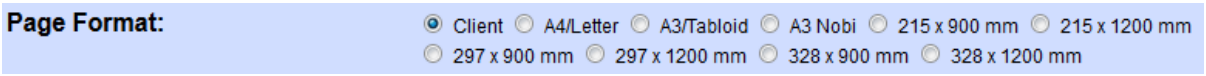
## (5) Copy:




Client: Lets the modality ask for the desired number of copies.
1 to 10: Overrides the modality value and always outputs the desired value.

## (6) Page Format:




If the printer supports different paper formats, you can force the printout into the format you wish. In [**Client**] mode, the printout will be resized to the nearest paper size. Refer to DCS (DICOM Conformance Statement) for more details.

## (7) Replace Header by Logo:

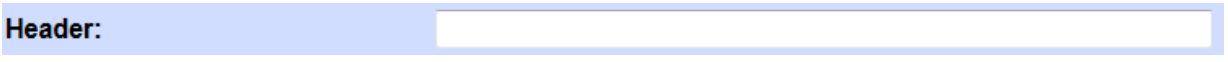
This function is used to customize the header of your printouts.

This function allows free creation. Refer to “Graphic Elements Creation Manual for DICOM Embedded Printer”.

**WARNING:**

- This function disables the Header in text mode function.
- This function is deactivated when “Booklet Print Mode” is activated.

## (8) Header:




This function is used to quickly customize the header of your printouts. (When “Replace Header by Logo” or “Booklet Print Mode” is not activated.)



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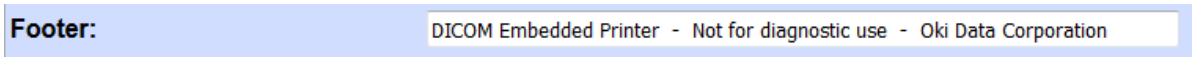
This customization is limited to one line of text only. Typeface is Courier at 18 points size, available length is the width of the page minus 10mm. (For example, 52 characters for A4 of which width is 210 mm.)

## (9) Footer:




This function allows editing the original statement of the footer.

This customization is limited to one line of text only. Typeface is Courier at 6 points size.

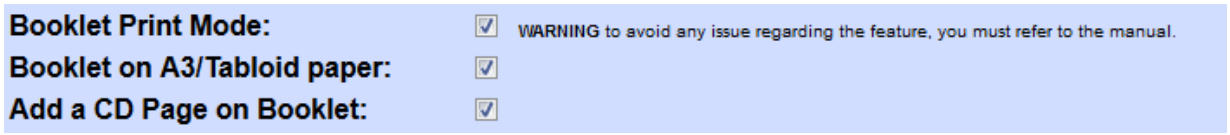
**WARNING:** Editing this original statement footer is full responsibility of the user.

## (10) Booklet Print Mode:

When “Booklet Print Mode” is enabled, the printer equipped with a duplex unit will add a cover page and a back page to your job, and then print all pages in a booklet. The number of additional sheets of paper is limited to 4 sheets of paper for ES9410 or 1 sheet of paper for ES6410/ES7411/ES8431.

Note:
- Once this mode is enabled, the maximum of simultaneous DICOM print association is set to 1.
- When “Booklet Print Mode” is enabled, “Header” function is not available.

After enabling “Booklet Print Mode” on an A3 printer, save your AET and re-open it. You will be proposed with the “Booklet on A3/Tabloid paper” option. Enable it to print on A3/Tabloid paper.




“Add a CD Page on Booklet” is only available on ES9410 and will insert a page to stick a CD holder. This page is the first one just after the cover page.

**WARNING:**
- Booklets will be produced on A4/Letter paper whatever format you ask for on the modality.



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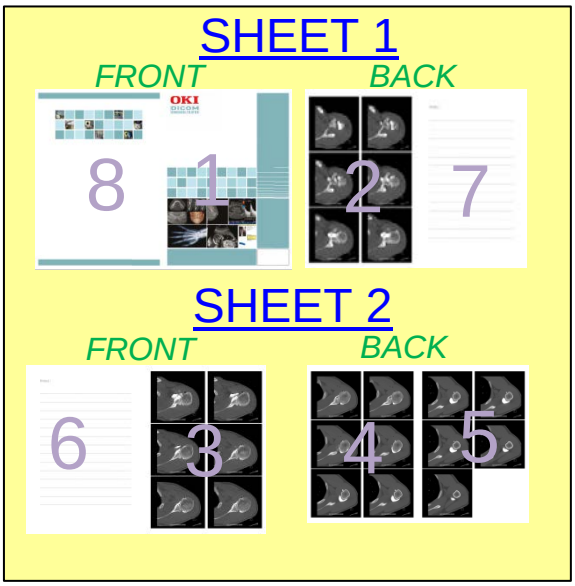
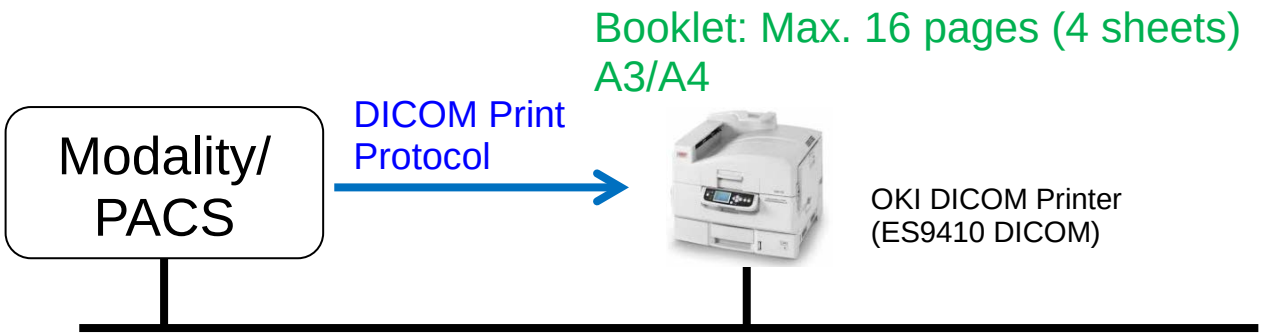
- If your printer supports A3/Tabloid and you activate the selection, all booklets will be printed on A3/Tabloid paper.
- YOU NEED TO HAVE ONE TRAY CONFIGURED WITH THE DESIRED PAPER FORMAT. If not, the printout will be discarded WITHOUT WARNING.

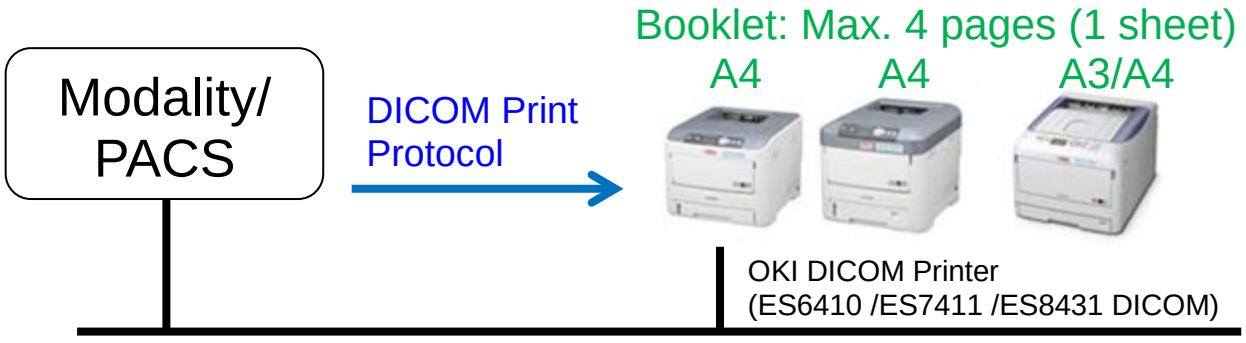
To customize the cover page and the back page of your booklets, please refer to “Graphic Elements Creation Manual for DICOM Embedded Printer”.




EXAMPLE of DICOM Booklet Print
(ES9410 DICOM)

EXAMPLE of DICOM Booklet Print
(ES6410 /ES7411/ES8431 DICOM)



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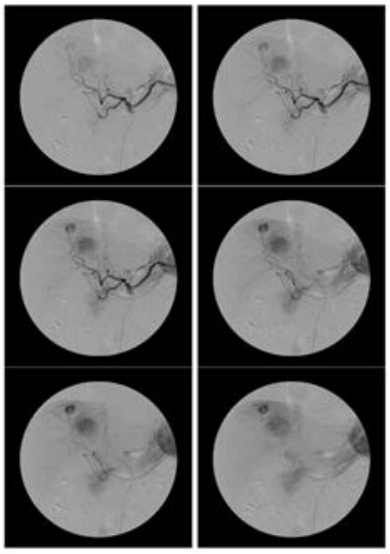
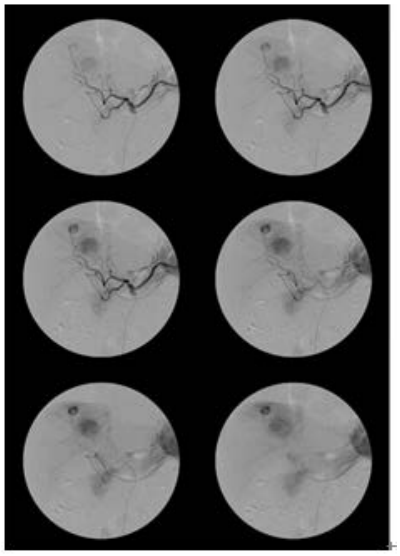
## (11) Border Density:

This function is used to define the border images to black or white.

[**Client**]: Manages the settings from the DICOM console.

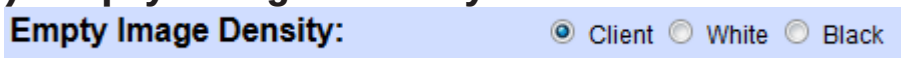


Border: White



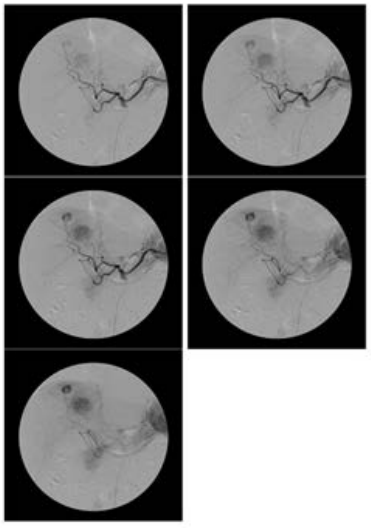
Border: Black

## (12) Empty Image Density:

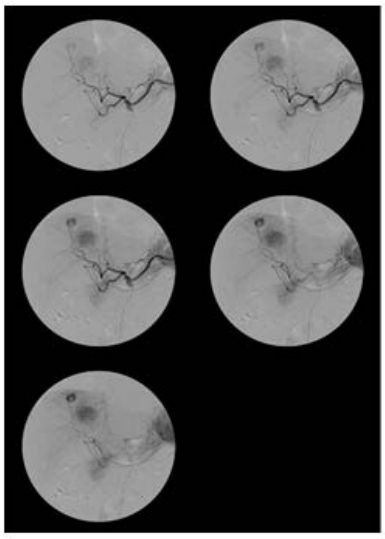



This function is used to define an image-free zone in black or white.

[**Client**]: Manages the settings from the DICOM console.



Empty Image: White



Empty Image: Black



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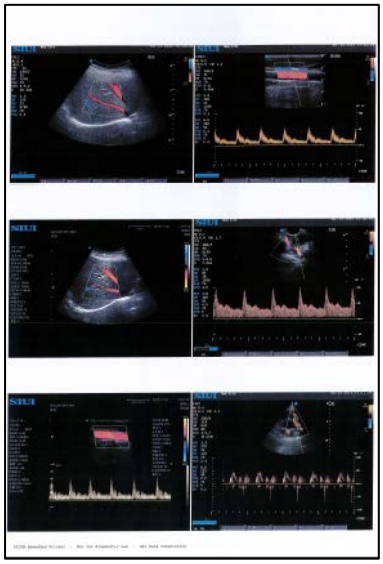
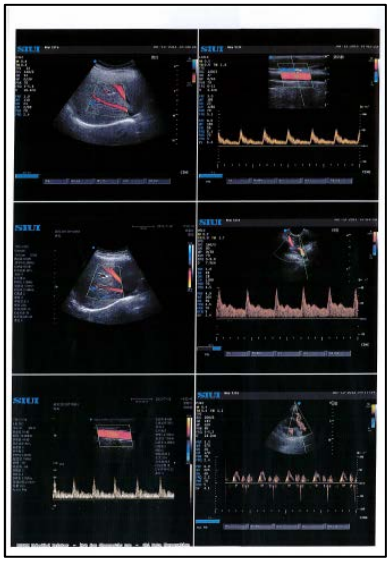
## (13) Image Background:

This function is used to define the background of the image zone in black or white and adds a thin line to define the image area. The choices are [**White**] and [**Black**].



Background Density: White

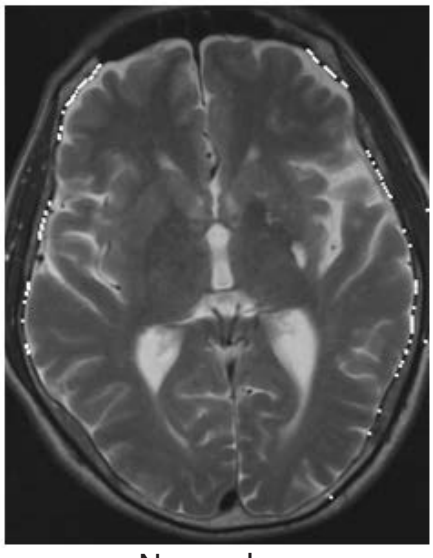


Background Density: Black

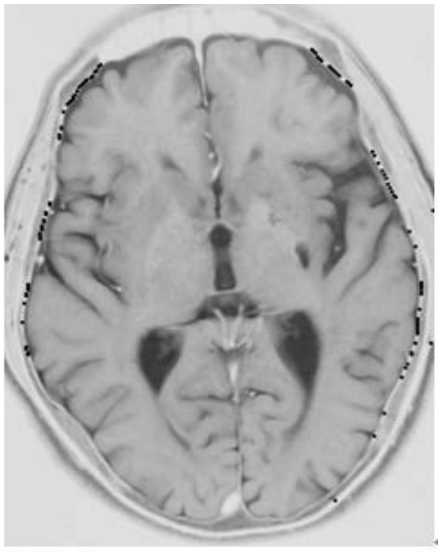
## (14) Polarity:

Select [**Normal**] or [**Reverse**] mode to print images in positive or negative.

[**Client**]: Manages the settings from the DICOM console.



Normal



Reverse



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## (15) Smoothing Filter:

This function is used to define the aspect rendering of the printed image. The choices are [**Client**], [**Normal**] and [**Sharp**]. As default, [**Client**] is selected.

[**Client**]: Manages the settings from the DICOM console.

[**Normal**]: Normal mode.

[**Sharp**]: Forces the use of the image sharpening filter (which only works on monochrome images).

## (16) Smoothing Level:

This function is used to define the level of action of the filter. The choices are [**Low**], [**Medium**] and [**Strong**]. As default, [**Low**] is selected.

Low

Medium



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## (17) Black & White Mode:

This function is used to define the level of action of the filter.

The choices are [**Standard**], [**Fine**] and [**Ultrafine**].

As default, [**Fine**] is selected.

[**Standard**]: Defines printing monochrome images in pure black.

[**Fine**]: Defines printing monochrome images in pure black with more detailed images.

[**Ultrafine**]: Defines printing monochrome images in pure black with high detailed images.

## (18) Color Mode:

This function is used to define the level of action of the filter.

The choices are [**Economy**] and [**Color Disable**].

As default, [**Economy**] is selected.

[**Economy**]: Defines printing color images in color (CMYK) with low usage of toner.

[**Color Disable**]: Disables Color DICOM Print Protocol so that the AET will only support Monochrome DICOM Print Protocol.



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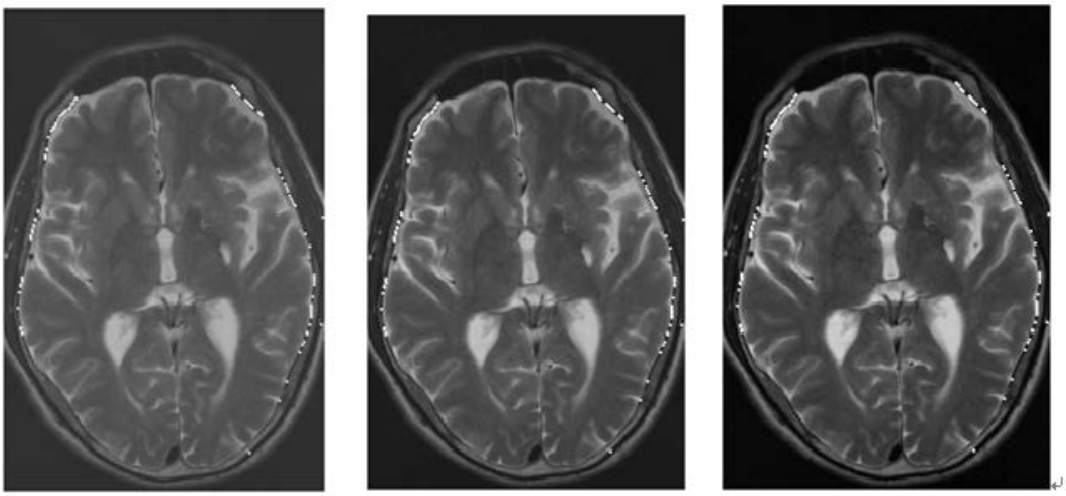
## (19) Contrast:

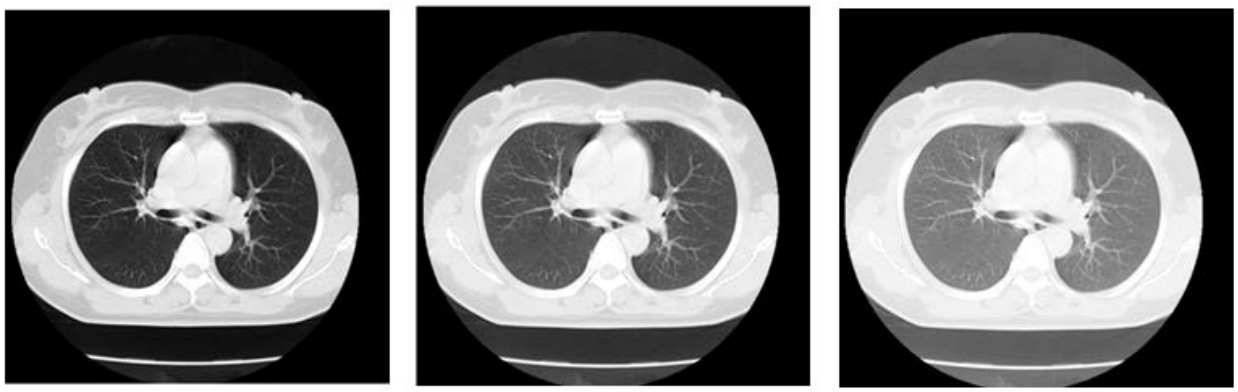
This function is used to change the level of contrast of the printouts. The choices are from [**-128**] to [**+128**]. Negative values reduce contrast to flatten the image, 0 doesn't change the level of contrast, and positive values increase contrast to enhance the image.



Contrast: -10 Contrast: 0 Contrast: +10

## (20) Brightness:

This function is used to change the level of brightness of the printouts. The choices are from [**-128**] to [**+128**]. Negative values reduce light to darken the image, 0 doesn't change the level of brightness, and positive values increase light to lighten the image.



Brightness: -20 Brightness: 0 Brightness: +20



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## (21) X Scale:

This function is used to define the level of zoom for X from 10 % to 1000%, values less than 100% reduce size for X, and values more than 100% enlarge size for X.

As default, [**100.0**] is selected.

## (22) Y Scale:

This function is used to define the level of zoom for Y from 10 % to 1000%, values less than 100% reduce size for Y, and values more than 100% enlarge size for Y.

As default, [**100.0**] is selected.

## (23) X Offset:

This function is used to define the level of offset for X in millimeter, negative values do offset to the left, and positive values do offset to the right.

The range is from -200(mm) to 200(mm). As default, [**0.0**] is selected.

## (24) Y Offset:

This function is used to define the level of offset for Y in millimeter, negative values do offset down, and positive values do offset up.

The range is from -200(mm) to 200(mm). As default, [**0.0**] is selected.



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## (25) Black Gamma:

This function is used to adjust the gamma for Black, when grey images are printed in pure black. Values can be within a range from 0.01 to 2.99, in increments of 0.01. Values below 1.00 will lighten the Black component of the image, and values above 1.00 will darken it.

## (26) Cyan Gamma:

This function is used to adjust the gamma for Cyan. Values can be within a range from 0.01 to 2.99, in increments of 0.01. Values below 1.00 will lighten the Cyan component of the image, and values above 1.00 will darken it.

## (27) Magenta Gamma:

This function is used to adjust the gamma for Magenta. Values can be within a range from 0.01 to 2.99, in increments of 0.01. Values below 1.00 will lighten the Magenta component of the image, and values above 1.00 will darken it.

## (28) Yellow Gamma:

This function is used to adjust the gamma for Yellow. Values can be within a range from 0.01 to 2.99, in increments of 0.01. Values below 1.00 will lighten the Yellow component of the image, and values above 1.00 will darken it.

Make appropriate settings for test printing.



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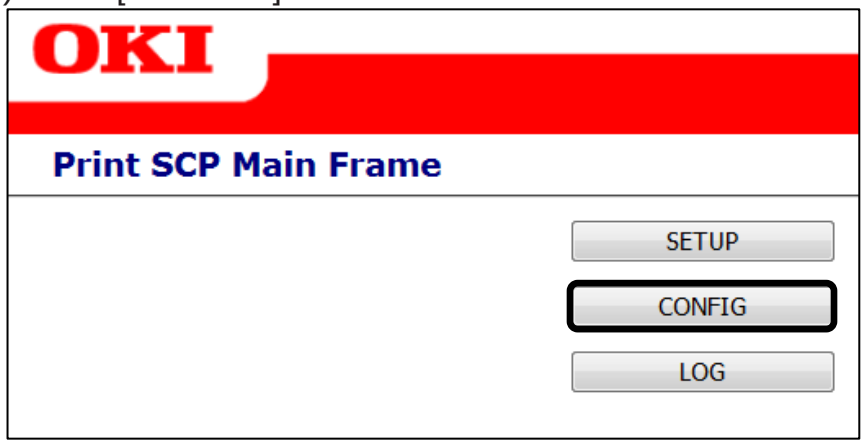
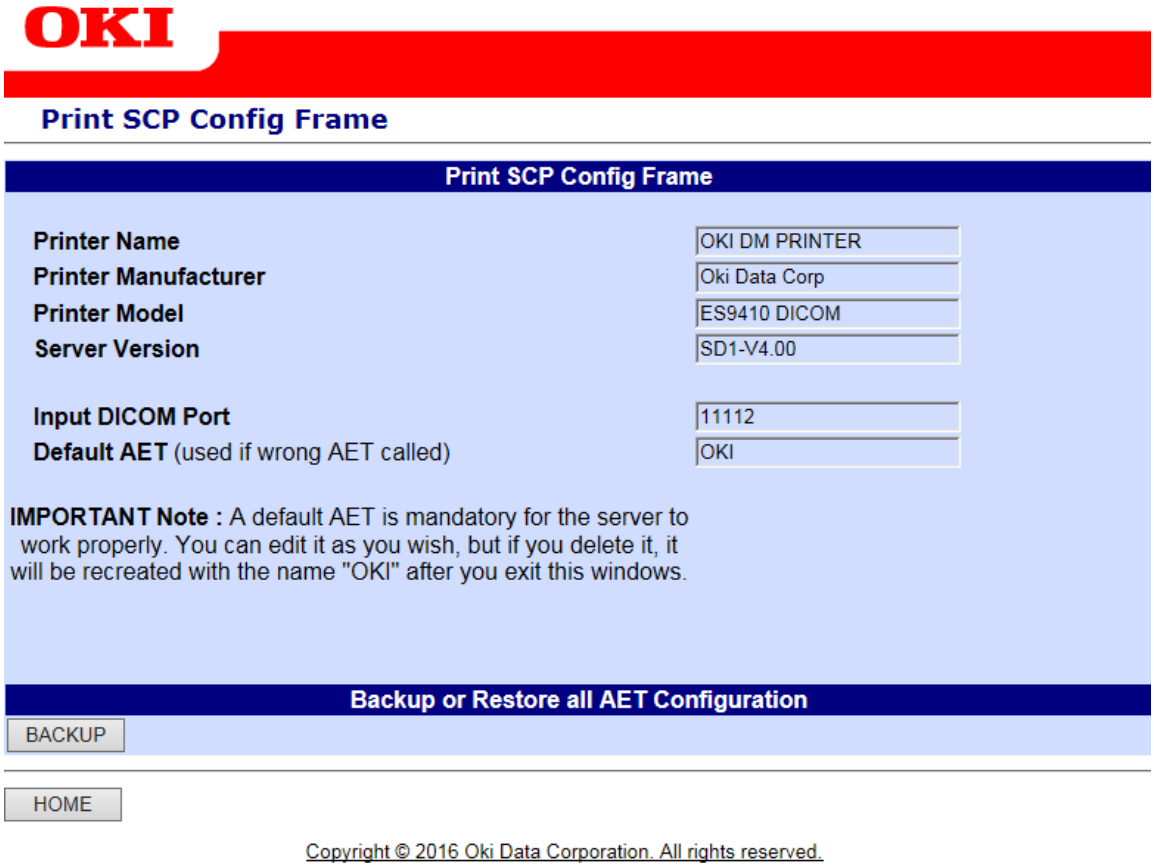
# 2. Related Settings

## 2-1 CONFIG menu

(1) Click [**CONFIG**] on DICOM Embedded Printer home page.




The Print SCP Config Frame page is displayed. This will give you a summary of all information.



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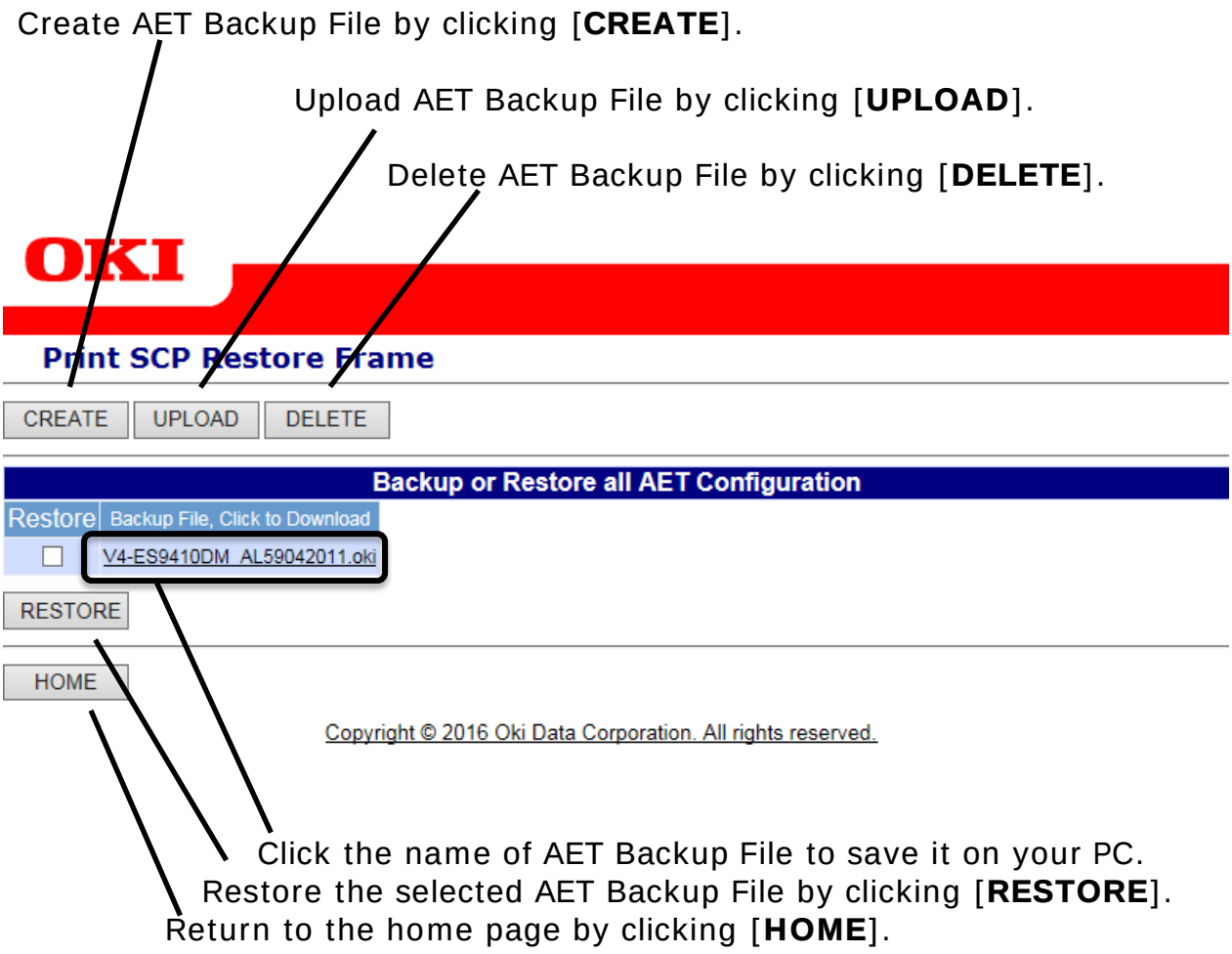
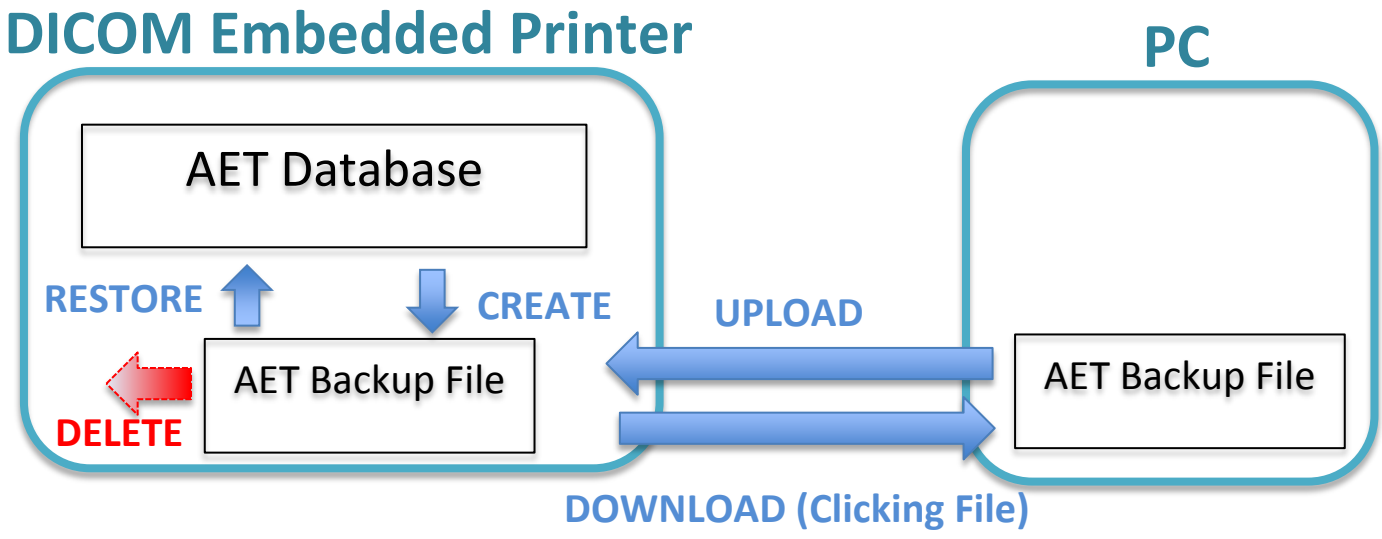
## 2-2 BACKUP menu

(1) Click [**BACKUP**] on the Print SCP Config Frame page. The BACKUP page is displayed.



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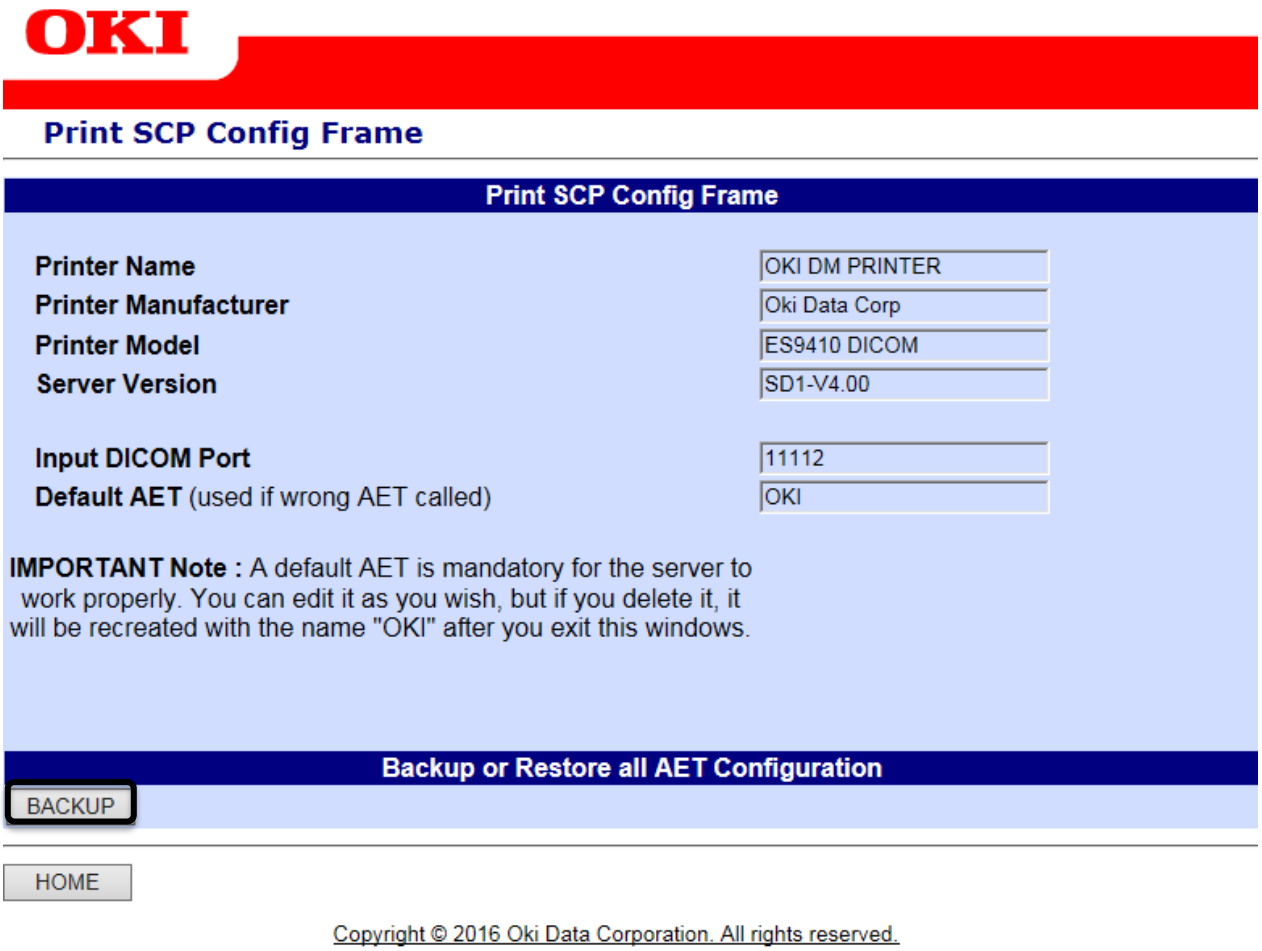
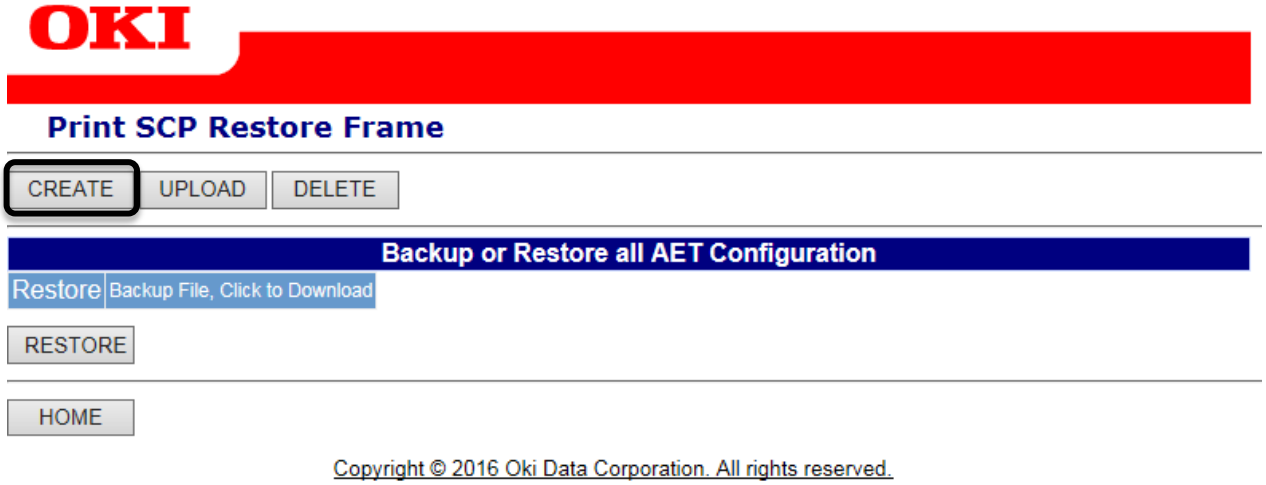
# 2-2-1 Create & Download AET Backup File from Printer to PC

(1) Click [**BACKUP**] on the Print SCP Config Frame page.




(2) Click [**CREATE**].



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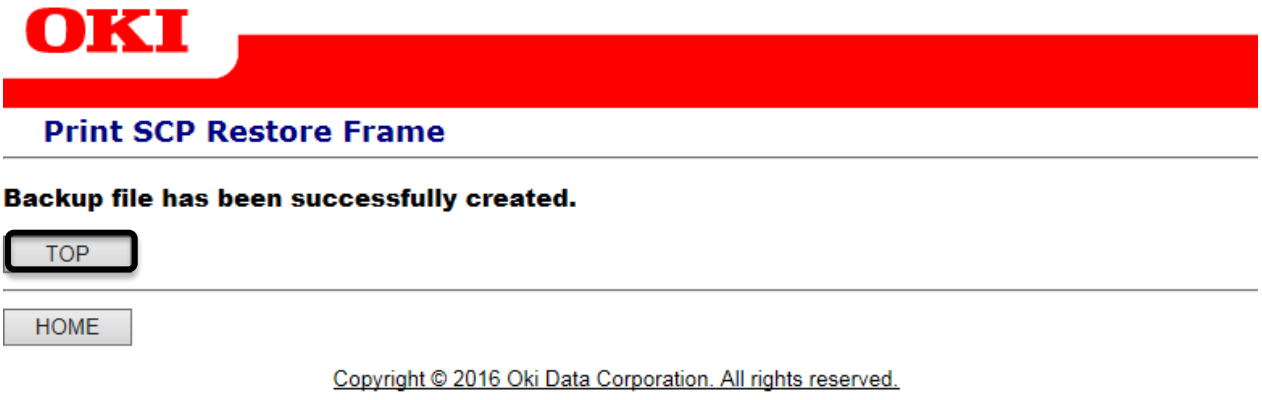
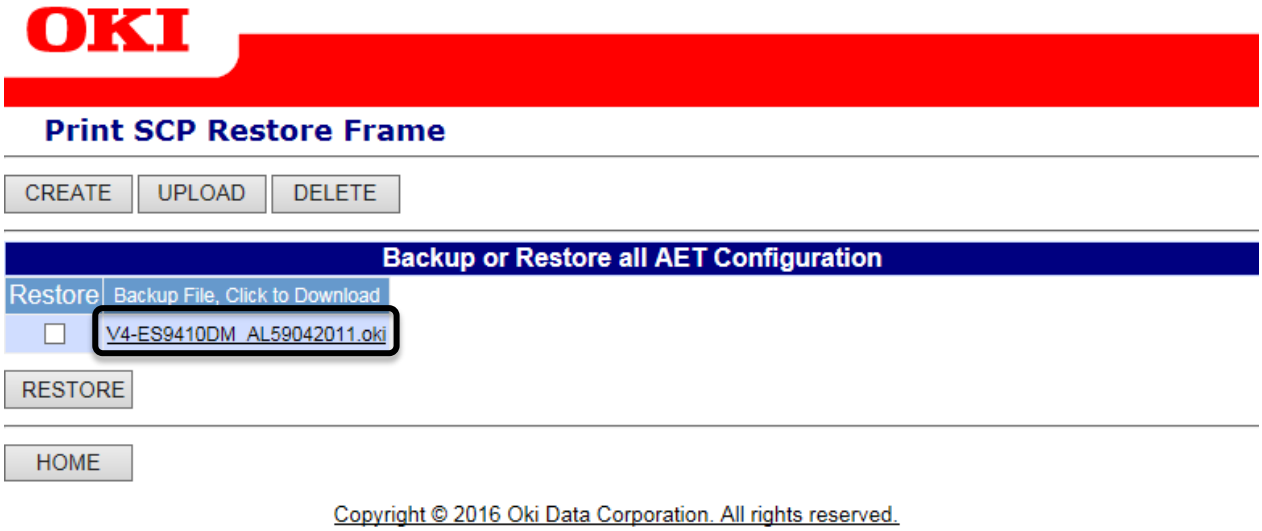
(3) Click [**TOP**].




(4) You will see the created file named like: "Printer model + serial number +.oki".
Click the name of the created AET Backup File.
You can download the AET Backup File into your PC.



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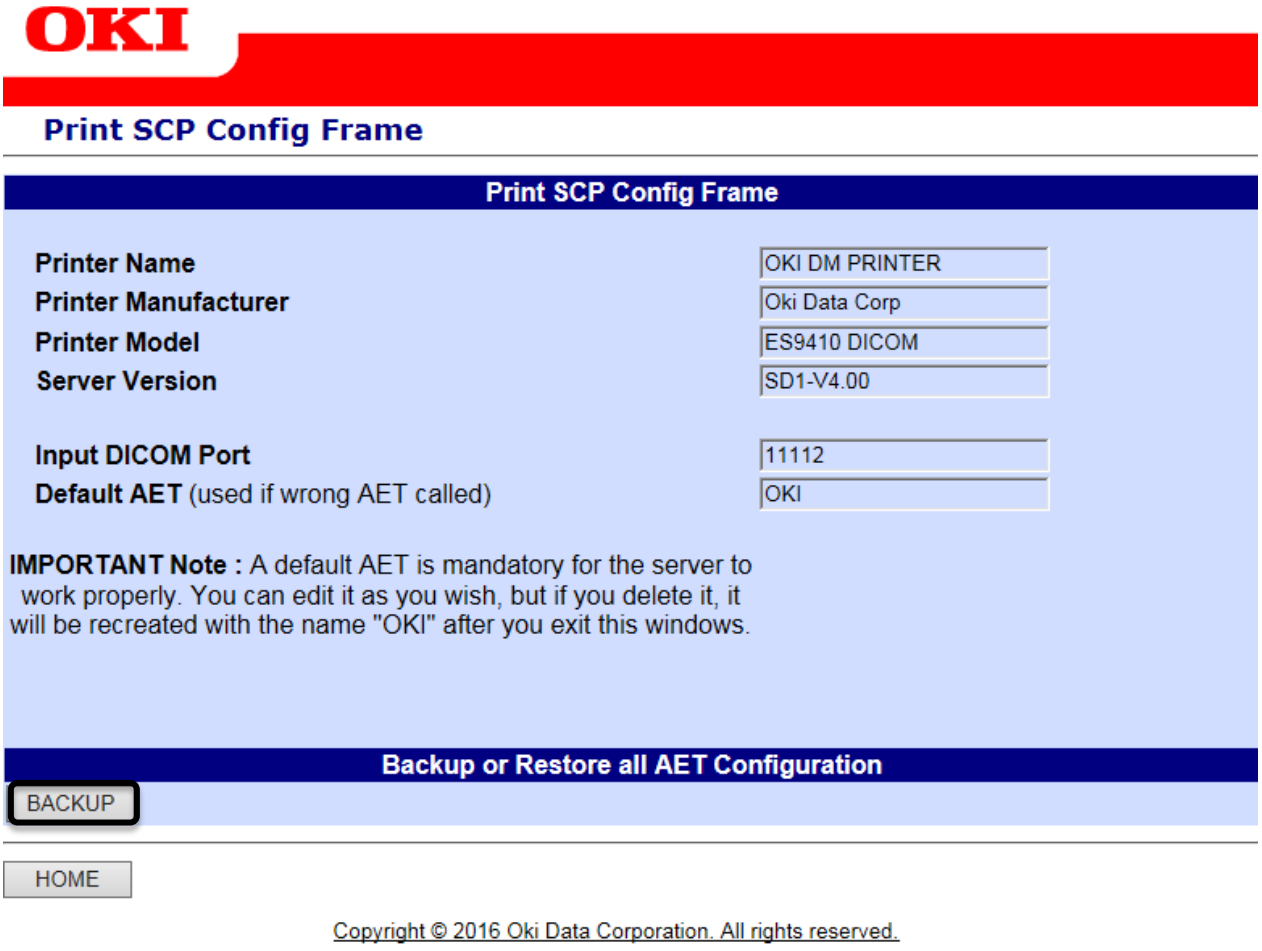
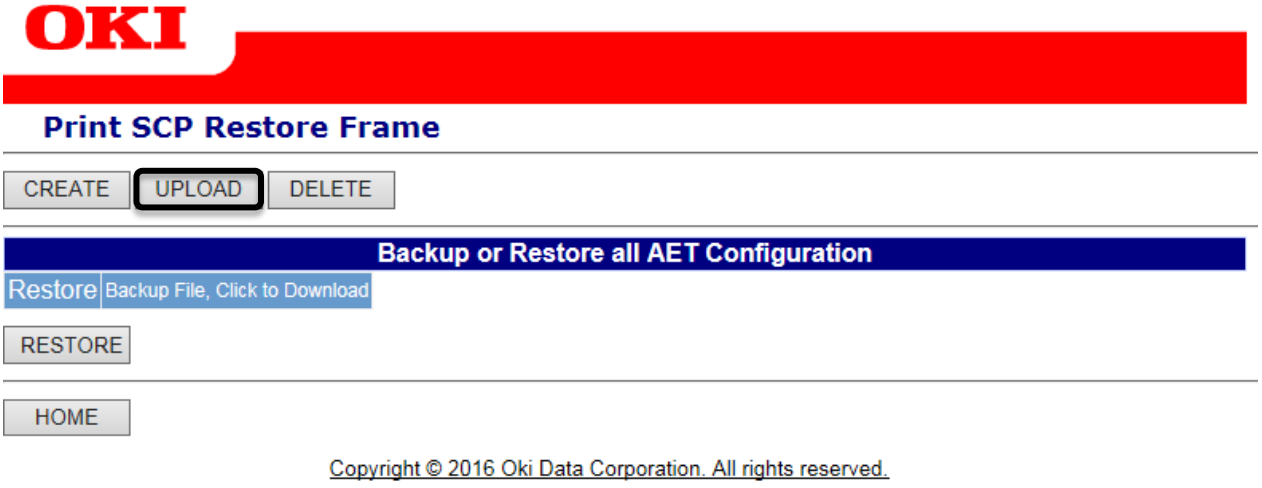
# 2-2-2 Upload AET Backup File from PC to Printer

(1) Click [**BACKUP**] on the Print SCP Config Frame page.




(2) Click [**UPLOAD**].



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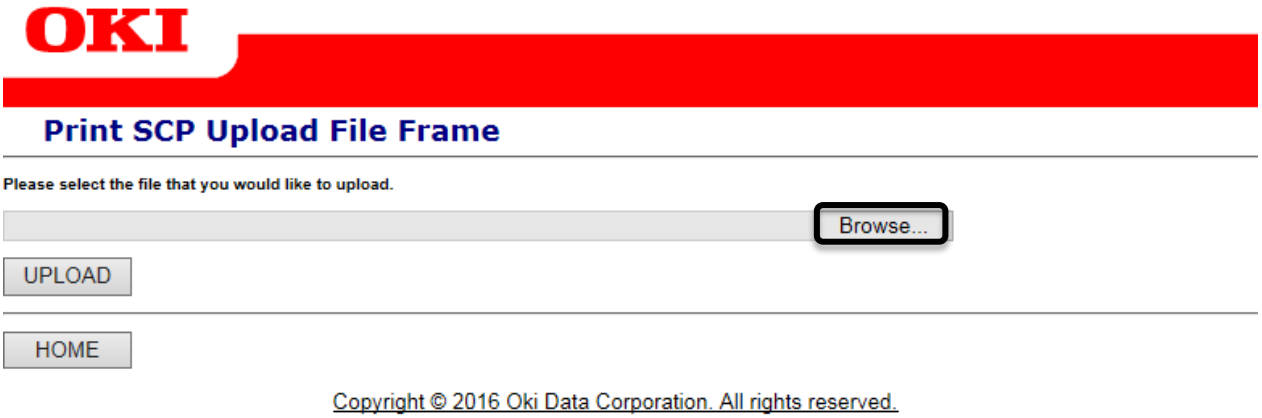
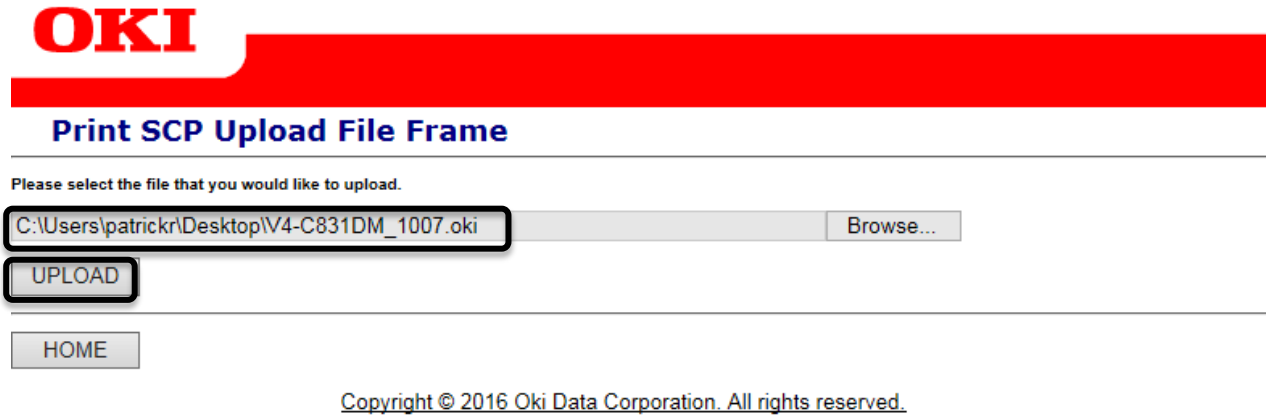
(3) Click [**Browse…**] and select a saved AET Backup File.




(4) Click [**UPLOAD**] to upload the selected AET Backup File.




**IMPORTANT:** You can use only files from the same printer family. Any wrong file is deleted during restoration.

(5) Click [**TOP**].

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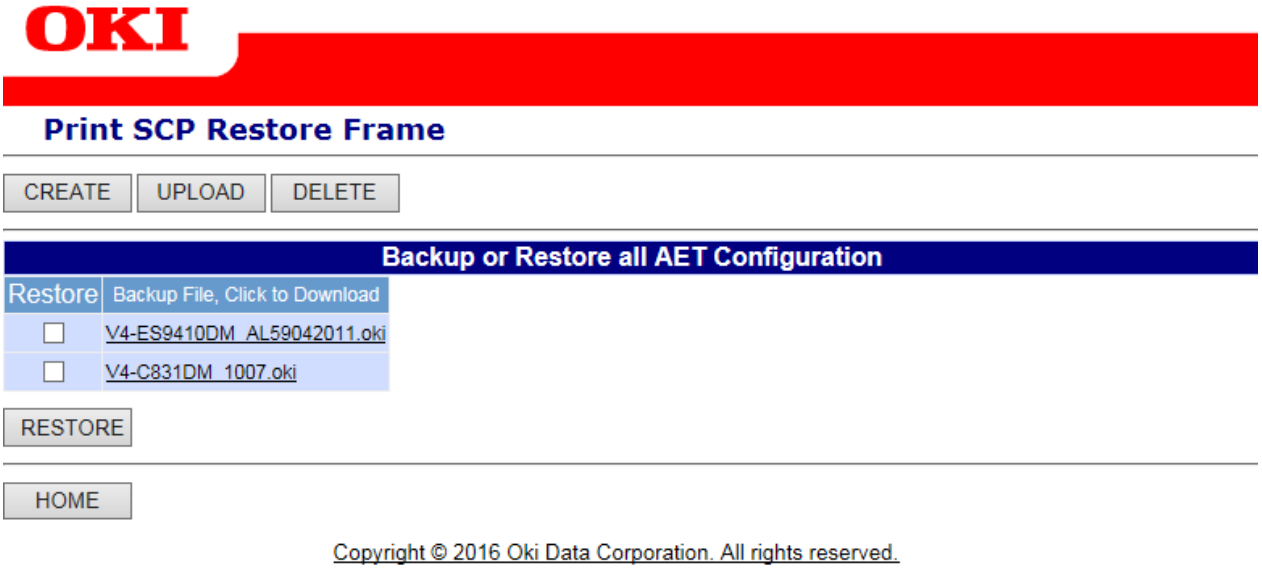
(6) The AET Backup File is now in the frame.



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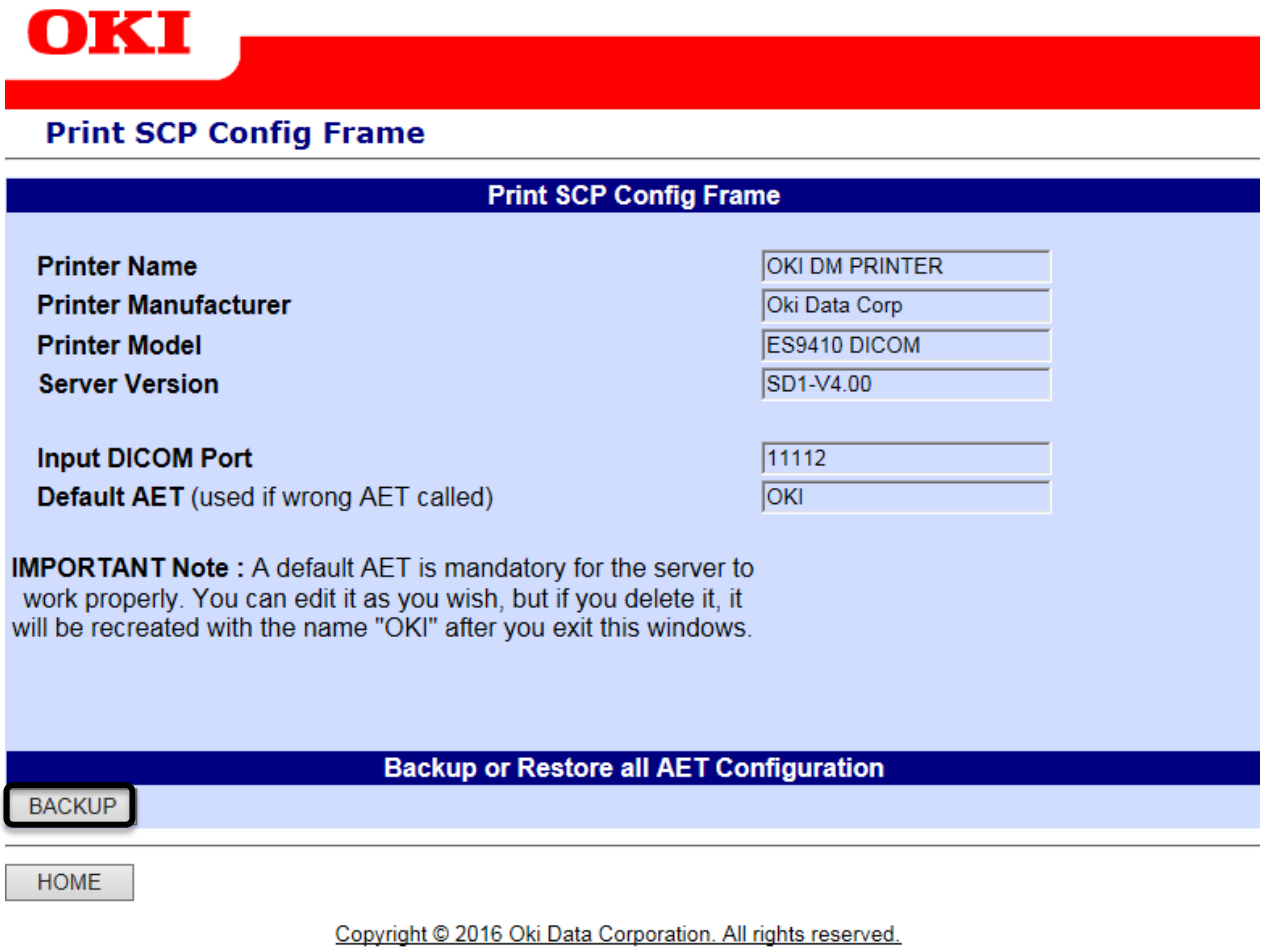
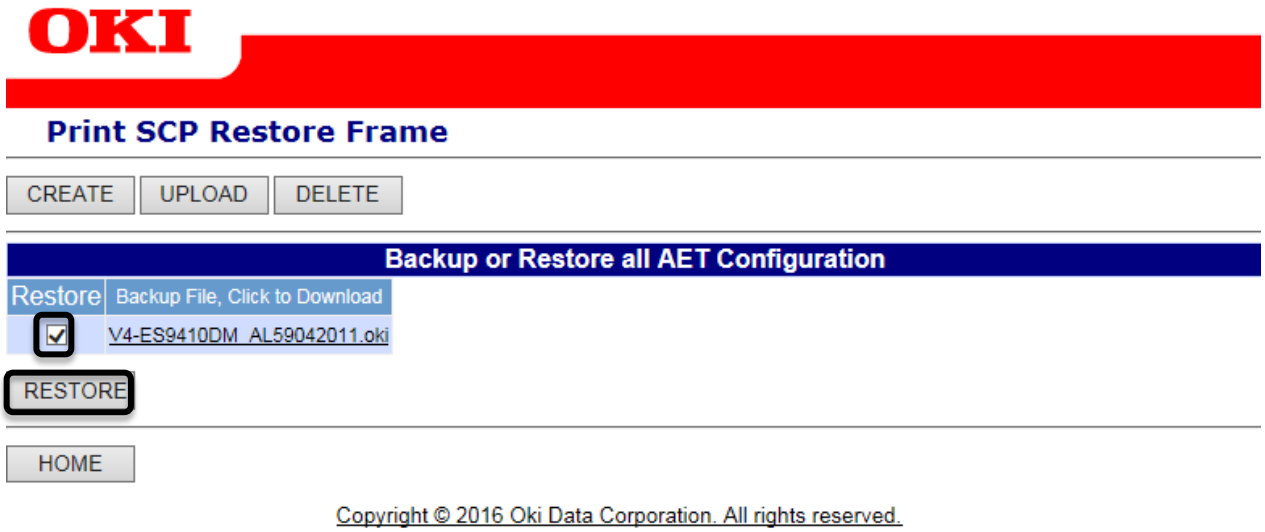
## 2-2-3 Restore AET data from AET Backup File to AET database

(1) Click [**BACKUP**] on the Print SCP Config Frame page.




(2) Select the AET Backup File by clicking on the checkbox at the left of the file. Then click [RESTORE] to reload the saved settings.



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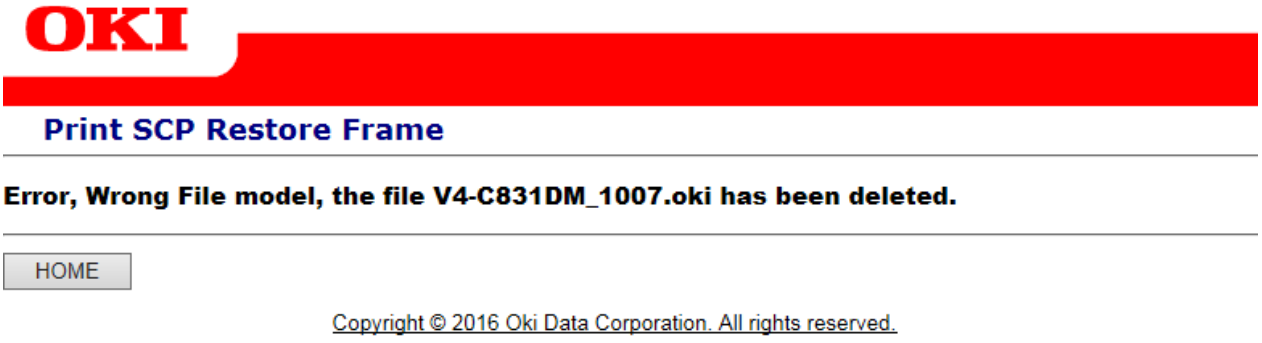
(3) When the saved settings have been reloaded, the screen displays the following.

**WARNING:** In case of wrong AET Backup File, you will see the following message.



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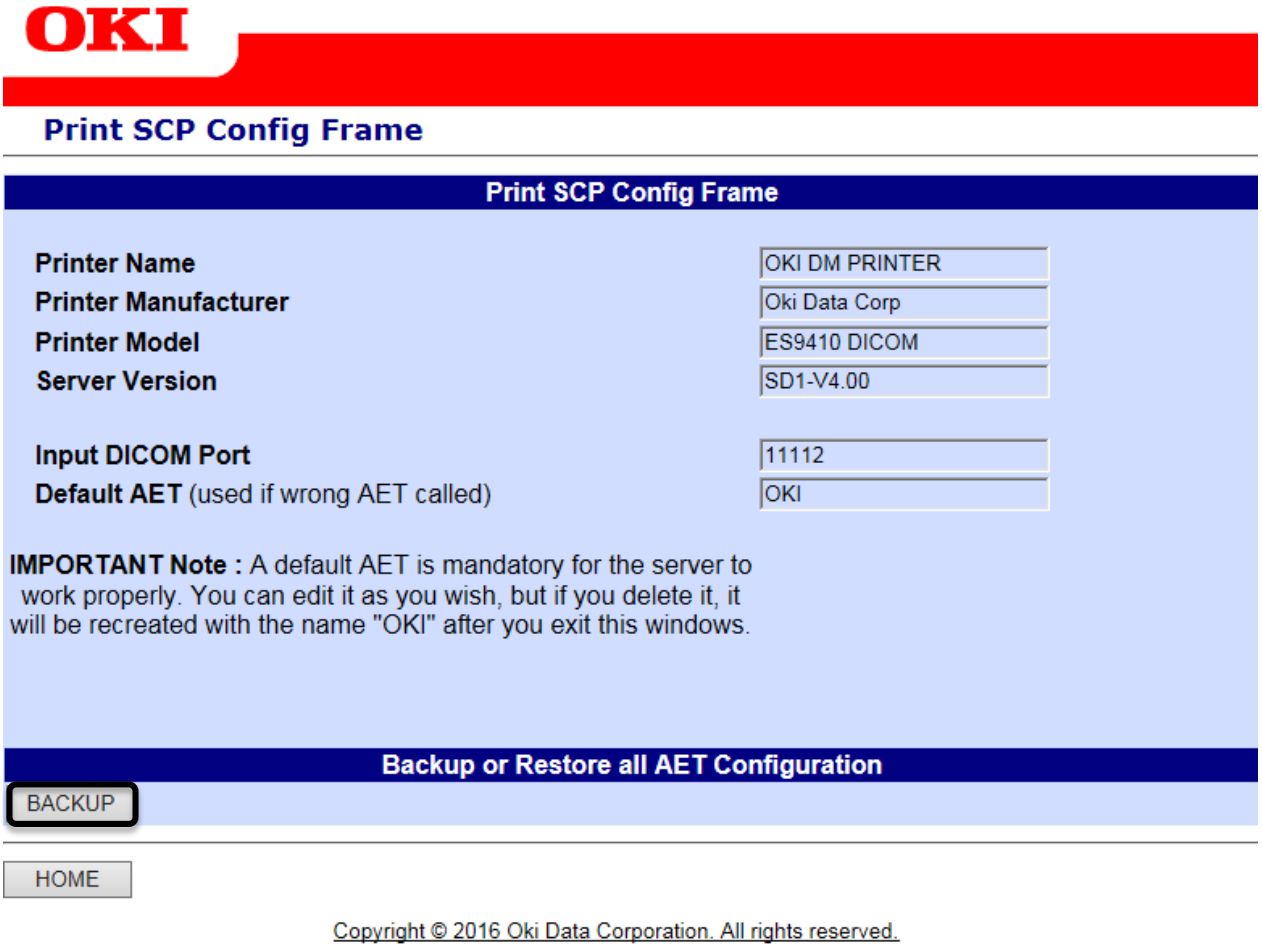
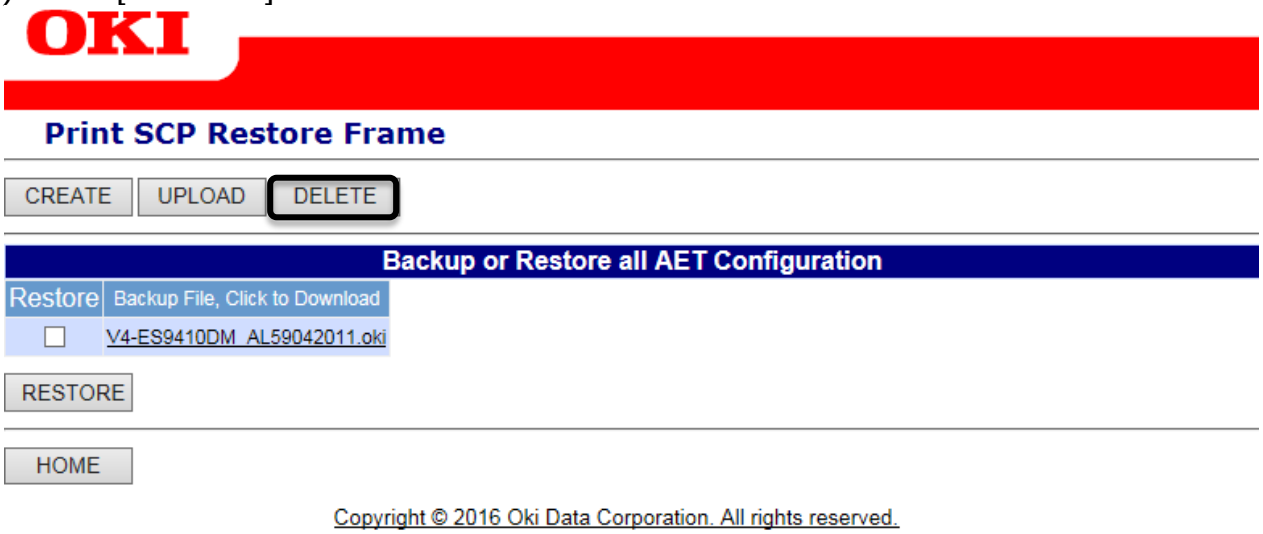
# 2-2-4 Delete AET Backup File from Printer

(1) Click [**BACKUP**] on the Print SCP Config Frame page.




(2) Click [**DELETE**].



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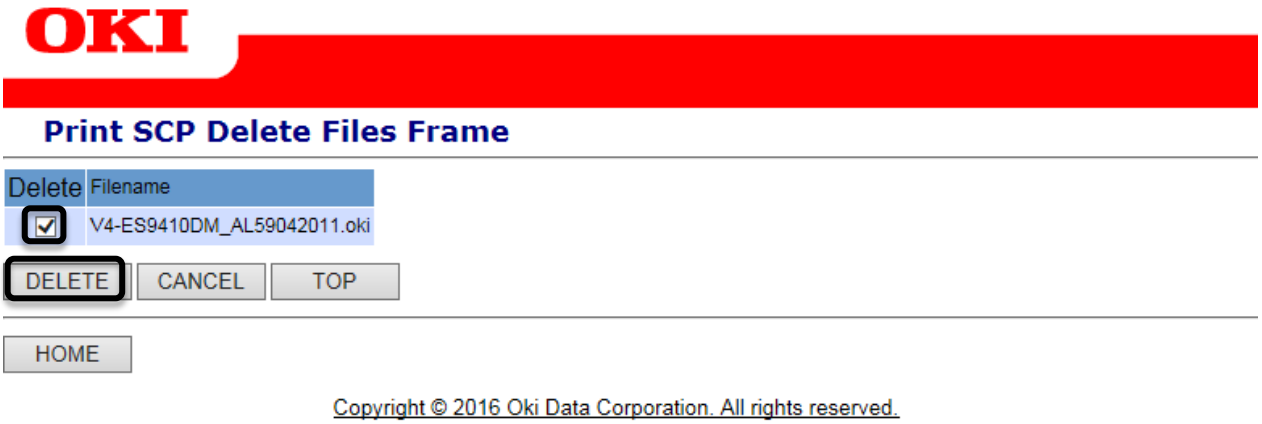
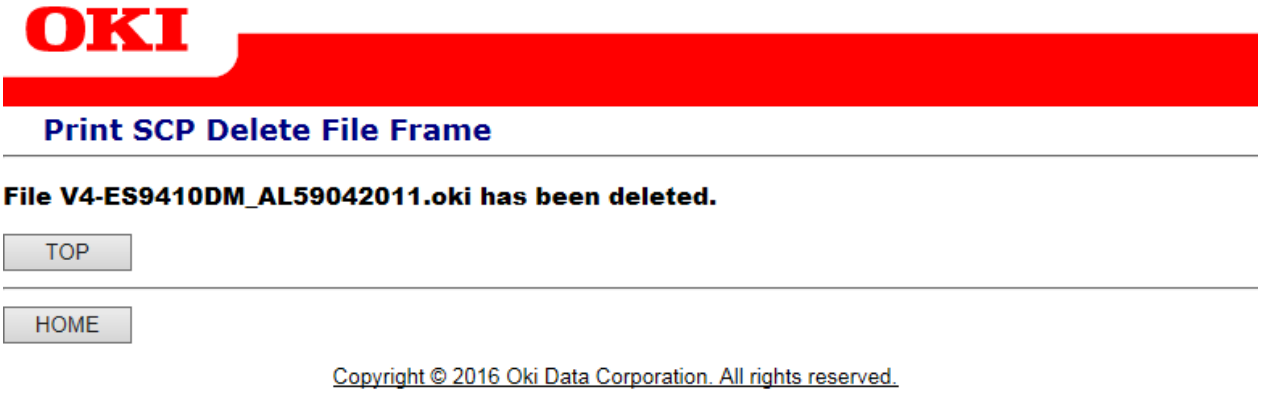
(3) Select the AET Backup File to delete by clicking on the checkbox at the left of the file. Then Click [**DELETE**].




(4) When the selected AET Backup File has been deleted, the screen displays the following.



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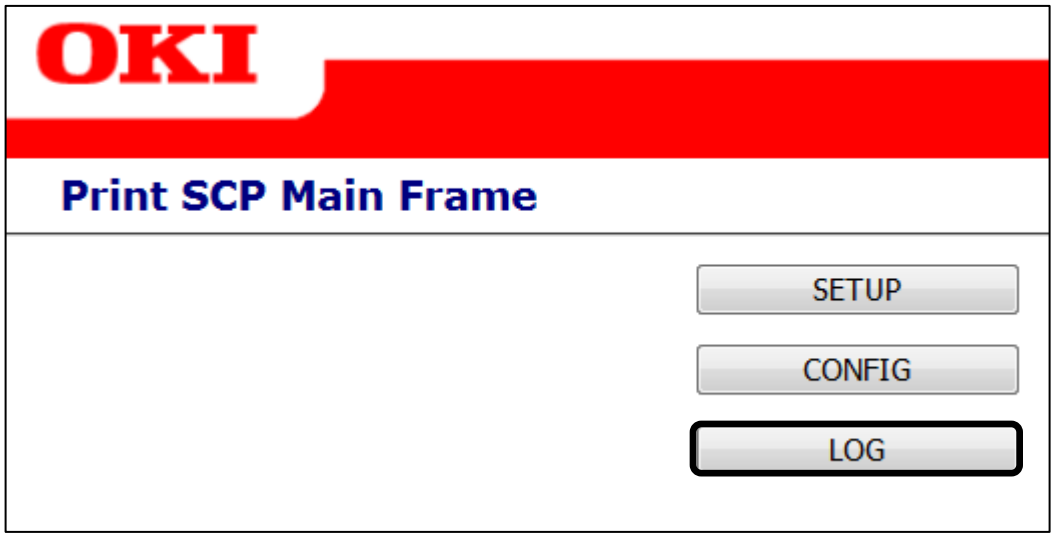
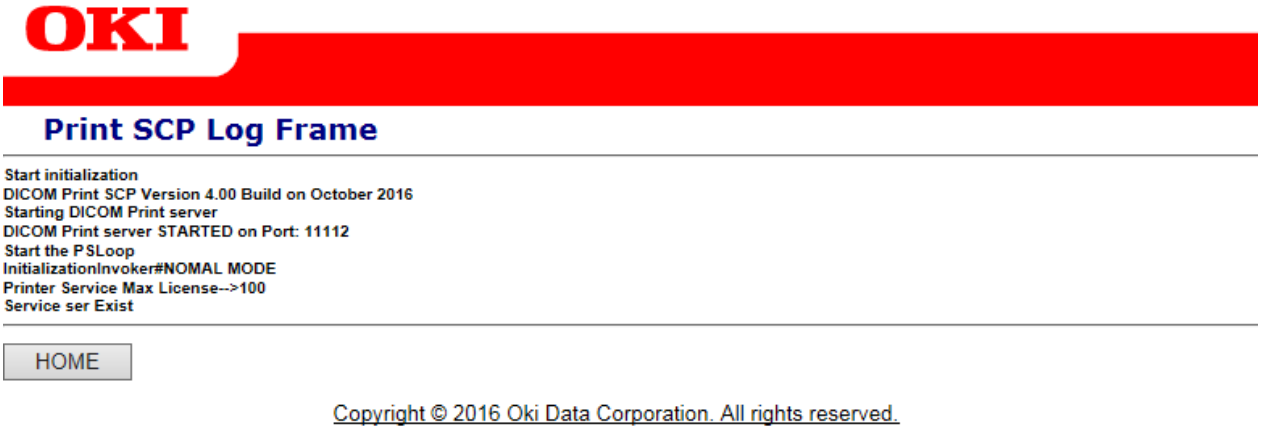
# 3. LOG menu (DICOM Protocol)

(1) Click [**LOG**] on DICOM Embedded Printer home page.




(2) The log menu is displayed.




This page lists the DICOM dialogue logs during printing. This is useful for identifying the source of an error in the event of problems.



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# 4. How to print the test patterns

The test patterns are designed to help you to troubleshoot your printer consumables quality.

(1) Select [**Print Information**] on the printer control panel.
(2) Select [**Demo Page**].
(3) Select [**CMY test**] to check the color imaging units or [**K test**] for the black imaging unit.
(4) The test pattern is printed.

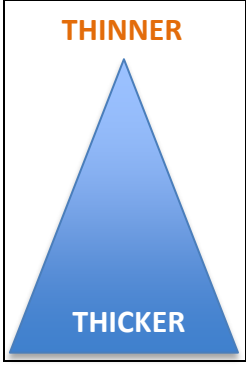
# 5. How to make setting for glossy paper

For printing on glossy paper, you can select from USERTYPE5 to USERTYPE1 on the "Media Type" menu from the operation panel of DICOM Embedded Printer.

Menus > Tray Configuration > Tray1 Config (or Tray "n" Config) > Media Type

Menus > Tray Configuration > MPTray Config > Media Type

(1) Print a medical image on glossy paper with USERTYPE5 first.
(2) Try the rest of options from USERTUPE4 to USERTYPE1 in turn.
(3) Select a preferred one of USERTYPE Group for glossy paper.

| PAPER THICKNESS | "Media Type" options |
|---|---|
|   | USERTYPE5 |
| | USERTYPE4 |
| | USERTYPE3 |
| | USERTYPE2 |
| | USERTYPE1 |



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