EUREKA
CLINICAL AI PLATFORM

Eureka™ AI De-identification Specification

Version 1.0.3

English

TERARECON
A SYMPHONYAI GROUP COMPANY

Symbols used in the label:

Symbol	Meaning
	Consult Instructions for Use.
	The CE mark applies to the Eureka AI Interoperability Platform software. The CE mark is affixed onto all software included in the Eureka AI Interoperability Platform.
	Manufacturer The name and address of the manufacturer are listed next to this symbol.
	Date of Manufacture The year of manufacture is listed next to this symbol.
	Authorized Representative in the European Community The name and address of TeraRecon's authorized representative in the European Community are listed next to this symbol.

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Notices

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Note: Any beta features extended are not to be used clinically, and can ***only*** be authorized, obtained or accessed through an appropriate beta agreement.

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1. TeraRecon, Intuition™ Client, Intuition™ Thin Client, Intuition™ Server, AquariusAPS™, Intuition™ EMV (iEMV), Intuition™ Review (iReview), Eureka™ AI Results Explorer, Eureka™ AI Liaison, and Eureka™ AI Inference are either registered trademarks or trademarks of TeraRecon, Inc. in the United States and/or other countries. Copyright© 2011-2020 TeraRecon, Inc. All rights reserved.

General Description

Eureka™ AI (Artificial Intelligence) Results Explorer is a software device used with the off-the-shelf hardware for medical image and associated metadata viewing and analysis. It consists of two components, a server (Eureka AI Results Explorer Server) and a web-based zero-footprint client.

The Eureka AI Results Explorer Server software utilizes a web interface to connect to third party systems such as RIS, PACS, EMR, and other systems. The client is a web-based zero-footprint viewer and can run on hardware where a web browser such as Chrome, Edge, Firefox, and Internet Explorer is present. This includes, but is not limited to, locally sited off-the-shelf hardware systems and mobile devices. The main goal of the Eureka AI Results Explorer is to integrate automated and semi-automated artificial intelligence and computer vision results within a clinical workflow and allow the end-user to access these results. Eureka AI Results Explorer is not for diagnostic use when used with mobile devices.

Visualization of 2D, 3D and 4D DICOM and non-DICOM image review are supported for single or multiple datasets (or combinations thereof). Image optimization tools are included such as window level, zoom, and pan, filter. Quantitative analysis tools include measurements such as distance.

Eureka AI Results Explorer can be launched as a stand-alone application or can be launched from a third-party solution with a URL. One example of a third-party solution is Eureka AI. The Eureka AI Results Explorer products include a software compute developer platform and a vendor neutral Application Programming Interface (API) for integration partners.

Eureka AI Results Explorer Server

The Eureka AI Results Explorer Server receives, stores, and transmits images from acquisition devices, in both DICOM (images and non-images) and non-DICOM (images and non-images) format using DICOM and Web interfaces. The server software can receive and transmit post-processed image datasets and any derived information from other systems such as PACS or other platforms within the hospital network. The Eureka AI Results Explorer Server utilizes the Web interface to connect to third party systems.

Eureka AI Results Explorer Client

The Eureka AI Results Explorer Client is web-based zero-footprint application which does not required any client installation. The client may run on any device connected to the backend server (Eureka AI Results Explorer Server). The images and information are transferred securely from the backend to the web-based application, allowing the user to display, manipulate, accept, reject, and edit the image as well as any derived metadata. The Eureka AI Results Explorer Client sends the requests for the images, the processed images, and/or the result/metadata to the server and the server sends the requested information to the client. The client may cache the obtained information in the web-browser memory for fast display. This interactive communication can occur within the same computer if both server and client viewer software run on it, or over the hospital network and/ or Internet if the server and client viewer software are on different computers.

Eureka AI Results Explorer Base Functionality

Eureka AI Results Explorer software can be launched as a stand-alone application. Eureka AI Results Explorer can also be launched from any third-party solution that can launch a Web-browser using some authentication and patient context as parameters.

The base functionality includes support of 2D, 3D, and 4D DICOM and non-DICOM image review. The capability to window level, zoom, pan, filtering, and measure (for example, length, area, volume, angles) is provided.

Support is provided to overlay image-derived metadata on relevant images. The user can use the Eureka AI Results Explorer to inspect the images and metadata side-by-side or overlaid and can optionally accept/ reject/edit the metadata.

The main goal of this platform is to integrate the automated and semi-automated AI results within a clinical workflow. This goal includes allowing the end-user to access the AI results provided by any third- party algorithm

developers in a seamless way. The integration of Eureka AI Results Explorer can be done with RIS, PACS, EMR, and other systems.

Product Naming Convention

Due to the product evolution, variations in the platform names may be seen in supporting documentation. An effort has been made to include all names in the Device Description.

Shelf Life

Eureka AI Results Explorer is considered to be Durable Medical Equipment and is assigned a shelf life of 15 years.

Eureka AI Results Explorer Indications for Use

Eureka AI Results Explorer is a zero-footprint, web-based software device indicated for use in clinical settings where medical images and image-derived metadata can be accessed or visualized to aid healthcare professionals in diagnosis and patient management decision making. Eureka AI Results Explorer's web interfaces can obtain and consume both DICOM and non-DICOM image-derived metadata generated by Artificial Intelligence (AI) or computer vision algorithms.

Eureka AI Results Explorer is intended to receive, store, transmit, post-process, display and allow manipulation of both DICOM and non-DICOM medical images generated by image acquisition devices and image derived metadata.

Eureka AI Results Explorer provides access to images, image derived metadata and derived images through a web browser on desktop computer or mobile devices. Visualization of 2D, 3D, and 4D are supported for single or multiple datasets, or combinations thereof. Visualization tools are provided to optimize image presentation through zooming, window leveling, panning, filtering and synchronization of images from different series. Eureka AI Results Explorer also provides quantitative analysis tools for measurements such as distance. The device also supports overlay of image-derived metadata such as text, contours, and so on.

Eureka AI Results Explorer provides capability for the end user to accept, reject or edit the metadata. Based on user interaction, new derived images or metadata can be created for internal use or for forwarding to other devices. Eureka AI Results Explorer is designed for use by healthcare professionals and is intended to aid the physician in diagnosis, who is responsible for making all final patient management decisions.

Important! Eureka AI Results Explorer is not for diagnostic use when used with mobile devices.

Intended Patient Population

Eureka AI Results Explorer is a general image viewing and exploring platform that can be used with images from any patient that undergoes radiological and other imaging procedures that are not specific to any population group or clinical conditions.

Intended Part of the Body or Type of Tissue Applied to or Interacted With

Eureka AI Results Explorer is not intended to be in direct or indirect contact with patients or users.

Eureka AI Results Explorer is a general image viewing and exploring platform that can be used with images from any patient that undergoes radiological and other imaging procedures that are not specific to any body parts or tissue types.

Intended User Profile

The Eureka AI Results Explorer device is designed to be used by healthcare professionals with a primary focus on imaging such as radiologists, radiology technicians, surgeons, cardiologists, dermatologists, and neurologists, and to assist the physicians in diagnosis, who is responsible for making all final patient management decisions.

Principle of Operations

Eureka AI Results Explorer is a software device that is used with off-the-shelf hardware.

Using the hardware (for example, a computer, monitor, keyboard or mouse) or a mobile device (for example, an iPad or iPhone) to operate the client, user inputs from client software relates to a backend server software to achieve the intended use.

Safety Notifications

Eureka AI Results Explorer is a Class I medical device regulated by the Food and Drug Administration.

CAUTION! Federal law (USA) restricts the sale of this device to only sale by a physician or on orders from a physician.

If you require training, please contact TeraRecon or a suitably qualified trainer. Always keep this documentation readily available near the Eureka AI Results Explorer Viewer and updated with all corrections/addenda that may be released by TeraRecon.

Patient information is restricted, private, and extremely confidential, and subject to stringent legal regulations - you should control access to Eureka AI Results Explorer, and patient data contained therein should be protected accordingly.

Devices integrated to this product must comply with their own applicable safety standards.

You must review the *Eureka AI Results Explorer Server Installation Guide* for all warnings, notices, and precautions prior to using the software.

Precautions Relating to General Use

Eureka AI Results Explorer Server software may allow images to be generated in which parts of the original scan data are obscured, removed (including, but not limited to, through use of lossy compression), hidden, or modified. Similarly, output images and reports can be produced, saved, and annotated, with elements of the original acquisition omitted, obscured, modified, or hidden. The user should be careful and responsible in using the equipment and its output images. This requires the user to effectively communicate the important facts and usage to untrained or uninformed observers or recipients of the processed information.

Please ensure that all processing has completed (including completion of any final stage after an intermediate stage of processing) before formulating a final interpretative decision.

In certain situations, you may experience a delay in certain display processing. Please ensure that all processing has completed (including, as example, completion of any final stage after an intermediate stage of processing) before seeking to validate, or validating, a final interpretative decision.

Precautions Relating to Display Hardware

Eureka AI Results Explorer image display is limited in acuity, color or Grayscale depth to that of the display device used. Display hardware characteristics can vary widely. Interpretation of mammographic images or digitized film screen images is supported only when the software is used without compression and with an FDA- approved

monitor that offers at least 5Mpixel resolution and meets other technical specifications reviewed and accepted by the FDA. If a monitor is not calibrated, image quality may vary. Monitors must be calibrated by the monitor vendor's calibration method.

Image quality is subject to the quality of the monitor. An image displayed on a color monitor can appear different from the same image displayed on a Grayscale monitor. A monitor may contain small defects on the surface, such as dust or scratches on the surface of the CRT or defects of LCD cell or other defects. A customer should understand this problem and not confuse the defects with a software problem.

The surrounding lighting conditions are critically important for optimal image viewing in Eureka AI Results Explorer. Lighting conditions can reduce the contrast of images being viewed and may hinder your ability to distinguish subtle changes in the image.

Important! The judgment of the medical imaging professional is essential to reaching the appropriate conclusion from the results presented by Eureka.

Precautions Relating to Interpretation

Calculations relating to distances, measurements, and other physical properties performed by Eureka AI Results Explorer are dependent on the accuracy of the input DICOM images. It is the responsibility of the operator to ensure that the source DICOM images are correctly formatted and to heed any warnings that the software may display during operation relating to potential problems with the information supplied in those DICOM images.

Further, in certain instances, there may be problems or inconsistencies in the image information left undetected by Eureka AI Results Explorer and an erroneous image display is unavoidable unless the user properly ensures the correctness of all input data in advance. Potential problems relating to errors in the DICOM information include incorrect dimensional readouts, incorrect orientation markings, and incorrect pixel value calibration. Limitations present in the original input data (such as those relating to spatial and/or temporal resolution, pixel size, and slice thickness) remain valid even when Eureka AI Results Explorer processes the data and these provisos should be considered when using the equipment for image review.

The image processing and display techniques offered by Eureka AI Results Explorer are only intended as an adjunct to, and not a substitute for, conventional diagnostic review of medical imaging data. All results should be validated by qualified physicians trained in the subject matter.

Eureka AI Results Explorer provides tools and protocols to quantify metrics and distances relating to structures in the CT, MR or other scans or images which are based upon the dimensions of the anatomy scanned or imaged at the time the images were originally acquired from the patient and based on the measurement calibrations provided by the acquiring device. The suitability for any purpose, especially monitoring the progression of disease, or the sizing or planning of a device to be implanted in a patient, is dependent upon many factors the extent to which the images acquired still represent the patient's anatomy.

TeraRecon does not represent that the Eureka AI Results Explorer products are suitable for such purposes all such activities should always be cross correlated with other techniques to ensure a complete understanding of the patient and contemplated findings is obtained by the validating physician(s) in charge.

Precautions Relating to Magnetic Resonance Imaging Machines

Components of Eureka AI Results Explorer Server, including this document and its packaging or binding, may contain metallic or Ferro-magnetic components. Please ensure that no such component is introduced into the influence of magnetic fields from devices such as Magnetic Resonance Imaging Scanners, since injury or damage to equipment or property could occur.

Precautions Relating to Risk of Loss of Data

Eureka AI Results Explorer is not intended to be used as a primary archive for medical imaging data. A secure copy of any data should be maintained in a location separate from this software, for example, in the scanner, in a PACS archive, or on archive media. Please do not rely on Eureka AI Results Explorer as your primary archive.

In addition, do not rely on Eureka AI Results Explorer to convey data from its acquisition point to your primary archive, because in this configuration, a failure in Eureka AI Results Explorer could compromise your primary archive. Your primary archive should be maintained in a manner independent of, and not relying on, Eureka AI Results Explorer.

Precautions Relating to Computer Software and Hardware

The installation and use of any additional software or hardware component without the specific direction and approval of TeraRecon may impair the safety and effectiveness of the product. No additional software or hardware component should be added to Eureka AI Results Explorer nor should the configuration be changed in any way, except under the express direction of TeraRecon personnel. Do not use the software if it is damaged, compromised, or if you in any way suspect that its safety may have been compromised; in such case, contact your customer service representative immediately.

Microsoft Windows Operating System Updates

Eureka AI Results Explorer software relies on the integrity of the Microsoft Windows operating system to perform as documented by Microsoft. If a Microsoft Knowledge Base article is released that exposes a bug or defect adversely affecting specific hardware platforms documented for use with Eureka AI Results Explorer software, it is the customer's responsibility to remedy those defects using the steps outlined by Microsoft in its Knowledge Base articles.

Eureka AI Results Explorer is not accessible without a network, including LAN and WAN. The availability of a network is the customer's responsibility. This includes accessibility to other devices on the network including but not limited to authentication servers and storage locations.

Precautions Related to Image Output Option

Eureka AI Results Explorer allows for output of selected images and series to various computer standard file types. This technique does not maintain full image fidelity and may affect image quality. DICOM, PNG, and PDF files are not intended for diagnostic purposes.

Captured images for output may contain patient information and use and distribution must be controlled to ensure that secure access to PHI is maintained pursuant to all applicable U.S. and International Laws, including but not limited to, the Health Insurance Portability and Accountability Act ("HIPAA") and the Health Information Technology for Economic and Clinical Health Act (“HITECH Act”).

Measurement Accuracy

Based on published literature and our analysis, the derived Eureka AI Results Explorer values have approximately 3% of uncertainties, depending on the data.

Supported Data

Eureka AI Results Explorer supports DICOM GSPS, DICOM RT STRUCT, DICOM SC, JPEG, PNG, and PDF image formats.

Patent Information

U.S. patents apply to this product. For details, see http://www.terarecon.com/patents.

Cybersecurity

TeraRecon is committed to produce and distribute reliable image processing medical device software through capable processes. At every stage of development, from software qualified requirements through design and development, validation, verification and final deployment, the process has been tailored to effect quality and security considerations into the product. Information security is integrated into the company's software development life-cycle from system inception.

Scope

To demonstrate compliance to the requirements as stated in the FDA guidance document titled "Guidance for Industry and Food and Drug Administration Staff Document," issued on October 2, 2014.

Cybersecurity Functions

As part of the company's devices' basic functionality, appropriate cybersecurity controls are developed to assure medical device cybersecurity and maintain medical device functionality and safety. These controls are provided within the device with the intention to create a robust, reliable and efficient medical device; with the understanding that it is a shared responsibility between stakeholders, including health care facilities, cloud infrastructure providers and manufacturers of medical devices.

Identify and Protect

TeraRecon's software devices such as Intuition Client, Intuition APS, Eureka AI Results Explorer, and standalone algorithms is are a prescription only medical device software intended to be used by medical practitioners who are trained in the software's function, capabilities and limitations. Appropriate supporting documentation with information related to functionality and security requirements are provided to the users; these include but are not limited to the Instructions for Use (IFU) and Customer Release Notes.

Limit Access to Trusted Users Only

This is achieved collaboratively between the manufacturer of the device and healthcare facilities or cloud infrastructure providers. Firewalls, anti-virus and other control measures are provided by the facility or infrastructure providers.

Notice: (If applicable) Standalone algorithms in a Docker container are deployed on a facility's authorized compute infrastructure with user controls or granted access with IP white-listing in the cloud deployment.

How to Use this Guide

You are advised to read all chapters to gain a complete understanding this procedure. Use the table of contents to navigate to the desired information.

Pay special attention to all *NOTES, IMPORTANT, TIP, WARNING, and CAUTION* notifications, whether presented on-screen, or contained in this manual, including all precautionary statements and advisories in the Notice section, as these are essential to the effective and authorized use of the Eureka AI Results Explorer Server.

Conventions used in this Manual

This manual uses the following conventions:

- The text that appears on buttons, menu items, dialog boxes and other elements of the application are printed in a bold font. For example, Click the **Save** button.
- Screen names are capitalized. For example, Patient List, Viewer.
- The chapters are arranged based on the functions in the application.

A NOTE contains supplementary and important information about a topic. *Please do not ignore NOTES, IMPORTANT, TIP, WARNING, and CAUTION notifications. Read each one carefully*.

Additional Typographical Conventions

After an action, button, or command is spelled-out in the first instance, they are abbreviated:

- **RMB** – Right mouse button; also referred to as “right-click”
- **LMB** – Left mouse button; also referred to as “left-click”
- **MMB** – Middle mouse button

Page Numbering Conventions

Page numbers are formatted for ease of use at the bottom of each page in a position based on left and right pages. They contain the Chapter number and page number in this format:

This format indicates Chapter 3, page 1.

Contents

Chapter 1 Introduction

The Eureka™ AI Interoperability platform consists of two subsystems. One subsystem is the Eureka AI Liaison that resides inside the hospital that manages the workflow orchestration and handles most of the patient confidentiality related tasks. The other subsystem is the Eureka AI Inference that hosts docker-based algorithms or trained models and is instantiated either as cloud-based solution or sited solution. Together, they offer AI interoperability functionalities integrating the image-derived intelligence into the day-to-day routine workflow. A schematic workflow is illustrated in Appendix A: "Eureka AI De-identification Workflow".

Since the workflow involves algorithms from third parties and cloud, the protection of patient confidentiality is an important, and foundational part of the design and implementation of the Eureka AI platform.

Following industry best-practices, the Eureka AI platform uses standard-based approach to de-identification of DICOM images to ensure the images are free of protected health information (PHI). The de-identification process ensures that the HIPAA de-identification standard is met by following the Safe Harbor Method as defined in section §164.514(b)(2) of the HIPPA Privacy Rule. The standard for de-identification of DICOM objects is defined by the DICOM Standard PS 3.15-2019b Digital Imaging and Communications in Medicine (DICOM), Part 15: Security and System Management Profiles.

By default, the Eureka AI de-identification follows the most conservative ‘Basic Application Confidentiality Profile’ with the ‘Retain Longitudinal Temporal Information with Modified Dates’ option. Just like the DICOM standard, additional Eureka AI options exist that can be used to retain more information. Without exception, the Eureka AI option is more stringent and more conservative than DICOM standard counterpart. These additional options can be configured after the initial Eureka AI deployment.

Additionally, the Eureka AI platform executes the docker in a secure environment where the underlying algorithm has no access to network or file systems, except those provided by the platform. This offers another layer of protection that eliminates the possibility of an algorithm transmitting any part of the input data to systems or locations outside of the Eureka AI platform.

In this document, design and implementation of various regulations and technical specification are explained, and when appropriate, nuances of technical details are included.

In Chapter 4: "Re-identification" the approach and details of our test protocol are documented, with provision to track the execution of the test protocol, various checkpoints and results.

HIPPA Privacy Rule

The HIPAA Privacy Rule establishes national standards to protect individuals’ medical records and other personal health information. The Rule requires safeguards to protect the privacy of personal health information and sets limits and conditions on the uses and disclosures that may be made of this information without patient authorization.

HIPPA Privacy Rule provides the standard for de-identification of protected health information using both the Expert Determination and Safe Harbor methods. The Eureka AI platform uses the Safe Harbor method.

Safe Harbor

The following identifiers of the individual or of relatives, employers, or household members of the individual, should be removed:

1. Names
2. All geographic subdivisions smaller than a state, including street address, city, county, precinct, ZIP code, and their equivalent geocodes, except for the initial three digits of the ZIP code if, according to the current publicly available data from the Bureau of the Census:
    a. The geographic unit formed by combining all ZIP codes with the same three initial digits contains more than 20,000 people; and
    b. The initial three digits of a ZIP code for all such geographic units containing 20,000 or fewer people is changed to 000
3. All elements of dates (except year) that are directly related to an individual, including birth date, admission date, discharge date, death date, and all ages over 89 and all elements of dates (including year) indicative of such age, except that such ages and elements may be aggregated into a single category of age 90 or older.
4. Telephone numbers
5. Fax numbers
6. Email addresses
7. Social security numbers
8. Medical record number
9. Health plan beneficiary numbers
10. Account numbers
11. Certificate/license numbers
12. Vehicle identifiers and serial numbers, including license plate numbers
13. Device identifiers and serial numbers
14. URLs
15. Internet Protocol (IP) addresses
16. Biometric identifiers, including finger and voice prints
17. Full-face photographs and any comparable images
18. Any other unique identifying number, characteristic, or code, except those that are assigned for re-identification purposes that are not derived from or related to information about the individual and are not otherwise capable of being translated to identify the individual.

Eureka AI de-identification ensures the DE-identified data are free of the 18 forms PHI listed above. Depending on input data and format, actual implementation of removing the PHI can vary. For example, for DICOM objects, it is not possible to indicate an age of 90+. In this instance, patient age is incremented or decremented by a random amount to achieve the removal of this PHI.

Chapter 2 DICOM De-identification

The standard for de-identification of DICOM objects is defined by the DICOM Standard PS 3.15-2019b Digital Imaging and Communications in Medicine (DICOM), Part 15: Security and System Management Profiles. Too access the standard, see:

http://dicom.nema.org/medical/dicom/2019b/output/html/part15.html#table_E.1-1

This *Basic Application Level Confidentiality Profile* defines an extremely conservative approach that removes all information related to:

- the identity and demographic characteristics of the patient
- the identity of any responsible parties or family members
- the identity of any personnel involved in the procedure
- the identity of the organizations involved in ordering or performing the procedure
- additional information that could be used to match instances if given access to the originals, such as UIDs, or dates and times
- private attributes

Various options exist that can be used to retain information that would otherwise be removed by the *Basic Application Level Confidentiality* Profile.

Appendix B: "DICOM Anonymization Table" lists *Application Level Confidentiality Profile Attributes* and various options.

Chapter 3 Eureka AI De-identification Implementation

The default configuration of the Eureka AI system ensures that every DICOM tag of every DICOM object is free of the 18 forms of PHI as currently defined by the Safe Harbor Method. The Eureka AI implementation references the implementation of The Cancer Imaging Archive (TCIA) de-identification but enhanced it so the Eureka AI implementation is more conservative and safer. Additionally, Eureka AI de-identification implementation incorporated confidentiality attributes introduced in the new DICOM 2019b standard.

Options exist that can potentially retain additional information that is valuable clinically or scientifically to the algorithms. For these options, see Chapter 4, "Test Protocol" on page 4-1.

Date Handling

Longitudinal information is important for progression evaluation. For this reason, default system configuration uses the “Retain Longitudinal Temporal Information With Modified Dates” option. Specifically, all dates in the DICOM objects are incremented/decremented by a patient-specific random amount.

To show that the dates have been modified, the term “MODIFIED” is written into DICOM tag (0028,0303) “LongitudinalTemporalInformationModified”.

UID Handling

All UIDs are replaced with a non-reversible cryptographic hash or hashes. A new pseudo-root UID, 1.2.2.2, is added to the resulting UID. This new root UID can be used for validation.

Other IDs

Other IDs like AccessionNumber and PatientID are replaced with non-empty dummy values that are compatible with their respective VR.

Private Tags

By default, all private tags are removed. It is possible to configure the system to selectively retain some or all private tags.

The private tag options are:

- Default (Basic Application Profile) – all private tags are removed.
- Eureka AI Retain Safe Private Tags – keep those tags that do not contain any PHI as documented by the manufacturers in their DICOM Conformance Statement. This knowledge base might grow over time.
- As of this writing, the following private tags are retained when this Eureka AI Retain Safe Private Tags is on
    - (7053,xx00) with Creator “Philips PET Private Group”

- (7053,xx09) with Creator “Philips PET Private Group”

Burned-in Annotations

Information can be burned into pixels either by the acquisition device or by screen captures. This burned-in information can potentially contain identifying information.

Even though DICOM tag BurnedInAnnotation (0028,0301) is intended to indicate whether or not there are burned-in annotations in the pixels, relying on this tag might not be sufficient when considering the diversity of image creators and their varying degrees of conformance to the DICOM standard. For this reason, Eureka AI takes the most conservative approach to ensure no identifying information as burned-in pixels are passed to any algorithms by excluding secondary captures, ultrasound and other types of images known to occasionally contain PHI as burned-in annotations. Only known clean modalities can pass.

Some other formats, like encapsulated PDF, contain free text inside the content portion of the DICOM. The information is not actually “burned-in”, but it represents the same risk profile as burned-in annotation. For this reason, some of formats by default are not allowed to pass the de-identification process.

Table 1.1 lists modalities that are allowed to pass if the value of “Burned In Annotation” tag is false.

Table 1.1: Modalities Passed to Algorithms

Modality	SOP Class UID	Comments
CT	1.2.840.10008.5.1.4.1.1.2	
Enhanced CT	1.2.840.10008.5.1.4.1.1.2.1	
MR	1.2.840.10008.5.1.4.1.1.4	
Enhanced MR	1.2.840.10008.5.1.4.1.1.4.1	
PET	1.2.840.10008.5.1.4.1.1.128	
Enhanced PET	1.2.840.10008.5.1.4.1.1.130	
CR	1.2.840.10008.5.1.4.1.1.1	
DX (presentation)	1.2.840.10008.5.1.4.1.1.1.1	
DX (processing)	1.2.840.10008.5.1.4.1.1.1.1.1	
Mammography (presentation)	1.2.840.10008.5.1.4.1.1.1.2	
Mammography (processing)	1.2.840.10008.5.1.4.1.1.1.2.1	
Tomosynthesis	1.2.840.10008.5.1.4.1.1.13.1.3	

Through configuration, additional modalities can be added. Configuring any modalities listed in Table 2.2 requires filtering by manufacturer, model name, series description, and so on.

That is, only certain devices from certain manufacturers or creators and for certain type of studies, are added to the allowed modality list.

ll listed modalities are subject to additional filtering by the Burned-In Annotation tag. Table 2.2 lists any modalities that are not allowed to pass without special configuration.

Table 2.2: Modalities Not Allowed to Pass

Modality	SOP Class UID	Comment
Secondary Capture	1.2.840.10008.5.1.4.1.1.7	Configurable
Multiframe SC (single bit)	1.2.840.10008.5.1.4.1.1.7.1	
Multiframe SC (grayscale byte)	1.2.840.10008.5.1.4.1.1.7.2	
Multiframe SC (grayscale word)	1.2.840.10008.5.1.4.1.1.7.3	
Multiframe SC (color)	1.2.840.10008.5.1.4.1.1.7.4	
US	1.2.840.10008.5.1.4.1.1.6.1	Configurable
US Multiframe	1.2.840.10008.5.1.4.1.1.3.1	Configurable
Encapsulated PDF	1.2.840.10008.5.1.4.1.1.104.1	
Encapsulated CDA Storage	1.2.840.10008.5.1.4.1.1.104.2	Configurable
Basic Text SR	1.2.840.10008.5.1.4.1.1.88.11	Configurable
Enhanced SR	1.2.840.10008.5.1.4.1.1.88.22	
Comprehensive SR	1.2.840.10008.5.1.4.1.1.88.33	
Mammography CAD SR	1.2.840.10008.5.1.4.1.1.88.50	Configurable
Chest CAD SR	1.2.840.10008.5.1.4.1.1.88.65	Configurable
Colon CAD SR	1.2.840.10008.5.1.4.1.1.88.69	Configurable
fluoroscopic Image	1.2.840.10008.5.1.4.1.1.12.2	Configurable
Enhanced fluoroscopic Image	1.2.840.10008.5.1.4.1.1.12.2.1	Configurable
GSPS Storage	1.2.840.10008.5.1.4.1.1.11.1	Configurable
CSPS Storage	1.2.840.10008.5.1.4.1.1.11.2	Configurable
VL Photographic Image	1.2.840.10008.5.1.4.1.1.77.1.4	
Video Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4.1	
Key Object Selection	1.2.840.10008.5.1.4.1.1.88.59	

Configuring any modalities listed in Table 2.2 requires filtering by manufacturer, model name, series description, and so on. That is, only certain devices from certain manufacturers or creators and for certain type of studies, are added to the allowed modality list. All listed modalities are subject to additional filtering by the Burned-In Annotation tag.

- Default – Only known clean modalities will be allowed to pass.
- Eureka AI Safe Clean Pixel Data – Knowledge-based option that can be used to forward specific images for processing.

Patient Demographics

By default, all patient demographics are removed. However, it is possible to configure the system to retain some patient characteristic information, for example patient's sex. Instead of allowing all characteristics to be retained, The Eureka AI de-identification process uses a modified and more conservative 'Eureka AI Keep Patient Characteristics' option.

The Eureka AI patient demographics handling options are as follows

- Default – All patient demographics information is removed or replaced with dummy values.
- Eureka AI Keep Patient Characteristics – Retain
- Patient's Sex, Patient's Age and Ethnic Group. One exception in this option is patient's age. If the patient is younger than 90, age is retained unmodified. Otherwise a patient-specific random increment/decrement is used to offset the age.
- Eureka AI Keep Patient Metabolic Characteristics – Retain patient sex, size and weight.
- Keep Patient Characteristics – retain Patient's Sex, Patient's Age, Patient's Size, Patient's Weight, Ethnic Group, Smoking Status, and Pregnancy Status. Allergies, Patient State (this is not where they live, rather their condition), Pre-Medication, and Special Needs.
- One exception in this option is patient's age. If the patient is younger than 90, it is retained unmodified. Otherwise a random increment/decrement is used.
- Keep Patient Sex – Only retain patient's sex information.
- Keep Patient Age – Only retain patient's age if the patient is younger than 90. Otherwise a random increment/decrement is used.

Clean Free Text

DICOM object can contain tags that hold free text entered by the technicians. These free texts can contain PHI. By default, all these tags are removed or replaced by dummy values.

Table 3.3 lists these tag.

Table 3.3: Free Text Tag

Allergies, Patient State, Study Description, Series Description, Admitting Diagnoses Description, Admitting Diagnoses Code Sequence, Derivation Description, Identifying Comments, Medical Alerts, Occupation, Additional Patient's History, Patient Comments, Contrast Bolus Agent, Protocol Name, Acquisition Device Processing Description, Acquisition Comments, Acquisition Protocol Description, Contribution Description, Image Comments, Frame Comments, Reason for Study, Requested Procedure Description, Requested Contrast Agent, Study Comments, Discharge Diagnosis Description, Service Episode Description, Visit Comments, Scheduled Procedure Step Description, Performed Procedure Step Description, Comments on Performed Procedure Step, Requested Procedure Comments, Reason for Imaging Service Request, Imaging Service Request Comments, Interpretation Text, Interpretation Diagnosis Description, Impressions, and Results Comments

Note: 'Request Attributes Sequence' is always removed.

The following options exist to selectively retain some of the free text tags:

- Default – Free text tags are removed or replaced with dummy values.
- Eureka AI Clean Descriptor Option – Retain Study Description, Series Description and Contrast Bolus Agent.
- Eureka AI Safe Descriptor Option – Retain selected tags from Table 3.3 on page 3-5 through a configuration file. Each tag will be filtered by scanner and scanning protocol.

Devices

All device related tags are removed by default. Table 4.4 lists theses tags.

Table 4.4: Device Related Tag

Station Name, Device Serial Number, Device UID, Plate ID, Generator ID, Cassette ID, Gantry ID, Detector ID, Scheduled Study Location, Scheduled Study Location AE Title, Scheduled Station AE Title, Scheduled Station Name, Scheduled Procedure Step Location, Performed Station AE Title, Performed Station Name, Performed Station Name Code Sequence, Scheduled Station Name Code Sequence, Scheduled Station Geographic Location Code Sequence, and Performed Station Geographic Location Code Sequence

The following options exist to retain some or all tags list in Table 4.4 on page 3-5:

- Default – remove all device related tags.
- Eureka AI Retain Device Identity Option – Selected tags to retain through configuration files.
- Retain Device Identity Option – Retains all tags in Table 4.4 on page 3-5 except for station name.

Summary of Eureka AI De-identification

The following table details the de-identification performed before submitting the data to the algorithm(s). The comment field indicates the new attributes in 2019a and 2019b DICOM standard.

Action keys:

- hash or hashuid – a hashed version of the original ID or UID.
- keep – tag and value are retained.
- remove – tag is removed completely.
- incrementdate – Date is incremented/decremented by a patient-specific random amount.
- e-mapped – Replaced with random alphanumerical string. De-identification retains the mapping for re-identification. Remapping can be implemented by using non-reversible hashing.
- dummy – tag is retained but value is replaced with non-zero length dummy value compatible with VR.
- 'LITERAL' – Replacement value LITERAL
- Process – process the date in the sequence using incrementdate and hashuid.

Table 5.5: Eureka AI De-identification

Tag	Name	Base	Eureka AI Keep Patient Characteristic Option	Eureka AI Clean Descriptor Option	Comment
00080050	AccessionNumber	re-mapped			
00184000	AcquisitionComments	remove			
00400555	AcquisitionContextSeq	remove			
00080022	AcquisitionDate	incrementdate			
0008002a	AcquisitionDatetime	incrementdate			
00181400	AcquisitionDeviceProcessingDescription	remove			
00189424	AcquisitionProtocolDescription	remove			
00080032	AcquisitionTime	keep			
00404035	ActualHumanPerformersSequence	remove			
001021b0	AdditionalPatientHistory	remove			
0040A353	Address(Trial)	remove			2019a
00380010	AdmissionID	remove			
00380020	AdmittingDate	incrementdate			
00081084	AdmittingDiagnosesCodeSeq	remove			
00081080	AdmittingDiagnosesDescription	remove			
00380021	AdmittingTime	keep			
00102110	Allergies	remove			
00001000	AffectedSOPInstanceUID	remove			2019a
40000010	Arbitrary	remove			
0040a078	AuthorObserverSequence	remove			
22000005	BarcodeValue	remove			2019a
300a00c3	BeamDescription	remove			2019a
00790010	Creator	'Eureka AI'			
00180015	BodyPartExamined	keep			
300a00dd	BolusDescription	remove			2019a
00101081	BranchOfService	remove			
00280301	BurnedInAnnotation	keep			
0016004D	CameraOwnerName	remove			2019a
00181007	CassetteID	remove			
00400280	CommentsOnPPS	remove			
300A02EB	CompensatorDescription	remove			2019a
00209161	ConcatenationUID	hashuid			
00403001	ConfidentialityPatientData	remove			
0008009C	ConsultingPhysiciansName	dummy			2019a
0008009D	ConsultingPhysicianIdentificationSequence	remove			2019a
0050001B	ContainerComponentID	remove			2019a
0040051A	ContainerDescription	remove			2019a
00400512	ContainerIdentifier	dummy			2019a
00700086	ContentCreatorsIdCodeSeq	remove			
00700084	ContentCreatorsName	dummy			
00080023	ContentDate	incrementdate			
0040a730	ContentSeq	remove			
00080033	ContentTime	keep			
0008010d	ContextGroupExtensionCreatorUID	hashuid			

Tag	Name	Base	Eureka AI Keep Patient Characteristic Option	Eureka AI Clean Descriptor Option	Comment
00180010	ContrastBolusAgent	remove		keep	
0018a003	ContributionDescription	remove			
00102150	CountryOfResidence	remove			
00089123	CreatorVersionUID	hashuid			
00380300	CurrentPatientLocation	remove			
0040A307	CurrentObserver(Trial)	remove			2019a
00080025	CurveDate	incrementdate			
Group	Curves	remove			
00080035	CurveTime	keep			
0040a07c	CustodialOrganizationSeq	remove			
fffcfffc	DataSetTrailingPadding	remove			
00181200	DateofLastCalibration	incrementdate			
0018700c	DateofLastDetectorCalibration	incrementdate			
00181012	DateOfSecondaryCapture	incrementdate			
00120063	DeIdentificationMethod	´Eureka AI"\Options			
00082111	DerivationDescription	remove			
0018700a	DetectorID	remove			
00181000	DeviceSerialNumber	remove			
0016004B	DeviceSettingDescription	remove			2019a
00181002	DeviceUID	remove			
fffafffa	DigitalSignaturesSeq	remove			
04000100	DigitalSignatureUID	remove			
00209164	DimensionOrganizationUID	hashuid			
00380040	DischargeDiagnosisDescription	remove			
4008011a	DistributionAddress	remove			
40080119	DistributionName	remove			
300A0016	DoseReferenceDescription	remove			2019a
300a0013	DoseReferenceUID	hashuid			
00189517	EndAcquisitionDateTime	incrementdate			2019a
00102160	EthnicGroup	remove	keep		
00404011	ExpectedCompletionDateTime	remove			2019a
00080058	FailedSOPInstanceUIDList	hashuid			
0070031a	FiducialUID	hashuid			
00402017	FillerOrderNumber	dummy			
30080054	FirstTreatmentDate	Incrementdate			2019a
300A0196	FixationDeviceDescription	remove			2019a
300A0072	FractionGroupDescription	remove			2019a
00209158	FrameComments	remove			
00200052	FrameOfReferenceUID	hashuid			
00181008	GantryID	remove			
00181005	GeneratorID	remove			
00700001	GraphicAnnotationSequence	remove			
00160076	GPSAltitude	remove			2019a
00160075	GPSAltitudeRef	remove			2019a
0016008C	GPSAreaInformation	remove			2019a
0016008D	GPSDateStamp	remove			2019a
00160088	GPSDestBearing	remove			2019a
00160087	GPSDestBearingRef	remove			2019a
0016008A	GPSDestDistance	remove			2019a
00160089	GPSDestDistanceRef	remove			2019a
00160084	GPSDestLatitude	remove			2019a

Tag	Name	Base	Eureka AI Keep Patient Characteristic Option	Eureka AI Clean Descriptor Option	Comment
00160083	GPSDestLatitudeRef	remove			2019a
00160086	GPSDestLongitude	remove			2019a
00160085	GPSDestLongitudeRef	remove			2019a
0016008E	GPSDifferential	remove			2019a
0016007B	GPSDOP	remove			2019a
00160081	GPSImgDirection	remove			2019a
00160080	GPSImgDirectionRef	remove			2019a
00160072	GPSLatitude	remove			2019a
00160071	GPSLatitudeRef	remove			2019a
00160074	GPSLongitude	remove			2019a
00160073	GPSLongitudeRef	remove			2019a
00160082	GPSMapDatum	remove			2019a
0016007A	GPSMeasureMode	remove			2019a
0016008B	GPSProcessingMethod	remove			2019a
00160078	GPSSatellites	remove			2019a
0016007D	GPSSpeed	remove			2019a
0016007C	GPSSpeedRef	remove			2019a
00160079	GPSStatus	remove			2019a
00160077	GPSTimeStamp	remove			2019a
0016007F	GPSTrack	remove			2019a
0016007E	GPSTrackRef	remove			2019a
00160070	GPSVersionID	remove			2019a
00404037	HumanPerformersName	remove			
00404036	HumanPerformersOrganization	remove			
00880200	IconImageSequence	remove			
00084000	IdentifyingComments	remove			
00204000	ImageComments	keep			
00284000	ImagePresentationComments	remove			
00402400	ImagingServiceRequestComments	remove			
40080300	Impressions	remove			
00080015	InstanceCoercionDateTime	remove			2019a
00080012	InstanceCreationDate	incrementdate			
00080014	InstanceCreatorUID	hashuid			
04000600	InstanceOriginStatus	remove			2019a
00080081	InstitutionAddress	remove			
00081040	InstitutionalDepartmentName	remove			
00080082	InstitutionCodeSequence	remove			
00380064	InstitutionalDepartmentTypeCodeSequence	remove			2019a
00080080	InstitutionName	remove			
00101050	InsurancePlanIdentification	remove			
00401011	IntendedRecipientsOfResultsIDSequence	remove			
40080111	InterpretationApproverSequence	remove			
4008010c	InterpretationAuthor	remove			
40080115	InterpretationDiagnosisDescription	remove			
40080202	InterpretationIdIssuer	remove			
40080102	InterpretationRecorder	remove			
4008010b	InterpretationText	remove			
4008010a	InterpretationTranscriber	remove			
00083010	IrradiationEventUID	hashuid			
00380011	IssuerOfAdmissionID	remove			
00380014	IssuerofAdmissionIDSequence	remove			2019a
00100021	IssuerOfPatientID	re-mapped			
00380061	IssuerOfServiceEpisodeId	remove			
00380064	IssuerofServiceEpisodeIDSequence	remove			2019a
00400513	IssueroftheContainerIdentifierSequence	remove			2019a
00400562	IssueroftheSpecimenIdentifierSequence	remove			2019a

Tag	Name	Base	Eureka AI Keep Patient Characteristic Option	Eureka AI Clean Descriptor Option	Comment
22000002	LabelText	remove			2019a
00281214	LargePaletteColorLUTUid	hashuid			
001021d0	LastMenstrualDate	incrementdate			
0016004F	LensMake	remove			2019a
00160050	LensModel	remove			2019a
00160051	LensSerialNumber	remove			2019a
0016004E	LensSpecification	remove			2019a
00280303	LongitudinalTemporalInformationModified	'MODIFIED'			
04000404	MAC	remove			
0016002B	MakerNote	remove			2019a
00080070	Manufacturer	keep			
00081090	ManufacturerModelName	keep			
00102000	MedicalAlerts	remove			
00020003	MediaStorageSOPInstanceUID	hashuid			2019a
00101090	MedicalRecordLocator	remove			
00101080	MilitaryRank	remove			
04000550	ModifiedAttributesSequence	remove			
00203406	ModifiedImageDescription	remove			
00203401	ModifyingDeviceID	remove			
00203404	ModifyingDeviceManufacturer	remove			
30080056	MostRecentTreatmentDate	incrementdate			2019a
00081060	NameOfPhysicianReadingStudy	remove			
00401010	NamesOfIntendedRecipientsOfResults	remove			
0040A192	ObservationDate(Trial)	remove			2019a
0040A402	ObservationSubjectUID(Trial)	hashuid			2019a
0040A193	ObservationTime(Trial)	remove			2019a
0040A171	ObservationUID	hashuid			2019a
00102180	Occupation	remove			
00081070	OperatorName	remove			
00081072	OperatorIdentificationSeq	remove			
00402010	OrderCallbackPhoneNumber	remove			
00402011	OrderCallbackTelecomInformation	remove			2019a
00402008	OrderEnteredBy	remove			
00402009	OrderEnterersLocation	remove			
04000561	OriginalAttributesSequence	remove			
00101000	OtherPatientIDs	remove			
00101002	OtherPatientIDsSeq	remove			
00101001	OtherPatientNames	remove			
00080024	OverlayDate	incrementdate			
Group	Overlays	remove			
00080034	OverlayTime	keep			
00281199	PaletteColorLUTUID	hashuid			
0040a07a	ParticipantSequence	remove			
00101040	PatientAddress	remove			
00101010	PatientAge	remove	keep		
00100030	PatientBirthDate	dummy			
00101005	PatientBirthName	remove			
00100032	PatientBirthTime	remove			
00104000	PatientComments	remove			
00100020	PatientID	re-mapped			
00120062	PatientIdentityRemoved	'YES'			
00380400	PatientInstitutionResidence	remove			
00100050	PatientInsurancePlanCodeSeq	remove			
00101060	PatientMotherBirthName	remove			
00100010	PatientName	re-mapped			
00102154	PatientPhoneNumbers	remove			
00100101	PatientPrimaryLanguageCodeSeq	remove			

Tag	Name	Base	Eureka AI Keep Patient Characteristic Option	Eureka AI Clean Descriptor Option	Comment
00100102	PatientPrimaryLanguageModifierCodeSeq	remove			
001021f0	PatientReligiousPreference	remove			
00100040	PatientSex	remove	keep		
00102203	PatientSexNeutered	remove			
00101020	PatientSize	remove			
00380500	PatientState	remove			
00102155	Patient'sTelecomInformation	remove			2019a
00401004	PatientTransportArrangements	remove			
00101030	PatientWeight	remove			
00400243	PerformedLocation	remove			
00404051	PerformedProcedureStepEndDateTime	remove			2019a
00400251	PerformedProcedureStepEndTime	remove			2019a
00404050	PerformedProcedureStepStartDateTime	remove			2019a
00400241	PerformedStationAET	remove			
00404030	PerformedStationGeoLocCodeSeq	remove			
00400242	PerformedStationName	remove			
00404028	PerformedStationNameCodeSeq	remove			
00081052	PerformingPhysicianIdSeq	remove			
00081050	PerformingPhysicianName	remove			
00400250	PerformProcedureStepEndDate	incrementdate			
00401102	PersonAddress	remove			
00401101	PersonIdCodeSequence	remove			
0040a123	PersonName	dummy			
00401104	Person'sTelecomInformation	remove			2019a
00401103	PersonTelephoneNumbers	remove			
40080114	PhysicianApprovingInterpretation	remove			
300A000E	PrescriptionDescription	remove			2019a
00081048	PhysicianOfRecord	remove			
00081049	PhysicianOfRecordIdSeq	remove			
00081062	PhysicianReadingStudyIdSeq	remove			
00402016	PlaceOrderNumberOfImagingServiceReq	dummy			
00181004	PlateID	remove			
00400254	PPSDescription	remove			
00400253	PPSID	remove			
00400244	PPSStartDate	incrementdate			
00400245	PPSStartTime	keep			
001021c0	PregnancyStatus	remove			
00400012	PreMedication	remove			
00701101	PresentationDisplayCollectionUID	hashuid			2019a
00701102	PresentationSequenceCollectionUID	remove			2019a
00404052	ProcedureStepCancellationDateTime	remove			2019a
Group	Privategroups	remove			
00181030	ProtocolName	remove			
00540016	RadiopharmaceuticalInformationSequence	process			
00181078	RadiopharmaceuticalStartDateTime	incrementdate			
00181079	RadiopharmaceuticalStopDateTime	incrementdate			
00402001	ReasonForImagingServiceRequest	remove			
300C0113	ReasonforOmissionDescription	remove			2019a
00401002	ReasonfortheRequestedProcedure	remove			2019a
0040100A	ReasonforRequestedProcedureCodeSequence	remove			2019a
00321066	ReasonforVisit	remove			2019a
00321067	ReasonforVisitCodeSequence	remove			2019a

Tag	Name	Base	Eureka AI Keep Patient Characteristic Option	Eureka AI Clean Descriptor Option	Comment
00321030	ReasonforStudy	remove			
04000402	RefDigitalSignatureSeq	remove			
300A0083	ReferencedDoseReferenceUID	hashuid			2019a
30060024	ReferencedFrameOfReferenceUID	hashuid			
0040A172	ReferencedObservationUID(Trial)	hashuid			2019a
00380004	ReferencedPatientAliasSeq	remove			
00101100	ReferencedPatientPhotoSequence	remove			2019a
00041511	ReferencedSOPInstanceUIDinFile	hashuid			2019a
00001001	RequestedSOPInstanceUID	hashuid			2019a
00189185	RespiratoryMotionCompensationTechniqueDescription	remove			2019a
300A0006	RTPlanDate	incrementdate			2019a
300A0004	RTPlanDescription	remove			2019a
300A0002	RTPlanLabel	dummy			2019a
300A0003	RTPlanName	remove			2019a
300A0007	RTPlanTime	keep			2019a
00080092	ReferringPhysicianAddress	remove			
00080090	ReferringPhysicianName	dummy			
00080094	ReferringPhysicianPhoneNumbers	remove			
00080096	ReferringPhysiciansIDSeq	remove			
00404023	RefGenPurposeSchedProcStepTransUID	hashuid			
00081140	RefImageSeq	remove			
00081120	RefPatientSeq	remove			
00081111	RefPPSSeq	remove			
00081150	RefSOPClassUID	keep			
04000403	RefSOPInstanceMACSeq	remove			
00081155	RefSOPInstanceUID	hashuid			
00081110	RefStudySeq	remove			
00102152	RegionOfResidence	remove			
300600c2	RelatedFrameOfReferenceUID	hashuid			
00400275	RequestAttributesSeq	remove			
00321070	RequestedContrastAgent	remove			
00401400	RequestedProcedureComments	remove			
00321060	RequestedProcedureDescription	remove			
00401001	RequestedProcedureID	remove			
00401005	RequestedProcedureLocation	remove			
00321032	RequestingPhysician	remove			
00321033	RequestingService	remove			
00102299	ResponsibleOrganization	remove			
00102297	ResponsiblePerson	remove			
40084000	ResultComments	remove			
40080118	ResultsDistributionListSeq	remove			
40080042	ResultsIDIssuer	remove			
300e0008	ReviewerName	remove			
00404034	ScheduledHumanPerformersSeq	remove			
0038001e	ScheduledPatientInstitutionResidence	remove			
0040000b	ScheduledPerformingPhysicianIDSeq	remove			
00400006	ScheduledPerformingPhysicianName	remove			
00404008	ScheduledProcedureStepExpirationDateTime	remove			2019a
00404010	ScheduledProcedureStepModificationDateTime	remove			2019a
00404005	ScheduledProcedureStepStartDateTime	remove			2019a
00400001	ScheduledStationAET	remove			
00404027	ScheduledStationGeographicLocCodeSeq	remove			
00400010	ScheduledStationName	remove			

Tag	Name	Base	Eureka AI Keep Patient Characteristic Option	Eureka AI Clean Descriptor Option	Comment
00404025	ScheduledStationNameCodeSeq	remove			
00321020	ScheduledStudyLocation	remove			
00321021	ScheduledStudyLocationAET	remove			
00321000	ScheduledStudyStartDate	incrementdate			
00080021	SeriesDate	incrementdate			
0008103e	SeriesDescription	remove		keep	
0020000e	SeriesInstanceUID	hashuid			
00080031	SeriesTime	keep			
00380062	ServiceEpisodeDescription	remove			
00380060	ServiceEpisodeID	remove			
300A01B2	Setup-TechniqueDescription	remove			2019a
300a01a6	ShieldingDeviceDescription	remove			2019a
004006FA	SlideIdentifier	remove			2019a
001021a0	SmokingStatus	remove			
00181020	SoftwareVersion	keep			
00080018	SOPInstanceUID	hashuid			
00082112	SourceImageSeq	remove			
300A0216	SourceManufacturer	remove			2019a
30080105	SourceSerialNumber	remove			2019a
00380050	SpecialNeeds	remove			
0040050A	SpecimenAccessionNumber	remove			2019a
00400602	SpecimenDetailedDescription	remove			2019a
00400551	SpecimenIdentifier	dummy			2019a
00400610	SpecimenPreparationSequence	dummy			2019a
00400600	SpecimenShortDescription	remove			2019a
00400554	SpecimenUID	hashuid			2019a
00400007	SPSDescription	remove			
00400004	SPSEndDate	incrementdate			
00400005	SPSEndTime	keep			
00400011	SPSLocation	remove			
00400002	SPSStartDate	incrementdate			
00400003	SPSStartTime	keep			
00189516	StartAcquisitionDateTime	remove			2019a
00081010	StationName	remove			
00880140	StorageMediaFilesetUID	hashuid			
30060008	StructureSetDate	incrementdate			
00321040	StudyArrivalDate	incrementdate			
00324000	StudyComments	remove			
00321050	StudyCompletionDate	incrementdate			
00080020	StudyDate	incrementdate			
00081030	StudyDescription	remove		keep	
00200010	StudyID	dummy			
00320012	StudyIDIssuer	remove			
0020000d	StudyInstanceUID	hashuid			
00080030	StudyTime	keep			
00200200	SynchronizationFrameOfReferenceUID	hashuid			
00182042	TargetUID	hashuid			2019a
0040A354	TelephoneNumber(Trial)	remove			2019a
0040db0d	TemplateExtensionCreatorUID	hashuid			
0040db0c	TemplateExtensionOrganizationUID	hashuid			
40004000	TextComments	remove			
20300020	TextString	remove			
00080201	TimezoneOffsetFromUTC	remove			

Tag	Name	Base	Eureka AI Keep Patient Characteristic Option	Eureka AI Clean Descriptor Option	Comment
00880910	TopicAuthor	remove			
00880912	TopicKeyWords	remove			
00880906	TopicSubject	remove			
00880904	TopicTitle	remove			
00620021	TrackingUID	hashuid			2019a
00081195	TransactionUID	hashuid			
30080250	TreatmentDate	incrementdate			2019a
300A00B2	TreatmentMachineName	remove			2019a
30080251	TreatmentTime	keep			2019a
0040a124	UID	hashuid			
Group	Unspecifiedelements	keep			
0040A352	VerbalSource(Trial)	remove			2019a
0040A358	VerbalSourceIdentifierCodeSequence (Trial)	remove			2019a
0040a088	VerifyingObserverIdentificationCodeSeq	remove			
0040a075	VerifyingObserverName	dummy			
0040a073	VerifyingObserverSequence	remove			
0040a027	VerifyingOrganization	remove			
00384000	VisitComments	remove			

Private group 0x0079 with creator code/block owner ‘Eureka AI’ will be created as part of the Eureka AI de-identification process.

Chapter 4 Re-identification

Eureka AI keeps a database holding all the modified tags information. After processing is complete and derived metadata comes back, re-identification is performed to restore all modified tags to their original state before forwarding to downstream consumers (Eureka AI Results Explorer, PACS, and others). Both the de-identification and re-identification are transparent processes to the user and integral parts of the Eureka AI Interoperability Platform.

Implementation Note

Depending on the version of the Eureka AI release, not all options may be implemented. However, the following options are available with all versions

- Default
- Eureka AI Keep Patient Characteristics
- Eureka AI Keep Patient Metabolic Characteristics
- Eureka AI
- Clean Descriptor Option

Test Protocol

Eureka AI de-identification uses reference images and tools that are independently validated. For every test, the input data are to be verified before the test.

The tools used are:

- `DITagChecker` – this tool reads a DICOM image and shows a warning when
  - Any of the tags marked as “remove” in is present.
  - Any of the UID marked as “hashuid” in does not contain the new root UID 1.2.2.2.
  - Presence of any private tags, except for group 0x0079 with creator ‘Eureka AI’.
  - Presence of any burned-in annotations (as indicated by the tag BurnedInAnnotation) Any of the tags that are marked as re-map do not start with capable letter X in its value (when it’s compatible with the VR).
  - SOP Class UID is not one of the modalities listed in Appendix A.

  When any of the above conditions is detected, all violative tags and their values are printed as console output and program exits with a non-zero status. If no violation is detected, a simple ‘Pass’ is printed, and the program exits with 0 status.

- `dcmheaderDump` – this program reads a DICOM image and writes the header information (tag, name, value), including sequences, in a plain text file so a regular text editor can be used to search for a tag or name.

- `DITestEngine` – a docker image that echoes the input as output, except for series UID.

Note that actual tool name can be different from above or a tool can be a collection of tools that accomplish the documented features.

Configuration File and Keys

There are two levels of configuration – system wide and algorithm specific. If the system configuration and machine specific configuration are not the same, the algorithm specific configuration shall take precedence.

The system wide configuration file is kept on the Liaison in a top-level folder while the algorithm specific configurations are kept under the machine ID/name.

Refer to *Eureka AI SQANotes: Eureka AI Test Environment* for additional information on the location and format of the configuration files.

System Default Configuration Test

Input Data:

- **Base Data**

  A study with many series that contains one or more modalities in and all or some of the modalities in Chapter 3,.Table 2.2 on page 3-3.

  - A CT series with 10 images that contain all tags mentioned in Table 5.5 on page 3-7 should be created. Image 2 will, in addition, contain a private data group. Image 3 will have a true Burned In Annotation tag.
  - Non-clean pixel modalities series listed in Chapter 3, Table 2.2 on page 3-3. One or two images per series.
  - All series must have the same study date and study description “Eureka AI DI Test data”

  All series must have the same study date. CT series should have a series date that is the same as study date. Non-clean pixel modality series must have a series date that is different from the CT series.

- **Non-Clean Modalities**

  Create a study with many series. Each series should be one of the modalities listed in Chapter 3, Table 2.2 on page 3-3.

- **Age 90+**

  Create a series of any modality from Table 1.1 on page 3-2 (Chapter 3). The patient age should be over 90. The study description shall contain ‘Eureka AI DITest Age’

Before running any test, run `DITagChecker`. This prints out most of the tags in the image (as they are violative). Verify the output is not ‘Pass’, and many tags are printed.

Running the End-to-End Workflow Base Test

Configure Liaison so that a DICOM series with description containing “Eureka AI DI Test data” are pushed, and this invokes engine `DITestEngine`.

Push data into Liaison. Once the results come back:

- Verify only 9 images came back.
- Run `DITagChecker` on all images – All images should 'Pass' or only have tags that do not contain PHI and are legitimate (new UID for example).
- Randomly select two images and run `dcmHeaderDump` on the images. Use a text editor to inspect the header information and search for some random tags listed in Chapter 3, Table 5.5 on page 3-7.
- Verify longitudinal information is retained. Compare various dates to ensure they are modified from the input and the modified amount is the same for all dates.

Private Tags Test

This section is intended to test the behavior of retaining safe private tags and for version 1.0, can be skipped. Eureka AI removes private tags always, except for the 0x0079 'Eureka AI' group. Test of removal is already included in the default configuration tests.

Burned-in Annotation Test

1. BurnedInAnnotation tag

   Eureka AI always withholds images with burned-in annotations. No option to pass any images with a true BurnedInAnnotation tag. This test is already included in the default configuration test.

2. Non-clean Modalities

   Base test already included non-clean modality handling.

   If additional test is desired, push the non-clean modalities data to Liaison and observe no images are sent to the Inference.

Patient Demographics Test

The Patient Demographic test examines the behavior of retaining the patient characteristics.

Default

This test is included in the base test.

Eureka AI Keep Patient Characteristics Test

Change the configuration so that **Eureka AI Keep Patient Characteristics** is set to true. Repeat base test.

Once the images come back, review to ensure that only the patient's sex, age, and ethnic group are retained. All other tag options are removed.

Eureka AI Keep Patient Metabolic Characteristics Test

Reset the configuration to default. Change the configuration so that **Eureka AI Keep Metabolic Characteristics** is true. Repeat base test.

Once the images come back, review to ensure that only the patient's sex, size, and weight are retained. All other tag options are removed.

Test Patient Age 90+

With **Eureka AI Keep Patient Characteristics Text** true, verify patient age 90+ handling by running the end-to-end test using the Age 90+ data.

Keep Patient Characteristics Test

Change the configuration so that `KeepPatientCharacteristics` is true. Run the end-to-end test again (see "Running the End-to-End Workflow Base Test" on page 4-2) and verify:

- Verify only 9 images come back.
- Run `DITagChecker` on all images – This should fail. The Patient Size etc. should be printed as console output.
- Randomly select two images and run `dcmHeaderDump` on the images. Use a text editor to inspect the header information and search for some random tags that are listed in Table 5.5 on page 3-7.
- Compare various dates to ensure they are modified from the input and the modified amount is the same for all dates.

Clean Free Text Test

- Default

  This is included in the base test.

- Eureka AI Clean Descriptor Option (see "Running the End-to-End Workflow Base Test" on page 4-2):
  - Change the configuration so `Eureka AICleanDescriptorOption` is true.
  - Repeat the end-to-end workflow test again.
  - Verify only 9 images come back.
  - Run `DITagChecker` on all images – This should fail. Study Description, Series Description and Contrast Bolus Agent should be printed on the console.
  - Randomly select two images and run `dcmHeaderDump` on the images. Use a text editor to inspect the header information and search for some random tags listed in Chapter 3, Table 3.3 on page 3-5.
  - Compare various dates to ensure they are modified from the input and the modified amount is the same for all dates.

Eureka AI Safe Descriptor Test

Not supported in the current version.

Clean Descriptor Test

Not supported in the current version.

Re-identification Test

Follow the end-to-end workflow test, and then use the Eureka AI Results Explorer, or any system that receives the re-identified data, to inspect and compare headers of the output file to the original data. The Patient module, study module, and some series module tags should have been restored. At a minimum, the following tags should be checked and verified that the re-identified data have identical values:

- Patients Name
- Patient ID
- Issuer of Patient ID
- Patient Birth Date
- Patient Sex
- Referring Physician's Name
- Study ID
- Accession Number
- Name of Physician(s) Reading Study
- Institution Name
- Study Date
- Study Description
- Specific Character Set

It is recommended that a full “diff” is run and that the patient and study modules are evaluated. Additionally, the following tags should not be present in the re-identified data:

- Patient Identify Removed
- De-identification method
- De-identification Method Code Sequence
- Longitudinal Temporal Information Modified
- Private Group 0x0079 with Creator ‘Eureka AI’

Appendix A Eureka AI De-identification Workflow

Figure A-1 depicts the Eureka AI de-identification and Re-identification workflow.

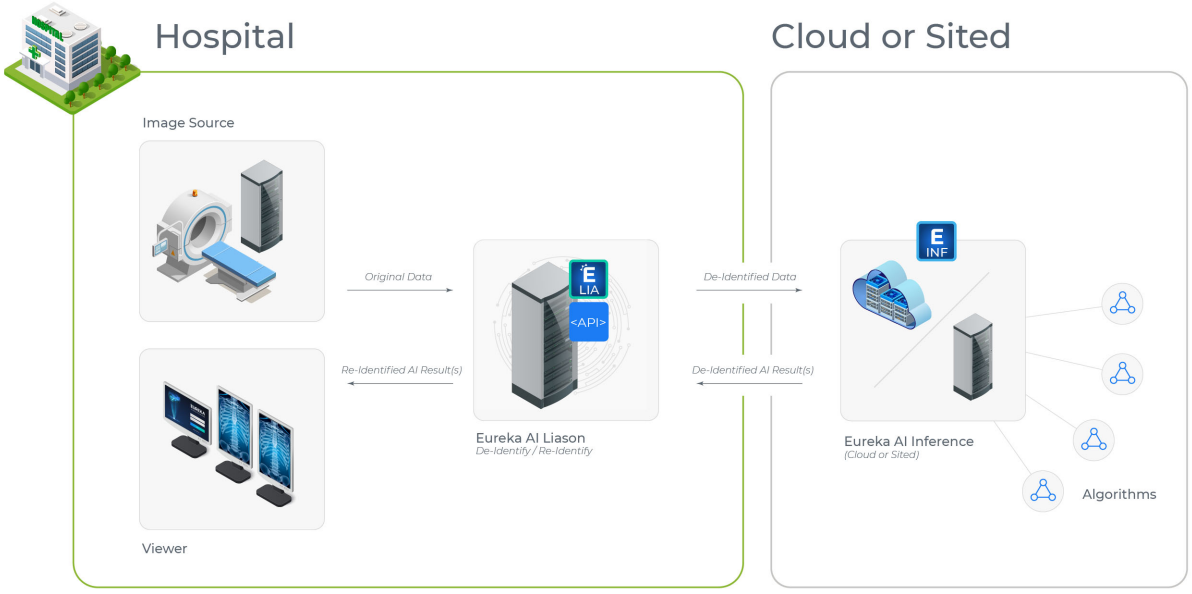

Figure A-1 Eureka AI De-identification Workflow

Appendix B DICOM Anonymization Table

The standard for De-identification of DICOM objects is defined by the DICOM Standard PS 3.15-2013 Digital Imaging and Communications in Medicine (DICOM), Part 15: Security and System Management Profiles.

The Attributes listed in Table B.1 for each profile are contained in Standard IODs or may be contained in Standard Extended IODs. An implementation claiming conformance to an Application Level Confidentiality Profile as a De-identifier shall protect or retain all instances of the Attributes listed in Table B.1 whether contained in the main dataset or embedded in an Item of a Sequence of Items. Table B.1 uses theses action codes:

- D - replace with a non-zero length value that may be a dummy value and consistent with the VR
- Z - replace with a zero-length value, or a non-zero length value that may be a dummy value and consistent with the VR
- X - remove
- K - keep (unchanged for non-sequence attributes, cleaned for sequences)
- C - clean, that is replace with values of similar meaning known not to contain identifying information and consistent with the VR
- U - replace with a non-zero length UID that is internally consistent within a set of Instances
- Z/D - Z unless D is required to maintain IOD conformance (Type 2 versus Type 1)
- X/Z - X unless Z is required to maintain IOD conformance (Type 3 versus Type 2)
- X/D - X unless D is required to maintain IOD conformance (Type 3 versus Type 1)
- X/Z/D - X unless Z or D is required to maintain IOD conformance (Type 3 versus Type 2 versus Type 1)
- X/Z/U* - X unless Z or replacement of contained instance UIDs (U) is required to maintain IOD conformance (Type 3 versus Type 2 versus Type 1 sequences containing UID references)

Table B.1: DICOM Anonymization Attributes

Attribute Name	Tag	Retd. (from PS3.6)	In Std. Comp. IOD (from PS3.3)	Basic Prof.	Rtn. Safe Priv. Opt.	Rtn. UIDs Opt.	Rtn. Dev. Id. Opt.	Rtn. Inst. Id. Opt.	Rtn. Pat. Chars. Opt.	Rtn. Long. Full Dates Opt.	Rtn. Long. Modif. Dates Opt.	Clean Desc. Opt.	Clean Struct. Cont. Opt.	Clean Graph. Opt.
Accession Number	(0008,0050)	N	Y	Z										
Acquisition Comments	(0018,4000)	Y	N	X								C		
Acquisition Context Sequence	(0040,0555)	N	Y	X/Z									C	
Acquisition Date	(0008,0022)	N	Y	X/Z						K	C			
Acquisition DateTime	(0008,002A)	N	Y	X/Z/D						K	C			
Acquisition Device Processing Description	(0018,1400)	N	Y	X/D								C		
Acquisition Protocol Description	(0018,9424)	N	Y	X								C		
Acquisition Time	(0008,0032)	N	Y	X/Z						K	C			
Actual Human Performers Sequence	(0040,4035)	N	N	X										
Additional Patient's History	(0010,21B0)	N	Y	X								C		
Address (Trial)	(0040,A353)	Y	N	X										
Admission ID	(0038,0010)	N	Y	X										
Admitting Date	(0038,0020)	N	N	X						K	C			

Attribute Name	Tag	Retd. (from PS3.6)	In Std. Comp. IOD (from PS3.3)	Basic Prof.	Rtn. Safe Priv. Opt.	Rtn. UIDs Opt.	Rtn. Dev. Id. Opt.	Rtn. Inst. Id. Opt.	Rtn. Pat. Chars. Opt.	Rtn. Long. Full Dates Opt.	Rtn. Long. Modif. Dates Opt.	Clean Desc. Opt.	Clean Struct. Cont. Opt.	Clean Graph. Opt.
Admitting Diagnoses Code Sequence	(0008,1084)	N	Y	X								C		
Admitting Diagnoses Description	(0008,1080)	N	Y	X								C		
Admitting Time	(0038,0021)	N	N	X						K	C			
Affected SOP Instance UID	(0000,1000)	N	N	X		K								
Allergies	(0010,2110)	N	N	X					C			C		
Arbitrary	(4000,0010)	Y	N	X										
Author Observer Sequence	(0040,A078)	N	Y	X										
Barcode Value	(2200,0005)	N	Y	X/Z										
Beam Description	(300A,00C3)	N	Y	X								C		
Bolus Description	(300A,00DD)	N	Y	X								C		
Branch of Service	(0010,1081)	N	N	X										
Camera Owner Name	(0016,004D)	N	Y	X										
Cassette ID	(0018,1007)	N	Y	X			K							
Comments on the Performed Procedure Step	(0040,0280)	N	Y	X								C		

Attribute Name	Tag	Retd. (from PS3.6)	In Std. Comp. IOD (from PS3.3)	Basic Prof.	Rtn. Safe Priv. Opt.	Rtn. UIDs Opt.	Rtn. Dev. Id. Opt.	Rtn. Inst. Id. Opt.	Rtn. Pat. Chars. Opt.	Rtn. Long. Full Dates Opt.	Rtn. Long. Modif. Dates Opt.	Clean Desc. Opt.	Clean Struct. Cont. Opt.	Clean Graph. Opt.
Compensator Description	(300A,02EB)	N	Y	X								C		
Concatenation UID	(0020,9161)	N	Y	U		K								
Confidentiality Constraint on Patient Data Description	(0040,3001)	N	N	X										
Consulting Physician's Name	(0008,009C)	N	Y	Z										
Consulting Physician Identification Sequence	(0008,009D)	N	Y	X										
Container Component ID	(0050,001B)	N	Y	X										
Container Description	(0040,051A)	N	Y	X								C		
Container Identifier	(0040,0512)	N	Y	D										
Content Creator's Identification Code Sequence	(0070,0086)	N	Y	X										
Content Creator's Name	(0070,0084)	N	Y	Z/D										
Content Date	(0008,0023)	N	Y	Z/D						K	C			
Content Sequence	(0040,A730)	N	Y	D									C	
Content Time	(0008,0033)	N	Y	Z/D						K	C			

Attribute Name	Tag	Retd. (from PS3.6)	In Std. Comp. IOD (from PS3.3)	Basic Prof.	Rtn. Safe Priv. Opt.	Rtn. UIDs Opt.	Rtn. Dev. Id. Opt.	Rtn. Inst. Id. Opt.	Rtn. Pat. Chars. Opt.	Rtn. Long. Full Dates Opt.	Rtn. Long. Modif. Dates Opt.	Clean Desc. Opt.	Clean Struct. Cont. Opt.	Clean Graph. Opt.
Contrast Bolus Agent	(0018,0010)	N	Y	Z/D								C		
Contribution Description	(0018,A003)	N	Y	X								C		
Country of Residence	(0010,2150)	N	N	X										
Current Observer (Trial)	(0040,A307)	Y	N	X										
Current Patient Location	(0038,0300)	N	N	X										
Curve Data	(50xx,xxxx)	Y	N	X										C
Curve Date	(0008,0025)	Y	Y	X						K	C			
Curve Time	(0008,0035)	Y	Y	X						K	C			
Custodial Organization Sequence	(0040,A07C)	N	Y	X										
Data Set Trailing Padding	(FFFC,FFFC)	N	Y	X										
Derivation Description	(0008,2111)	N	Y	X								C		
Detector ID	(0018,700A)	N	Y	X/D			K							
Device Serial Number	(0018,1000)	N	Y	X/Z/D			K							
Device Setting Description	(0016,004B)	N	Y	X								C		
Device UID	(0018,1002)	N	Y	U		K	K							

Attribute Name	Tag	Retd. (from PS3.6)	In Std. Comp. IOD (from PS3.3)	Basic Prof.	Rtn. Safe Priv. Opt.	Rtn. UIDs Opt.	Rtn. Dev. Id. Opt.	Rtn. Inst. Id. Opt.	Rtn. Pat. Chars. Opt.	Rtn. Long. Full Dates Opt.	Rtn. Long. Modif. Dates Opt.	Clean Desc. Opt.	Clean Struct. Cont. Opt.	Clean Graph. Opt.
Digital Signatures Sequence	(FFFA,FFFA)	N	Y	X										
Digital Signature UID	(0400,0100)	N	Y	U										
Dimension Organization UID	(0020,9164)	N	Y	U		K								
Discharge Diagnosis Description	(0038,0040)	Y	N	X								C		
Distribution Address	(4008,011A)	Y	N	X										
Distribution Name	(4008,0119)	Y	N	X										
Dose Reference Description	(300A,0016)	N	Y	X								C		
Dose Reference UID	(300A,0013)	N	Y	U		K								
End Acquisition DateTime	(0018,9517)	N	Y	X/D						K	C			
Ethnic Group	(0010,2160)	N	Y	X					K					
Expected Completion DateTime	(0040,4011)	N	N	X						K	C			
Failed SOP Instance UID List	(0008,0058)	N	N	U		K								
Fiducial UID	(0070,031A)	N	Y	U		K								
Filler Order Number / Imaging Service Request	(0040,2017)	N	Y	Z										

Attribute Name	Tag	Retd. (from PS3.6)	In Std. Comp. IOD (from PS3.3)	Basic Prof.	Rtn. Safe Priv. Opt.	Rtn. UIDs Opt.	Rtn. Dev. Id. Opt.	Rtn. Inst. Id. Opt.	Rtn. Pat. Chars. Opt.	Rtn. Long. Full Dates Opt.	Rtn. Long. Modif. Dates Opt.	Clean Desc. Opt.	Clean Struct. Cont. Opt.	Clean Graph. Opt.
First Treatment Date	(3008,0054)	N	Y	X/D						K	C			
Fixation Device Description	(300A,0196)	N	Y	X								C		
Fraction Group Description	(300A,0072)	N	Y	X								C		
Frame Comments	(0020,9158)	N	Y	X								C		
Frame of Reference UID	(0020,0052)	N	Y	U		K								
Gantry ID	(0018,1008)	N	Y	X			K							
Generator ID	(0018,1005)	N	Y	X			K							
GPS Altitude	(0016,0076)	N	Y	X										
GPS Altitude Ref	(0016,0075)	N	Y	X										
GPS Area Information	(0016,008C)	N	Y	X										
GPS Date Stamp	(0016,008D)	N	Y	X						K	C			
GPS Dest Bearing	(0016,0088)	N	Y	X										
GPS Dest Bearing Ref	(0016,0087)	N	Y	X										
GPS Dest Distance	(0016,008A)	N	Y	X										
GPS Dest Distance Ref	(0016,0089)	N	Y	X										
GPS Dest Latitude	(0016,0084)	N	Y	X										

Attribute Name	Tag	Retd. (from PS3.6)	In Std. Comp. IOD (from PS3.3)	Basic Prof.	Rtn. Safe Priv. Opt.	Rtn. UIDs Opt.	Rtn. Dev. Id. Opt.	Rtn. Inst. Id. Opt.	Rtn. Pat. Chars. Opt.	Rtn. Long. Full Dates Opt.	Rtn. Long. Modif. Dates Opt.	Clean Desc. Opt.	Clean Struct. Cont. Opt.	Clean Graph. Opt.
GPS Dest Latitude Ref	(0016,0083)	N	Y	X										
GPS Dest Longitude	(0016,0086)	N	Y	X										
GPS Dest Longitude Ref	(0016,0085)	N	Y	X										
GPS Differential	(0016,008E)	N	Y	X										
GPS DOP	(0016,007B)	N	Y	X										
GPS Img Direction	(0016,0081)	N	Y	X										
GPS Img Direction Ref	(0016,0080)	N	Y	X										
GPS Latitude	(0016,0072)	N	Y	X										
GPS Latitude Ref	(0016,0071)	N	Y	X										
GPS Longitude	(0016,0074)	N	Y	X										
GPS Longitude Ref	(0016,0073)	N	Y	X										
GPS Map Datum	(0016,0082)	N	Y	X										
GPS Measure Mode	(0016,007A)	N	Y	X										
GPS Processing Method	(0016,008B)	N	Y	X										
GPS Satellites	(0016,0078)	N	Y	X										
GPS Speed	(0016,007D)	N	Y	X										
GPS Speed Ref	(0016,007C)	N	Y	X										

Attribute Name	Tag	Retd. (from PS3.6)	In Std. Comp. IOD (from PS3.3)	Basic Prof.	Rtn. Safe Priv. Opt.	Rtn. UIDs Opt.	Rtn. Dev. Id. Opt.	Rtn. Inst. Id. Opt.	Rtn. Pat. Chars. Opt.	Rtn. Long. Full Dates Opt.	Rtn. Long. Modif. Dates Opt.	Clean Desc. Opt.	Clean Struct. Cont. Opt.	Clean Graph. Opt.
GPS Status	(0016,0079)	N	Y	X										
GPS Time Stamp	(0016,0077)	N	Y	X										
GPS Track	(0016,007F)	N	Y	X										
GPS Track Ref	(0016,007E)	N	Y	X										
GPS Version ID	(0016,0070)	N	Y	X										
Graphic Annotation Sequence	(0070,0001)	N	Y	D										C
Human Performers Name	(0040,4037)	N	N	X										
Human Performers Organization	(0040,4036)	N	N	X										
Icon Image Sequence(see Note 12)	(0088,0200)	N	Y	X										
Identifying Comments	(0008,4000)	Y	N	X								C		
Image Comments	(0020,4000)	N	Y	X								C		
Image Presentation Comments	(0028,4000)	Y	N	X										
Imaging Service Request Comments	(0040,2400)	N	N	X								C		
Impressions	(4008,0300)	Y	N	X								C		
Instance Coercion DateTime	(0008,0015)	N	Y	X						K	C			

Attribute Name	Tag	Retd. (from PS3.6)	In Std. Comp. IOD (from PS3.3)	Basic Prof.	Rtn. Safe Priv. Opt.	Rtn. UIDs Opt.	Rtn. Dev. Id. Opt.	Rtn. Inst. Id. Opt.	Rtn. Pat. Chars. Opt.	Rtn. Long. Full Dates Opt.	Rtn. Long. Modif. Dates Opt.	Clean Desc. Opt.	Clean Struct. Cont. Opt.	Clean Graph. Opt.
Instance Creator UID	(0008,0014)	N	Y	U		K								
Instance Origin Status	(0400,0600)	N	Y	X										
Institution Address	(0008,0081)	N	Y	X				K						
Institutional Department Name	(0008,1040)	N	Y	X				K						
Institutional Department Type Code Sequence	(0008,1041)	N	Y	X				K						
Institution Code Sequence	(0008,0082)	N	Y	X/Z/D				K						
Institution Name	(0008,0080)	N	Y	X/Z/D				K						
Insurance Plan Identification	(0010,1050)	Y	N	X										
Intended Recipients of Results Identification Sequence	(0040,1011)	N	N	X										
Interpretation Approver Sequence	(4008,0111)	Y	N	X										
Interpretation Author	(4008,010C)	Y	N	X										
Interpretation Diagnosis Description	(4008,0115)	Y	N	X								C		
Interpretation ID Issuer	(4008,0202)	Y	N	X										

Attribute Name	Tag	Retd. (from PS3.6)	In Std. Comp. IOD (from PS3.3)	Basic Prof.	Rtn. Safe Priv. Opt.	Rtn. UIDs Opt.	Rtn. Dev. Id. Opt.	Rtn. Inst. Id. Opt.	Rtn. Pat. Chars. Opt.	Rtn. Long. Full Dates Opt.	Rtn. Long. Modif. Dates Opt.	Clean Desc. Opt.	Clean Struct. Cont. Opt.	Clean Graph. Opt.
Interpretation Recorder	(4008,0102)	Y	N	X										
Interpretation Text	(4008,010B)	Y	N	X								C		
Interpretation Transcriber	(4008,010A)	Y	N	X										
Irradiation Event UID	(0008,3010)	N	Y	U		K								
Issuer of Admission ID	(0038,0011)	Y	Y	X										
Issuer of Admission ID Sequence	(0038,0014)	N	Y	X										
Issuer of Patient ID	(0010,0021)	N	Y	X										
Issuer of Service Episode ID	(0038,0061)	Y	Y	X										
Issuer of Service Episode ID Sequence	(0038,0064)	N	Y	X										
Issuer of the Container Identifier Sequence	(0040,0513)	N	Y	Z										
Issuer of the Specimen Identifier Sequence	(0040,0562)	N	Y	Z										
Label Text	(2200,0002)	N	Y	X/Z								C		
Large Palette Color Lookup Table UID	(0028,1214)	Y	N	U		K								

Attribute Name	Tag	Retd. (from PS3.6)	In Std. Comp. IOD (from PS3.3)	Basic Prof.	Rtn. Safe Priv. Opt.	Rtn. UIDs Opt.	Rtn. Dev. Id. Opt.	Rtn. Inst. Id. Opt.	Rtn. Pat. Chars. Opt.	Rtn. Long. Full Dates Opt.	Rtn. Long. Modif. Dates Opt.	Clean Desc. Opt.	Clean Struct. Cont. Opt.	Clean Graph. Opt.
Last Menstrual Date	(0010,21D0)	N	N	X						K	C			
Lens Make	(0016,004F)	N	Y	X			K							
Lens Model	(0016,0050)	N	Y	X			K							
Lens Serial Number	(0016,0051)	N	Y	X			K							
Lens Specification	(0016,004E)	N	Y	X			K							
MAC	(0400,0404)	N	Y	X										
Maker Note	(0016,002B)	N	Y	X								C		
Media Storage SOP Instance UID	(0002,0003)	N	N	U		K								
Medical Alerts	(0010,2000)	N	N	X								C		
Medical Record Locator	(0010,1090)	N	N	X										
Military Rank	(0010,1080)	N	N	X										
Modified Attributes Sequence	(0400,0550)	N	N	X										
Modified Image Description	(0020,3406)	Y	N	X										
Modifying Device ID	(0020,3401)	Y	N	X										
Most Recent Treatment Date	(3008,0056)	N	Y	X/D						K	C			

Attribute Name	Tag	Retd. (from PS3.6)	In Std. Comp. IOD (from PS3.3)	Basic Prof.	Rtn. Safe Priv. Opt.	Rtn. UIDs Opt.	Rtn. Dev. Id. Opt.	Rtn. Inst. Id. Opt.	Rtn. Pat. Chars. Opt.	Rtn. Long. Full Dates Opt.	Rtn. Long. Modif. Dates Opt.	Clean Desc. Opt.	Clean Struct. Cont. Opt.	Clean Graph. Opt.
Name of Physician(s) Reading Study	(0008,1060)	N	Y	X										
Names of Intended Recipient of Results	(0040,1010)	N	N	X										
Observation Date (Trial)	(0040,A192)	Y	N	X						K	C			
Observation Subject UID (Trial)	(0040,A402)	Y	N	U		K								
Observation Time (Trial)	(0040,A193)	Y	N	X						K	C			
Observation UID	(0040,A171)	N	Y	U		K								
Occupation	(0010,2180)	N	Y	X								C		
Operators' Identification Sequence	(0008,1072)	N	Y	X/D										
Operators' Name	(0008,1070)	N	Y	X/Z/D										
Order Call-back Phone Number	(0040,2010)	N	N	X										
Order Call-back Telecom Information	(0040,2011)	N	N	X										
Order Entered By	(0040,2008)	N	N	X										
Order Enterer Location	(0040,2009)	N	N	X										

Attribute Name	Tag	Retd. (from PS3.6)	In Std. Comp. IOD (from PS3.3)	Basic Prof.	Rtn. Safe Priv. Opt.	Rtn. UIDs Opt.	Rtn. Dev. Id. Opt.	Rtn. Inst. Id. Opt.	Rtn. Pat. Chars. Opt.	Rtn. Long. Full Dates Opt.	Rtn. Long. Modif. Dates Opt.	Clean Desc. Opt.	Clean Struct. Cont. Opt.	Clean Graph. Opt.
Original Attributes Sequence	(0400,0561)	N	Y	X										
Other Patient IDs	(0010,1000)	Y	Y	X										
Other Patient IDs Sequence	(0010,1002)	N	Y	X										
Other Patient Names	(0010,1001)	N	Y	X										
Overlay Comments	(60xx,4000)	Y	N	X										C
Overlay Data	(60xx,3000)	N	Y	X										C
Overlay Date	(0008,0024)	Y	Y	X						K	C			
Overlay Time	(0008,0034)	Y	Y	X						K	C			
Palette Color Lookup Table UID	(0028,1199)	N	Y	U		K								
Participant Sequence	(0040,A07A)	N	Y	X										
Patient's Age	(0010,1010)	N	Y	X					K					
Patient's Birth Date	(0010,0030)	N	Y	Z										
Patient's Birth Name	(0010,1005)	N	N	X										
Patient's Birth Time	(0010,0032)	N	Y	X										
Patient's Institution Residence	(0038,0400)	N	N	X										

Attribute Name	Tag	Retd. (from PS3.6)	In Std. Comp. IOD (from PS3.3)	Basic Prof.	Rtn. Safe Priv. Opt.	Rtn. UIDs Opt.	Rtn. Dev. Id. Opt.	Rtn. Inst. Id. Opt.	Rtn. Pat. Chars. Opt.	Rtn. Long. Full Dates Opt.	Rtn. Long. Modif. Dates Opt.	Clean Desc. Opt.	Clean Struct. Cont. Opt.	Clean Graph. Opt.
Patient's Insurance Plan Code Sequence	(0010,0050)			X										
Patient's Mother's Birth Name	(0010,1060)	N	N	X										
Patient's Name	(0010,0010)	N	Y	Z										
Patient's Primary Language Code Sequence	(0010,0101)			X										
Patient's Primary Language Modifier Code Sequence	(0010,0102)			X										
Patient's Religious Preference	(0010,21F0)	N	N	X										
Patient's Sex	(0010,0040)	N	Y	Z					K					
Patient's Size	(0010,1020)	N	Y	X					K					
Patient's Telecom Information	(0010,2155)	N	N	X										
Patient's Telephone Numbers	(0010,2154)	N	N	X										
Patient's Weight	(0010,1030)	N	Y	X					K					
Patient Address	(0010,1040)	N	N	X										
Patient Comments	(0010,4000)	N	Y	X								C		

Attribute Name	Tag	Retd. (from PS3.6)	In Std. Comp. IOD (from PS3.3)	Basic Prof.	Rtn. Safe Priv. Opt.	Rtn. UIDs Opt.	Rtn. Dev. Id. Opt.	Rtn. Inst. Id. Opt.	Rtn. Pat. Chars. Opt.	Rtn. Long. Full Dates Opt.	Rtn. Long. Modif. Dates Opt.	Clean Desc. Opt.	Clean Struct. Cont. Opt.	Clean Graph. Opt.
Patient ID	(0010,0020)	N	Y	Z										
Patient Sex Neutered	(0010,2203)	N	Y	X/Z					K					
Patient State	(0038,0500)	N	N	X					C			C		
Patient Transport Arrange-ments	(0040,1004)	N	N	X										
Performed Location	(0040,0243)	N	N	X										
Performed Procedure Step Description	(0040,0254)	N	Y	X								C		
Performed Procedure Step End Date	(0040,0250)	N	Y	X						K	C			
Performed Procedure Step End DateTime	(0040,4051)	N	N	X						K	C			
Performed Procedure Step End Time	(0040,0251)	N	Y	X						K	C			
Performed Procedure Step ID	(0040,0253)	N	Y	X										
Performed Procedure Step Start Date	(0040,0244)	N	Y	X						K	C			
Performed Procedure Step Start DateTime	(0040,4050)	N	N	X						K	C			

Attribute Name	Tag	Retd. (from PS3.6)	In Std. Comp. IOD (from PS3.3)	Basic Prof.	Rtn. Safe Priv. Opt.	Rtn. UIDs Opt.	Rtn. Dev. Id. Opt.	Rtn. Inst. Id. Opt.	Rtn. Pat. Chars. Opt.	Rtn. Long. Full Dates Opt.	Rtn. Long. Modif. Dates Opt.	Clean Desc. Opt.	Clean Struct. Cont. Opt.	Clean Graph. Opt.
Performed Procedure Step Start Time	(0040,0245)	N	Y	X						K	C			
Performed Station AE Title	(0040,0241)	N	N	X			K							
Performed Station Geographic Location Code Sequence	(0040,4030)	N	N	X			K							
Performed Station Name	(0040,0242)	N	N	X			K							
Performed Station Name Code Sequence	(0040,4028)	N	N	X			K							
Performing Physician Identification Sequence	(0008,1052)	N	Y	X										
Performing Physicians' Name	(0008,1050)	N	Y	X										
Person's Telecom Information	(0040,1104)	N	Y	X										
Person's Telephone Numbers	(0040,1103)	N	Y	X										
Person Address	(0040,1102)	N	Y	X										
Person Identification Code Sequence	(0040,1101)	N	Y	D										

Attribute Name	Tag	Retd. (from PS3.6)	In Std. Comp. IOD (from PS3.3)	Basic Prof.	Rtn. Safe Priv. Opt.	Rtn. UIDs Opt.	Rtn. Dev. Id. Opt.	Rtn. Inst. Id. Opt.	Rtn. Pat. Chars. Opt.	Rtn. Long. Full Dates Opt.	Rtn. Long. Modif. Dates Opt.	Clean Desc. Opt.	Clean Struct. Cont. Opt.	Clean Graph. Opt.
Person Name	(0040,A123)	N	Y	D										
Physician(s) of Record	(0008,1048)	N	Y	X										
Physician(s) of Record Identification Sequence	(0008,1049)	N	Y	X										
Physician(s) Reading Study Identification Sequence	(0008,1062)	N	Y	X										
Physician Approving Interpretation	(4008,0114)	Y	N	X										
Placer Order Number / Imaging Service Request	(0040,2016)	N	Y	Z										
Plate ID	(0018,1004)	N	Y	X			K							
Pregnancy Status	(0010,21C0)	N	N	X					K					
Pre-Medication	(0040,0012)	N	N	X					C					
Prescription Description	(300A,000E)	N	Y	X								C		
Presentation Display Collection UID	(0070,1101)	N	Y	U		K								
Presentation Sequence Collection UID	(0070,1102)	N	Y	U		K								

Attribute Name	Tag	Retd. (from PS3.6)	In Std. Comp. IOD (from PS3.3)	Basic Prof.	Rtn. Safe Priv. Opt.	Rtn. UIDs Opt.	Rtn. Dev. Id. Opt.	Rtn. Inst. Id. Opt.	Rtn. Pat. Chars. Opt.	Rtn. Long. Full Dates Opt.	Rtn. Long. Modif. Dates Opt.	Clean Desc. Opt.	Clean Struct. Cont. Opt.	Clean Graph. Opt.
Private attributes	(gggg,eeee) where gggg is odd	N	N	X	C									
Procedure Step Cancellation Date-Time	(0040,4052)	N	N	X						K	C			
Protocol Name	(0018,1030)	N	Y	X/D								C		
Reason for Omission Description	(300C,0113)	N	Y	X								C		
Reason for Study	(0032,1030)	Y	N	X								C		
Reason for the Imaging Service Request	(0040,2001)	Y	N	X								C		
Reason for the Requested Procedure	(0040,1002)	N	Y	X								C		
Reason for Requested Procedure Code Sequence	(0040,100A)	N	Y	X								C		
Reason for Visit	(0032,1066)	N	Y	X								C		
Reason for Visit Code Sequence	(0032,1067)	N	Y	X								C		
Referenced Digital Signature Sequence	(0400,0402)	N	Y	X										
Referenced Dose Reference UID	(300A,0083)	N	Y	U		K								

Attribute Name	Tag	Retd. (from PS3.6)	In Std. Comp. IOD (from PS3.3)	Basic Prof.	Rtn. Safe Priv. Opt.	Rtn. UIDs Opt.	Rtn. Dev. Id. Opt.	Rtn. Inst. Id. Opt.	Rtn. Pat. Chars. Opt.	Rtn. Long. Full Dates Opt.	Rtn. Long. Modif. Dates Opt.	Clean Desc. Opt.	Clean Struct. Cont. Opt.	Clean Graph. Opt.
Referenced Frame of Reference UID	(3006,0024)	N	Y	U		K								
Referenced General Purpose Scheduled Procedure Step Transaction UID	(0040,4023)	Y	N	U		K								
Referenced Image Sequence	(0008,1140)	N	Y	X/Z/U*		K								
Referenced Observation UID (Trial)	(0040,A172)	Y	N	U		K								
Referenced Patient Alias Sequence	(0038,0004)	N	N	X										
Referenced Patient Photo Sequence	(0010,1100)	N	Y	X										
Referenced Patient Sequence	(0008,1120)	N	Y	X		X								
Referenced Performed Procedure Step Sequence	(0008,1111)	N	Y	X/Z/D		K								
Referenced SOP Instance MAC Sequence	(0400,0403)	N	Y	X										
Referenced SOP Instance UID	(0008,1155)	N	Y	U		K								

Attribute Name	Tag	Retd. (from PS3.6)	In Std. Comp. IOD (from PS3.3)	Basic Prof.	Rtn. Safe Priv. Opt.	Rtn. UIDs Opt.	Rtn. Dev. Id. Opt.	Rtn. Inst. Id. Opt.	Rtn. Pat. Chars. Opt.	Rtn. Long. Full Dates Opt.	Rtn. Long. Modif. Dates Opt.	Clean Desc. Opt.	Clean Struct. Cont. Opt.	Clean Graph. Opt.
Referenced SOP Instance UID in File	(0004,1511)	N	N	U		K								
Referenced Study Sequence	(0008,1110)	N	Y	X/Z		K								
Referring Physician's Address	(0008,0092)	N	N	X										
Referring Physician's Name	(0008,0090)	N	Y	Z										
Referring Physician's Telephone Numbers	(0008,0094)	N	N	X										
Referring Physician Identification Sequence	(0008,0096)	N	Y	X										
Region of Residence	(0010,2152)	N	N	X										
Related Frame of Reference UID	(3006,00C2)	N	Y	U		K								
Request Attributes Sequence	(0040,0275)	N	Y	X								C		
Requested Contrast Agent	(0032,1070)	N	N	X								C		
Requested Procedure Comments	(0040,1400)	N	N	X								C		
Requested Procedure Description	(0032,1060)	N	Y	X/Z								C		

Attribute Name	Tag	Retd. (from PS3.6)	In Std. Comp. IOD (from PS3.3)	Basic Prof.	Rtn. Safe Priv. Opt.	Rtn. UIDs Opt.	Rtn. Dev. Id. Opt.	Rtn. Inst. Id. Opt.	Rtn. Pat. Chars. Opt.	Rtn. Long. Full Dates Opt.	Rtn. Long. Modif. Dates Opt.	Clean Desc. Opt.	Clean Struct. Cont. Opt.	Clean Graph. Opt.
Requested Procedure ID	(0040,1001)	N	N	X										
Requested Procedure Location	(0040,1005)	N	N	X										
Requested SOP Instance UID	(0000,1001)	N	N	U		K								
Requesting Physician	(0032,1032)	N	N	X										
Requesting Service	(0032,1033)	N	N	X										
Respiratory Motion Compensation Technique Description	(0018,9185)	N	Y	X								C		
Responsible Organization	(0010,2299)	N	Y	X										
Responsible Person	(0010,2297)	N	Y	X										
Results Comments	(4008,4000)	Y	N	X								C		
Results Distribution List Sequence	(4008,0118)	Y	N	X										
Results ID Issuer	(4008,0042)	Y	N	X										
Reviewer Name	(300E,0008)	N	Y	X/Z										
RT Plan Date	(300A,0006)	N	Y	X/D						K	C			
RT Plan Description	(300A,0004)	N	Y	X								C		
RT Plan Label	(300A,0002)	N	Y	D								C		

Attribute Name	Tag	Retd. (from PS3.6)	In Std. Comp. IOD (from PS3.3)	Basic Prof.	Rtn. Safe Priv. Opt.	Rtn. UIDs Opt.	Rtn. Dev. Id. Opt.	Rtn. Inst. Id. Opt.	Rtn. Pat. Chars. Opt.	Rtn. Long. Full Dates Opt.	Rtn. Long. Modif. Dates Opt.	Clean Desc. Opt.	Clean Struct. Cont. Opt.	Clean Graph. Opt.
RT Plan Name	(300A,0003)	N	Y	X								C		
RT Plan Time	(300A,0007)	N	Y	X/D						K	C			
Scheduled Human Performers Sequence	(0040,4034)	N	N	X										
Scheduled Patient Institution Residence	(0038,001E)	Y	N	X										
Scheduled Performing Physician Identification Sequence	(0040,000B)	N	N	X										
Scheduled Performing Physician Name	(0040,0006)	N	N	X										
Scheduled Procedure Step Description	(0040,0007)	N	Y	X								C		
Scheduled Procedure Step End Date	(0040,0004)	N	N	X						K	C			
Scheduled Procedure Step End Time	(0040,0005)	N	N	X						K	C			
Scheduled Procedure Step Expiration Date-Time	(0040,4008)	N	N	X						K	C			

Attribute Name	Tag	Retd. (from PS3.6)	In Std. Comp. IOD (from PS3.3)	Basic Prof.	Rtn. Safe Priv. Opt.	Rtn. UIDs Opt.	Rtn. Dev. Id. Opt.	Rtn. Inst. Id. Opt.	Rtn. Pat. Chars. Opt.	Rtn. Long. Full Dates Opt.	Rtn. Long. Modif. Dates Opt.	Clean Desc. Opt.	Clean Struct. Cont. Opt.	Clean Graph. Opt.
Scheduled Procedure Step Location	(0040,0011)	N	N	X			K							
Scheduled Procedure Step Modification DateTime	(0040,4010)	N	N	X						K	C			
Scheduled Procedure Step Start Date	(0040,0002)	N	N	X						K	C			
Scheduled Procedure Step Start DateTime	(0040,4005)	N	N	X						K	C			
Scheduled Procedure Step Start Time	(0040,0003)	N	N	X						K	C			
Scheduled Station AE Title	(0040,0001)	N	N	X			K							
Scheduled Station Geographic Location Code Sequence	(0040,4027)	N	N	X			K							
Scheduled Station Name	(0040,0010)	N	N	X			K							
Scheduled Station Name Code Sequence	(0040,4025)	N	N	X			K							
Scheduled Study Location	(0032,1020)	Y	N	X			K							

Attribute Name	Tag	Retd. (from PS3.6)	In Std. Comp. IOD (from PS3.3)	Basic Prof.	Rtn. Safe Priv. Opt.	Rtn. UIDs Opt.	Rtn. Dev. Id. Opt.	Rtn. Inst. Id. Opt.	Rtn. Pat. Chars. Opt.	Rtn. Long. Full Dates Opt.	Rtn. Long. Modif. Dates Opt.	Clean Desc. Opt.	Clean Struct. Cont. Opt.	Clean Graph. Opt.
Scheduled Study Location AE Title	(0032,1021)	Y	N	X			K							
Series Date	(0008,0021)	N	Y	X/D						K	C			
Series Description	(0008,103E)	N	Y	X								C		
Series Instance UID	(0020,000E)	N	Y	U		K								
Series Time	(0008,0031)	N	Y	X/D						K	C			
Service Episode Description	(0038,0062)	N	Y	X								C		
Service Episode ID	(0038,0060)	N	Y	X										
Setup- Technique Description	(300A,01B2)	N	Y	X								C		
Shielding Device Description	(300A,01A6)	N	Y	X								C		
Slide Identifier	(0040,06FA)	Y	N	X										
Smoking Status	(0010,21A0)	N	N	X					K					
SOP Instance UID	(0008,0018)	N	Y	U		K								
Source Image Sequence	(0008,2112)	N	Y	X/Z/U*		K								
Source Manufacturer	(300A,0216)	N	Y	X			K							
Source Serial Number	(3008,0105)	N	Y	X/Z			K							

Attribute Name	Tag	Retd. (from PS3.6)	In Std. Comp. IOD (from PS3.3)	Basic Prof.	Rtn. Safe Priv. Opt.	Rtn. UIDs Opt.	Rtn. Dev. Id. Opt.	Rtn. Inst. Id. Opt.	Rtn. Pat. Chars. Opt.	Rtn. Long. Full Dates Opt.	Rtn. Long. Modif. Dates Opt.	Clean Desc. Opt.	Clean Struct. Cont. Opt.	Clean Graph. Opt.
Source Serial Number	(3008,0105)	N	Y	X			K							
Special Needs	(0038,0050)	N	N	X					C					
Specimen Accession Number	(0040,050A)	Y	N	X										
Specimen Detailed Description	(0040,0602)	N	Y	X								C		
Specimen Identifier	(0040,0551)	N	Y	D										
Specimen Preparation Sequence	(0040,0610)	N	Y	Z									C	
Specimen Short Description	(0040,0600)	N	Y	X								C		
Specimen UID	(0040,0554)	N	Y	U		K								
Start Acquisition Date-Time	(0018,9516)	N	Y	X/D						K	C			
Station Name	(0008,1010)	N	Y	X/Z/D			K							
Storage Media File-set UID	(0088,0140)	N	Y	U		K								
Study Comments	(0032,4000)	Y	N	X								C		
Study Date	(0008,0020)	N	Y	Z						K	C			
Study Description	(0008,1030)	N	Y	X								C		
Study ID	(0020,0010)	N	Y	Z										

Attribute Name	Tag	Retd. (from PS3.6)	In Std. Comp. IOD (from PS3.3)	Basic Prof.	Rtn. Safe Priv. Opt.	Rtn. UIDs Opt.	Rtn. Dev. Id. Opt.	Rtn. Inst. Id. Opt.	Rtn. Pat. Chars. Opt.	Rtn. Long. Full Dates Opt.	Rtn. Long. Modif. Dates Opt.	Clean Desc. Opt.	Clean Struct. Cont. Opt.	Clean Graph. Opt.
Study ID Issuer	(0032,0012)	Y	N	X										
Study Instance UID	(0020,000D)	N	Y	U		K								
Study Time	(0008,0030)	N	Y	Z						K	C			
Synchronization Frame of Reference UID	(0020,0200)	N	Y	U		K								
Target UID	(0018,2042)	N	Y	U		K								
Telephone Number (Trial)	(0040,A354)	Y	N	X										
Template Extension Creator UID	(0040,DB0D)	Y	N	U		K								
Template Extension Organization UID	(0040,DB0C)	Y	N	U		K								
Text Comments	(4000,4000)	Y	N	X										
Text String	(2030,0020)	N	N	X										
Timezone Offset From UTC	(0008,0201)	N	Y	X						K	C			
Topic Author	(0088,0910)	Y	N	X										
Topic Keywords	(0088,0912)	Y	N	X										
Topic Subject	(0088,0906)	Y	N	X										
Topic Title	(0088,0904)	Y	N	X										

Attribute Name	Tag	Retd. (from PS3.6)	In Std. Comp. IOD (from PS3.3)	Basic Prof.	Rtn. Safe Priv. Opt.	Rtn. UIDs Opt.	Rtn. Dev. Id. Opt.	Rtn. Inst. Id. Opt.	Rtn. Pat. Chars. Opt.	Rtn. Long. Full Dates Opt.	Rtn. Long. Modif. Dates Opt.	Clean Desc. Opt.	Clean Struct. Cont. Opt.	Clean Graph. Opt.
Tracking UID	(0062,0021)	N	Y	U		K								
Transaction UID	(0008,1195)	N	N	U		K								
Treatment Date	(3008,0250)	N	Y	X/D						K	C			
Treatment Machine Name	(300A,00B2)	N	Y	X			K							
Treatment Time	(3008,0251)	N	Y	X/D						K	C			
UID	(0040,A124)	N	Y	U										
Verbal Source (Trial)	(0040,A352)	Y	N	X										
Verbal Source Identifier Code Sequence (Trial)	(0040,A358)	Y	N	X										
Verifying Observer Identification Code Sequence	(0040,A088)	N	Y	Z										
Verifying Observer Name	(0040,A075)	N	Y	D										
Verifying Observer Sequence	(0040,A073)	N	Y	D										
Verifying Organization	(0040,A027)	N	Y	D										
Visit Comments	(0038,4000)	N	N	X								C		