

# INTEGRATED PACS SYSTEM

## iQ System PACS

The iQ System PACS software suite is a comprehensive, easy-to-use solution for storing, viewing, and distributing medical images and reports, as well as for managing and optimizing workflows specific to image studies.

**Licensing method:** per hardware device and modules

**Activation method:** serial number linked to the hardware fingerprint of the equipment on which it is installed

### *1) Local component iQ View*

#### **I-1) General features**

- (1) Support for WIN 11 Professional 64 bit
- (2) Support for DICOM data sets other than ISO\_IR 100
- (3) Scalable buttons and font size adjustment (for high-resolution monitors)
- (4) Support for multiple monitors
- (5) Allows the internal database to be deleted each time the application is launched, based on defined study age criteria
- (6) Allows editing of DICOM attributes
- (7) Allows adding, modifying, deleting information (DICOM tags) at study, series, image level
- (8) Allows simultaneous search for studies on multiple DICOM nodes
- (9) StoreSCU; StoreSCP; Q/R; Auto Q/R; PrintSCU
- (10) Localization: English, French, German, Hungarian, Spanish, Polish, Romanian, Russian, Ukrainian<sup>1</sup>

#### **I-2) Study browser**

- (1) Tabular list of studies
- (2) Thumbnail preview
- (3) Virtual tree list at patient level

#### **I-3) 2D viewer**

- (1) Allows image processing (including comparison of multiple studies, image-level filters, synchronization, desynchronization of series)
- (2) Customizable toolbar
- (3) Basic measurement tools—distance, angles, Cobb angle, regions of interest, proportions—with edit/delete options
- (4) Additional measurement tools - perpendicular distances, line-point distances, polygonal region of interest, interior angles (e.g., for measuring the radial inclination of the most important clinical values). Copying measurements made on other images to facilitate the 3D measurement process
- (5) Static and dynamic zoom
- (6) Image movement tools (Pan)

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<sup>1</sup> Other locations are available upon request

- (7) Show/Hide DICOM attributes
- (8) Allows modification of DICOM attributes
- (9) Merge protocols (including the creation of merge sequences and the affiliation of merge-specific tools)
- (10) Image annotation tools (includes storage and saving in presentation state)
- (11) Color schemes for nuclear medicine (GE Color, Hot Iron, Lut7)
- (12) Measuring tool features - during the measurement of distances and angles, the measured value is displayed in real time; when measuring distance, a marker is displayed to determine the center (useful for determining the axis at the bone level)
- (13) Tools for optimizing the quality of displayed images (filters, contrast, brightness)
- (14) Image mirroring - horizontal and vertical
- (15) Allows you to define images of interest
- (16) Image rotation – 90° (clockwise and counterclockwise), 180°
- (17) Zoom in/out on area of interest (digital collimation)
- (18) Customizable guide lines to display plane projections and/or plane intersections
- (19) Allows integration of external 3D applications for image processing or analysis – see paragraph A) III)
- (20) Supports DICOM sequential images
- (21) Window management features for easy manipulation of different applications on the same screen (minimization, restoration)
- (22) White screen for viewing radiological films
- (23) Allows comparison of studies

#### **I-4) 2D post-processing**

- (1) Widget for MPR navigation (Brightness, Contrast, Mirroring, Widths, Thicknesses, Heights)
- (2) Skeleton segment removal
- (3) <sup>2</sup> -stitching for RX images for 2 or more images and obtaining a new DICOM image
- (4) Export images (secondary capture) to local database, external files, or PACS systems

#### **I-5) 3D post-processing<sup>3</sup>**

- (1) Volumetric reconstruction techniques (VRT) for CT and MRI studies
- (2) SSD reconstruction
- (3) MPR tools
- (4) High-quality MIP/MiIP visualization
- (5) Definition of tissue types for volumetric reconstruction
- (6) Predefined displays for different tissue types (lung, bone, abdomen, etc.)
- (7) Easy selection of volume of interest, image filters
- (8) Volumetric cropping and cutting
- (9) Measurement and calculation tools
- (10) 3D rotation, zoom, move, window centering
- (11) Tissue-level scrolling
- (12) Support for navigation systems

#### **I-6) Reporting**

- (1) Reporting module with read/write/edit rights for the basic components of the structured report
- (2) Customization of reporting templates
- (3) Read-only support for other structured report formats

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<sup>2</sup> Licensed separately

<sup>3</sup> Licensed separately

**I-7) Import**

- (1) Import from CD/DVD/USB media
- (2) TWAIN interface (e.g., scanner)
- (3) Import images (BMP, JPEG, PNG, TIFF, RAW, etc.)
- (4) Video file import
- (5) Video capture<sup>4</sup>
- (6) Import from archived files
- (7) Drop box interface

**I-8) Export**

- (1) Export to CD/DVD/USB media
- (2) Direct integration with the iQ-ROBOT interface for creating CDs/DVDs for patients
- (3) Local or network storage locations
- (4) Allows export via email
- (5) Export to other image formats (JPEG, TIFF, BMP, Raw, etc.) or video files including measurements, annotations, etc. – anonymized or not

**I-9) Transfer**

- (1) PACS systems
- (2) DICOM printers
- (3) Third-party DICOM nodes
- (4) Print
  - (a) Customize print layout
  - (b) Tools for adjusting brightness and contrast at the study or printed image level
  - (c) File preview
  - (d) Options to show/hide DICOM information and/or custom text
  - (e) DICOM printing (1:1)
  - (f) Windows® printing
  - (g) PDF printing

**I-10) Interconnection<sup>5</sup>**

- (1) Administration tools for DICOM configuration
- (2) Allows connection to multiple DICOM nodes and worklists
- (3) Interoperability with any other iQ component – enables file transfer using different syntax types
- (4) HIS/RIS integration
- (5) Allows integration with third-party post-processing applications – see paragraph A)III)
- (6) DICOM Query/Retrieve, C-FIND, C-STORE, DICOM print client, and DICOM email

**II) WEB component – iQ WEB****II-1) Server**

- (1) Database
  - (a) MySQL database configurable at patient, study, series, image, and DICOM node levels
  - (b) Configuration of overload management using high water/low water markers, study dates, or other configurable parameters. E.g., storage space limit, DICOM tag content, etc.
  - (c) Storage space management (customizable triggers based on defined study age criteria)

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<sup>4</sup> Licensed separately

<sup>5</sup> See also DICOM Statement of Conformity

- (d) Support for multiple character sets: GB18030 Simplified Chinese, ISO 2022 IR 149 (Korean), ISO 2022 IR 13 (Japanese JIS X 0201), ISO 2022 IR 87 (Japanese JIS X 0208), ISO 2022 IR 159 (Japanese JIS X 0212), ISO\_IR 192 (Unicode), ISO\_IR 100 (Latin Alphabet Part 1), ISO\_IR 101 (Latin Alphabet Part 2), ISO\_IR 109 (Latin Alphabet Part 3), ISO\_IR 110 (Latin Alphabet Part 4), ISO\_IR 144 (Russian), ISO\_IR 127 (Arabic), ISO\_IR 126 (Greek), ISO\_IR 138 (Hebrew Logical Order), ISO\_IR 148 (Latin Alphabet Part 5)
- (e) Automatic backup and restore functions
- (f) Database management tools
- (g) Activity logging
- (h) Daily log files
- (i) Localization: English, French, German, Hungarian, Spanish, Polish, Romanian, Russian, Ukrainian<sup>6</sup>
- (2) DICOM archive
  - (a) DICOM 3.0 compliant
  - (b) Full 64-bit architecture
  - (c) Function monitoring
  - (d) Statistics
  - (e) Allows archiving of images from modalities such as<sup>7</sup> : CT, MR, DX, CR, XA, US, NM, PT, MG, etc.
  - (f) Support for tomosynthesis mammograms
  - (g) Allows interconnection with other DICOM nodes (<sup>8</sup>), including DICOM WEB nodes
  - (h) DICOM interconnection:
    - h.i) Connection verification - Echo
    - h.ii) DICOM C-Store SCP/SCU
    - h.iii) DICOM Query/Retrieve SCP/SCU
    - h.iv) DICOM C-Find SCP/SCU
    - h.v) DICOM C-Move SCP/SCU
    - h.vi) DICOM Print
    - h.vii) DICOM Worklist
  - (i) Allows, per DICOM node:
    - i.i) the definition of the number of connections open simultaneously
    - i.ii) the syntax proposed for receiving/accepting studies from that DICOM node
    - i.iii) definition of users who have access to studies generated by that DICOM node
    - i.iv) the definition of the image storage location
    - i.v) definition of how the hierarchical structure of files will be created in the storage location (based on calendar date or unique study identification number)
    - i.vi) selecting the image compression rate, depending on the bandwidth, using JPEG Lossless, JPEG2000, and JPEG LS transfer syntaxes
    - i.vii) Filtering studies at user level based on source DICOM node, specialist physician, type of investigation
  - (j) Allows restrictions to be applied at the DICOM node level:
    - j.i) DICOM command type (Store, Query, Retrieve)
    - j.ii) DICOM attribute filters (Institution Name, Referring Physician, Reading Physician, etc.)
  - (k) Allows manual transmission of DICOM studies (series, images) to other DICOM nodes:
    - k.i) At a specific time
    - k.ii) Using its own name (its own AET) or another name (another AET)
  - (l) DICOM Part 10 format
  - (m) Automatic verification of worklists, based on customizable rules
  - (n) Verification, validation, and consolidation of DICOM attributes
  - (o) Allows manual reconciliation of studies;
  - (p) Allows automatic reconciliation of patients through worklists or HL7 protocol
  - (q) Allows manual modification of editable DICOM attributes

<sup>6</sup> Other locations are available upon request

<sup>7</sup> For a complete list, request the DICOM Statement of Conformity

<sup>8</sup> The number of connected nodes depends on the type of license (e.g., 2, 5, 15, unlimited)

- (r) Allows definition of rules for dynamic modification of DICOM attributes<sup>9</sup>
- (s) Allows connection to other DICOM servers (PACS system) and their synchronization based on rules:
  - s.i) Synchronization of studies based on the definition of a specific time interval
  - s.ii) Synchronization of studies with an age that can be defined by the user
  - s.iii) Bidirectional synchronization
- (t) Allows archiving of original images and/or images resulting from compression
- (u) Image compression
  - u.i) Allows images to be stored in their original format
  - u.ii) 100% reversible, transparent to the user
  - u.iii) Allows simultaneous storage of images in both original and compressed formats
  - u.iv) Rule-based image compression
  - u.v) Allows compression rates to be set
  - u.vi) Support for Lossless/Lossy compression
  - u.vii) Support for DICOM JPEG/JPEG 2000/ECW compression
- (v) Allows multiple archives to be defined
- (w) Allows working with an unlimited number of storage locations (local, network, NAS, SAN, RAID array, CD/DVD, etc.)
- (x) Allows defining different storage locations per modality
- (y) Allows working with encrypted storage media (AES-256, hardware with or without TPM, etc.)
- (z) Allows the definition of image deletion policies
- (aa) Configure overload management using high water/low water markers, study dates, or other configurable parameters. E.g., storage space limit, DICOM tag content, etc.
- (bb) Automatic pre-fetching of related images based on defined rules, including decompression
- (cc) Allows manual routing of studies to other DICOM nodes
- (dd) Allows automatic routing of studies to other DICOM nodes based on rules
  - dd.i) Applying filters (e.g., modality, study date, physician, institution name, etc.) individually or combined using logical operators (AND and OR)
  - dd.ii) Establishing the DICOM node to which studies will be routed
  - dd.iii) Defining the modality name (AET) used by PACS to communicate with the receiving DICOM node
  - dd.iv) Establishing when routing will take place
  - dd.v) Assigning a priority level to the rule
  - dd.vi) Restricting the routing of files generated by a specific DICOM entity
  - dd.vii) Choosing the type of DICOM syntax used for transfer
- (ee) Allows prioritization of routing operations
- (ff) Allows working with worklists
  - ff.i) Allows transmission/reception of worklists sent to/from third-party systems (RIS, HIS, etc.)
  - ff.ii) Allows the creation of worklists
  - ff.iii) Allows status monitoring (planned, arrived, etc.)
  - ff.iv) Includes algorithms for checking duplicate patient IDs (e.g., identical CNP for two people with different names)
  - ff.v) Allows the creation of rules (e.g., routing) based on information in the worklist (sent/received)
  - ff.vi) Allows importing worklists from text files
- (gg) Study import facilities (series, images, external files): external media, local or network locations - automatic, preset, or manual
- (hh) Allows automatic scanning and import of DICOM files from user-defined locations at customizable time intervals
- (ii) Allows export at study, series, or image level in DICOM format to external locations or CD/DVD media
- (jj) Allows compression of the exported study (series, image) into ZIP archives with the option of including a viewer<sup>10</sup> for viewing the exported study (series, image)
- (kk) Allows export in DICOM or JPEG, PDF format with or without anonymization
- (ll) Allows images to be sent by email in JPEG format

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<sup>9</sup> Licensed separately

<sup>10</sup> The viewer is certified as a medical device

- (mm) Email alerts (newly entered studies, low storage space, etc.)
- (nn) Allows the creation and transmission of automatic emails, SMS notifications about the received study
- (oo) Statistics
  - oo.i) Number of studies: per time interval, per modality, per type of investigation, status, etc.
  - oo.ii) Users: logins, number of studies viewed, interpreted; dictated, transcribed, approved reports, etc.
  - oo.iii) Reports: by diagnosis, type of investigation, status, etc.
  - oo.iv) Reports defined at the request of the beneficiary
- (pp) Allows real-time backup and multiple backup (in different storage locations)
- (qq) Allows activity logging (for information or troubleshooting purposes)
- (3) WEB server
  - (a) HTML5 technology (Microsoft Edge min 85, Mozilla Firefox min 74, Google Chrome min 74, Safari min 10)
  - (b) WEB server configurable on http or HTTPS protocol, with secure TLS/SSL communication, with integration of own security certificate (SSL) or generated by a third party authority
  - (c) Integrates both the user interface and the administration interface
  - (d) Stores the filtering criteria used by the authenticated user in the web browser's cookie files, so that the next time the list of studies is displayed, the studies that match the search criteria last used will be displayed
  - (e) Study list filterable by: type, modality, calendar, patient, order number, study description, referring physician, AET, date of receipt in PACS, etc.
  - (f) Imaging study status monitoring
  - (g) Allows the display of a list of:
    - g.i) Studies – recent, unread, etc.
    - g.ii) Patients
    - g.iii) Work lists
    - g.iv) Scheduled application tasks
    - g.v) Activity log
  - (h) Display studies as a multi-filter list – default view
  - (i) Allows customization of columns to be displayed in the list
  - (j) Allows exporting the list of studies in csv format
  - (k) Allows sorting of lists according to the desired information (e.g. by CNP, patient name, study date, etc.)
  - (l) Allows you to upload (attach) non-DICOM notes and files, including video files, images, Word, Excel, and PDF files at the study and image level
  - (m) Allows automatic/manual marking of studies as read/unread
  - (n) Allows searching at the level of:
    - n.i) Patient – criteria: patient ID, last name, first name, date of birth, study date, etc.
    - n.ii) Study – criteria: Patient ID, patient surname, patient first name, study date, study ID, doctor, type of investigation (CT, MR, US, etc.), date of receipt in PACS, study description, notes attached to the study, etc.
    - n.iii) Series – criteria: series ID, series date, type of investigation (CT, MR, US, etc.), etc.
    - n.iv) Image – criteria: image ID, acquisition date, notes attached to the image, etc.
  - (o) Allows the definition of custom layouts (number of columns displayed, information to be displayed in columns, order of columns, etc.)
  - (p) Allows customization of font display – type, size, color
  - (q) Allows customizations to be saved and automatically loaded regardless of the computer the user logs in to or the browser used for authentication
  - (r) Allows opening multiple studies
  - (s) Allows merging of studies (Merge)
  - (t) Allows splitting a study into different studies (Split)
  - (u) Allows the display of patient history
  - (v) Allows conversion of DICOM video files to HTML5-compatible video formats
  - (w) Allows playback of DICOM video files with or without sound

- (x) Allows setting the idle time after which the connection will be interrupted
  - (y) Portal for radiologists and patients
  - (z) Easy assignment of one or more studies to the physicians designated for interpretation
  - (aa) Facilities for defining standardized reports by Patient Name, Patient ID, Study Date, Referring Physician, Gender, Study Description
  - (bb) Facilities for defining templates for transcription by dictated files
  - (cc) Facilities for defining templates for study anonymization
  - (dd) Allows the definition and management of routine activities (e.g., import, export, routing, etc.)
    - dd.i) Manual
    - dd.ii) Automatic – rules (e.g., DICOM tags), time intervals
  - (ee) Allows the user to modify the profile. E.g.:
    - ee.i) Columns to be displayed in the work list
    - ee.ii) Preferred location for exporting studies
    - ee.iii) Preferred location for storing imported studies
  - (ff) Allows database maintenance
  - (gg) Allows maintenance of the entire PACS system
- (4) Security
- (a) HIPAA and GDPR compliance regarding personal data protection
  - (b) Allows for the definition of an unlimited number of web users
  - (c) Portal for radiologists and patients
  - (d) 12 types of user/group privileges (viewing, modifying DICOM attributes, changing storage location, creating image captures, importing, exporting, downloading, routing, redirecting, editing reports, printing, deleting, uploading, generating WADO links)
  - (e) User access control
  - (f) Two authentication methods
    - f.i) User and password
    - f.ii) Double authentication verification by confirming the authentication code sent by email
    - f.iii) QR code
  - (g) Integrates anti-spam code during authentication
  - (h) LDAP server integration
  - (i) Advanced user management rules
  - (j) Password complexity rules
    - j.i) Defining the degree of complexity
    - j.ii) Password validity period
    - j.iii) User lockout for a customizable period of time after a customizable number of failed attempts
  - (k) Allows logging of user activity, date/time of login, user data, procedure and study details, etc.
  - (l) Allows patient authentication based on ID and date of birth
- (5) Additional features<sup>11</sup>
- (a) WADO
    - a.i) Integrated configuration in the administration interface
    - a.ii) Studies open directly in the viewer, based on the search criteria
    - a.iii) Temporary or permanent access to studies displayed at diagnostic quality
    - a.iv) Integratable with any RIS/HIS via HL7 (ORU) or MDM messages
    - a.v) Predefined automatic authentication
    - a.vi) Customization of link validity period
    - a.vii) Creating the WADO link as a QR code allows quick access, at diagnostic quality, to studies intended for patients or doctors
    - a.viii) Links can be shared via email directly from the WEB interface.
  - (b) WEBX WADO HL7

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<sup>11</sup> Licensed separately

- b.i) Enables integration of<sup>12</sup> with third-party HL7-compatible applications (e.g., HIS, RIS)
- (c) iQ Dictation

- c.i) Enables automatic dictation and transcription of results

## II-2) <sup>13</sup> 2D Viewer – iQ 4View

- (1) HTML5 technology (Microsoft Edge min 85, Mozilla Firefox min 74, Google Chrome min 74, Safari min 10)
- (2) Allows selection of image rendering mode – client-side or server-side depending on user preference and network bandwidth
- (3) Allows interactive work even on slow networks (128Kbit/s)
- (4) Allows working with DICOM images, structured reports, and PDF encapsulated files
- (5) Allows conversion (download) of DICOM files to PDF files
- (6) Support for mobile devices (iOS and Android)
- (7) Allows viewing of any type of image (in diagnostic or compressed format) and structured report
- (8) Displays the first image in a maximum of one second (for a 100Mbit network) and a maximum of 3 seconds (for a 64Kbit network)
- (9) Allows image processing (including comparison of multiple studies, image-level filters, synchronization, desynchronization of series)
- (10) Allows series to be displayed as thumbnails
  - (a) Allows them to be manipulated using drag and drop
  - (b) Allows automatic display (hiding) of thumbnails (AutoHide)
  - (c) Allows manual display (hiding) of thumbnails (Pin)
- (11) Allows the display of reference lines and/or the reference plane according to user preference
- (12) Integrates measurement tools:
  - (a) basic – distance, angles, regions of interest (rectangular, oval, etc.), proportions – with options to modify/delete
  - (b) for orthopedics (e.g., Cobb angle, hip dysplasia angle, George line) and tools for labeling the spine
  - (c) clinical measurements (e.g., thyroid volume, testicles, ovaries, uterus, mitral regurgitation, left ventricle)
- (13) Integrates annotation tools
- (14) Allows saving, deleting annotations and measurements
- (15) Integrates tools for:
  - (a) Scrolling through images
    - a.i) Manual
    - a.ii) Cine
      - Start/Stop
      - Forward/Back
      - 0.5 fps – 50 fps
  - (b) Image movement (Pan)
  - (c) Optimization of displayed image quality (filters, contrast, brightness) at series or image level
    - c.i) Dynamic windowing
    - c.ii) Static windowing
    - c.iii) Auto contrast
    - c.iv) Inverse windowing
    - c.v) Preformatted windows (lung, bone, abdomen, etc.)
    - c.vi) ROI – optimizes contrast and brightness on the user-defined area of interest
    - c.vii) Default values (reset)
  - (d) Image rotation and mirroring – horizontal and vertical
  - (e) Color maps – per series or image
    - e.i) Black and white
    - e.ii) Black and white

<sup>12</sup> Integration services are charged separately

<sup>13</sup> Licensed separately

- e.iii) Color map
- e.iv) Color map negative
- e.v) Default values (reset)
- (f) Zoom
  - f.i) Dynamic (with a minimum ratio of 1:3, 1:2, 1:1, 2:1, 3:1)
  - f.ii) Fit To Area
  - f.iii) Selective (user-defined area) 2x-6x
- (16) Allows calibration of measurements
- (17) Allows definition of areas of interest (polygonal, circular, etc.) with display of average, max, min, standard deviation for HU values
- (18) Allows definition of display mode and window arrangement at study or series level
- (19) Allows display of a window specific to the user-defined area of interest
- (20) Allows setting the number of images to be loaded in a window
- (21) Allows the display/hiding of DICOM attributes
- (22) Allows you to revert to the original format of images – at series or image level
- (23) Allows comparison of studies (series)
- (24) Allows you to work with studies containing more than 50,000 images
- (25) Allows working with high-resolution medical diagnostic monitors
- (26) Allows working with DICOM images with a resolution of up to 38 megapixels
- (27) Allows tomosynthesis to be displayed
- (28) Supports multiple monitors and allows font size adjustment (for high-resolution monitors)
- (29) Allows synchronization of studies (series), including studies with different slice thicknesses or slice distances
- (30) Allows the creation of structured reports with support for UTF-8 character sets
  - (a) Allows the use of templates
  - (b) Allows new templates to be defined or existing ones to be edited from its own interface
  - (c) Allows dictation of findings
- (31) Integrates facilities for defining report templates
- (32) Allows the allocation of multiple reports at the study level
- (33) Allows printing of images and reports
- (34) Allows images to be downloaded in DICOM or jpg/PDF format
- (35) Allows creation of SC (Secondary Capture) type DICOM objects
  - (a) From existing images
  - (b) From external documents
  - (c) Allows management of DICOM SC objects (add, delete)
- (36) PDF and SR support
- (37) Allows studies to be preloaded in the background
- (38) Supports JPEG DICOM/2000 lossless/lossy PNG (lossless)/JPEG 2000 (lossy)
- (39) Support for video files (MPEG 2, MPEG 4)
- (40) Support for ECG studies
- (41) Allows full screen display
- (42) Allows definition of shortcuts for the main tools used with and in the window (contrast, brightness, filters, etc.)

### II-3) 3D WEB viewer<sup>14</sup>

- (1) HTML5 technology (Microsoft Edge min 85, Mozilla Firefox min 74, Google Chrome min 74, Safari min 10)
- (2) Window manipulation tools
  - (a) Move image

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<sup>14</sup> Licensed separately

- (b) Scroll image
- (c) Image zoom in/out tools
- (3) MPR tools (orthogonal, axial, sagittal, coronal)
- (4) CT–PETCT fusion
- (5) Virtual endoscopy
- (6) Volumetric reconstruction with predefined views for organs and tissues
- (7) Double oblique MPR reconstruction
- (8) MPR/MIP comparison tools for 3D image comparison
- (9) MIP, MinIP, Average projections – for 3D reconstructions – with slice thickness configuration
- (10) Cine mode support

### III) Advanced tools<sup>15</sup>

#### III-1) iQ Router

Ideal tool for any frequently used and/or critical connection between imaging centers. Works with state-of-the-art algorithms that compress medical images into a lossless compressed format, maintaining the diagnostic quality of the images. Extensive and fast data transmissions can be achieved, accelerating the imaging workflow.

#### III-2) iQ Dose

A solution that enables automatic monitoring and documentation of the radiation dose applied during imaging procedures and creates automatic overdose notifications to allow medical institutions to take immediate action and meet legal requirements.

#### III-3) iQ Robot

Solution designed for managing the digital distribution of imaging studies and reports on portable optical media such as DVD-R or Blu-Ray. It enables fully automated creation of patient media—including inscription and labeling—from any modality or workstation using Epson® and PRIMERA™ robotic systems.

### IV) Integration with third-party applications<sup>16</sup>

#### IV-1) 3D post-processing – Myrian®

A complete, easy-to-use post-processing solution designed for post-processing DICOM studies generated by any type of imaging equipment regardless of manufacturer (GE, Philips, Siemens, Canon, etc.).

It can be used both locally (standard interface) and in a web browser (HTML5 technology).

It can be used both independently and integrated into the PACS subsystem.

##### (1) General features

- (a) Allows the definition of study search criteria - Institution name, referring physician, Patient ID, Protocol, operator name, name of the physician performing the investigation, name of the physician interpreting the investigation, study description, series description, study date, modality, order number, etc.

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<sup>15</sup> Licensed separately

<sup>16</sup> Licensed separately

- (b) Worklist search facilities;
- (c) DICOM connectivity: DICOM Query/Retrieve, C-FIND, C-STORE, DICOM print client, Modality Worklist, Echo;
- (d) Allows working with studies generated by modalities such as: AR, ASMT, AU, BDUS, BI, BMD, CR, CT, DG, DOC, DX, ECG, EPS, ES, FID, GM, HC, HD, IO, IOL, IVOCT, IVUS, KER, KO, LEN, LS, MG, MR, NM, OAM, OCT, OP, OPM, OPT, OPV, OSS, OT, PLAN, PR, PT, PX, REG, RESP, RF, RG, RTDOSE, RTIMAGE, RTPLAN, RTRECORD, RTSTRUCT, RWV, SEG, SM, SMR, SR, SRF, STAIN, TG, US, VA, XA, XC
- (e) Allows importing studies from external storage media;
- (f) Allows customization of the automatic refresh rate;
- (g) Allows the definition of custom layouts (number of columns displayed, information to be displayed in columns, column order, etc.);
- (h) Image movement;
- (i) Image scrolling (cine);
- (j) Image zoom in/out tools;
- (k) Allows positioning of the anatomical center and 3D cursor location;
- (l) Tools for optimizing image display (contrast, brightness);
- (m) Tools for rotating (90° clockwise and counterclockwise, 180°) and mirroring images (horizontally and vertically);
- (n) Annotation tools;
- (o) Tools for measurements – in plane (distances, angles, areas) and in 3D (volumes);
- (p) Tools for defining regions of interest and displaying volume, area, standard deviation, min, max, average
- (q) Allows ROI transposition to other series;
- (r) Tools for defining paths (create, modify, connect, detach, truncate, extrapolate);
- (s) Tools for defining points of interest and displaying the largest diameter, volume, mean HU, min HU, max HU;
- (t) Tools for calculating the metabolic volume of lesions with SUV threshold definition – PET studies – and 3D ISO Contour by displaying minimum, maximum, average intensity, standard deviation; region volume; threshold used; voxel counting;
- (u) Calibration tools
- (v) Allows synchronization of series (all series in the workspace, all series belonging to the same patient, all series belonging to the same group
- (w) Allows display/hiding of DICOM attributes – demographic data, modality info, W/L, etc. – and annotations
- (x) Allows customization of the DICOM attribute display layout;
- (y) Allows the display layout to be defined at the series/image set level – number of windows, W/L, etc.
- (z) Allows optimization of the windowing level at image or image set level at the same time;
- (aa) Allows full screen display;
- (bb) Allows capturing and saving images together with their settings (windowing, zoom, contrast, annotations, etc.);
- (cc) Allows deletion of saved images;
- (dd) Allows local saving of images;
- (ee) Allows images to be saved to the clipboard;
- (ff) Allows saving the workspace;
- (gg) Allows capture: images, image sets, windows, screens, all screens;
- (hh) Ability to export a video file of the 3D reconstruction with the definition of the rotation axis and its angle;
- (ii) Tools for capturing key images (selected image, all images in the view, combined images, all visible images of the study, entire study, screen capture);
- (jj) Saving images to the Clipboard with or without: DICOM information, Volume ROI, Annotations
- (kk) 3D capture with the possibility of:

- kk.i) customizing the width and height of the image and the number of rotations around the x and y axes
- kk.ii) selecting the export destination: local, PACS (DICOM format), local database (DICOM format)
- (ll) Reporting tools with the possibility of including images in the report;
- (mm) Tools for exporting reports in PDF or DICOM SR format;
- (nn) Printing reports;
- (oo) Printing:
  - oo.i) Customizable print layout (per page or file);
  - oo.ii) Allows image manipulation on pages
  - oo.iii) Printing (1:1) DICOM;
  - oo.iv) Windows® printing;
  - oo.v) PDF printing;
- (pp) Export tools:
  - pp.i) to CD/DVD with anonymization options (DICOM format)
  - pp.ii) avi format
  - pp.iii) gif, jpeg, png, tiff format
  - pp.iv) DICOM RT format
  - pp.v) DICOM SEG format
  - pp.vi) 3D Mesh format
  - pp.vii) to third-party applications
- (2) Advanced features
  - (a) 2D MPR tools (orthogonal, axial, sagittal, coronal);
    - a.i) Native/MPR visualization
    - a.ii) 3D visualization
    - a.iii) ROI creation
    - a.iv) CPR creation and analysis
    - a.v) Reformats (linear, curved, radial, double oblique)
    - a.vi) Endoscopies
    - a.vii) Synchronization of MPR series with native or volumetric series
    - a.viii) Reporting tools
  - (b) Section thickness modification
  - (c) Oblique plane navigation (single, double)
  - (d) MIP/MinIP rendering
  - (e) CPR navigation (extended, straightened)
  - (f) 3D reconstruction of defined ROI surfaces (volumes)
    - f.i) Editing tools
    - f.ii) ROI parameter definition tools (name, color, etc.)
    - f.iii) Measurement tools
    - f.iv) Overlay display with MPR plane
  - (g) 3D navigation
    - g.i) Throughout the entire volume
    - g.ii) Within the volume of interest
    - g.iii) Synchronization with MPR views
    - g.iv) Allows modification of the parameters of the reconstructed 3D area (color, brightness, etc.)
  - (h) Multiphase series visualization
    - h.i) Over time
    - h.ii) In space
    - h.iii) Series synchronization
    - h.iv) Overlay with defined ROIs
  - (i) Virtual endoscopy (airways, blood vessels, colon);
    - i.i) Allows modification of the camera viewing angle
    - i.ii) Allows definition of navigation direction
    - i.iii) Allows automatic, semi-automatic, manual navigation
    - i.iv) Synchronization with native series
  - (j) Segmentation tools: automatic, semi-automatic, manual (mass, tissues, organs, blood vessels, etc.);
  - (k) Segmentation modification and correction tools;
  - (l) 3D VR reconstruction (MPVR) with different highlighting of segmented structures;

- (m) CT/CT fusion; MR/MR; PET/CT; NM/CT
- (n) Facilities for cutting reconstructed 3D images (plane, irregular, etc.);
- (3) Auxiliary features
  - (a) PDF report creation (DICOM PDF);
  - (b) Image stitching;
  - (c) Questionnaire creation;
    - c.i) Creation: generic questions, multiple choice questions, questions based on an image (set of images)
    - c.ii) Saving
    - c.iii) Completion by students
    - c.iv) Correction by teachers
  - (d) Complex annotations and orthopedic measurements;
  - (e) Determination of cardio-thoracic ratio;
  - (f) ADC calculation;
  - (g) Tools for planning resections;
  - (h) Histograms.
- (4) CT Applications
  - (a) Lung Module – CT
    - a.i) Segmentation and quantification of low attenuation tissues<sup>17</sup> ;
      - Low opacities, ground glass, dense (emphysema)
      - Calculation of volumes (in absolute and percentage values) at total and per lung level
      - 3D visualization with highlighting of healthy and affected areas
    - a.ii) Airway segmentation and virtual bronchoscopy;
    - a.iii) Automatic nodule segmentation<sup>18</sup> ;
      - Localization and marking with specific markers
      - Volume determination and display in 3D visualization
      - Customizable display layouts (number of windows, planes, measurements)
    - a.iv) Display of segmented volumes – percentage and absolute values;
    - a.v) Allows determination of doubling time;
    - a.vi) Allows evaluation of nodule response to treatment (in relation to the follow-up module)
    - a.vii) Surgical planning;
    - a.viii) Airway stent planning;
    - a.ix) CPR visualization of the airways;
    - a.x) Clear visualization tools;
  - (b) Colonoscopy – CT
    - b.i) Intelligent virtual colonography;
    - b.ii) Enables automatic segmentation and correction, validation;
    - b.iii) Allows labeling of colon segments;
    - b.iv) Automatic calculation of lesion-rectum distance;
    - b.v) Synchronization of MPR, endoscopy, and thread visualization;
    - b.vi) 3D localization of polyps in DCBE visualization;
    - b.vii) Bowel cleansing;
    - b.viii) Synchronization of prone and supine series;
    - b.ix) Report generation;
  - (c) Blood vessels – CT
    - c.i) One-click blood vessel segmentation;
    - c.ii) Automatic bone tissue removal;
    - c.iii) Automatic calculation of the center line of any segmented blood vessel;
    - c.iv) CPR visualization of the blood vessel;
    - c.v) Predefined protocols and workflows for viewing and analyzing specific anatomical parts (intracranial, carotid, aorta, extremities);
    - c.vi) Automatic selection of the aorta and iliac artery;
    - c.vii) Automatic cross-section navigation window;
    - c.viii) Vascular measurement tools;
    - c.ix) Stenosis quantification and stent planning tools;

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<sup>17</sup> Also available in the artificial intelligence module

<sup>18</sup> Same

- c.x) Dedicated 3D reconstruction mode;
- c.xi) Report generation;
- (d) Cardio-CT
  - d.i) Workflow based on completed report;
  - d.ii) Automatic coronary segmentation;
  - d.iii) Stenosis quantification and stent planning tools;
  - d.iv) CPR visualization of coronary arteries;
  - d.v) Calcium score assessment;
  - d.vi) Agatston score calculation;
  - d.vii) Automatic heart extraction;
  - d.viii) Progressive vessel segmentation tool;
  - d.ix) Report generation;
- (e) Brain analysis – CT
  - e.i) Integrated algorithms: block-circulant SVD (bSVD), Single Compartment (SC), Maximum Slope, and Deconvolution
  - e.ii) Parametric (functional) perfusion maps:
    - BF (blood flow),
    - BV (blood volume),
    - TTP (time to peak)
    - (TDC)
    - MTT,
    - Tmax (time to max),
    - Tau (blood mean transit time from arterial input function)
    - Fv (blood flow)
  - e.iii) Bone tissue removal;
  - e.iv) Brain region templates with ROI display and analyzed parameters
  - e.v) Segmentation of cerebral aneurysms
  - e.vi) Visualization of parametric maps
  - e.vii) Report generation
- (f) Liver – CT
  - f.i) Accurate and fast automatic segmentation;
  - f.ii) Advanced 3D visualization;
  - f.iii) Unmatched surgical planning tools;
  - f.iv) 3D PDF reports;
  - f.v) Automated volumetry and surgical planning tools;
  - f.vi) Multi-scenario report generation;
- (5) MRI applications
  - (a) General MRI module
    - a.i) Protocols
      - Subtraction
      - WashIn – WashOut
      - Time To Peak
      - Area Under the Curve
      - ADC Map
      - DWI Postprocessing
    - a.ii) Image Shift
    - a.iii) Image scrolling
    - a.iv) Image zoom in/out tools
    - a.v) MPR tools (orthogonal, axial, sagittal, coronal)
    - a.vi) Key image capture tools
    - a.vii) Allows customization of workspace
    - a.viii) Reporting tools with the option to include images in the report
    - a.ix) Tools for exporting reports in PDF or DICOM SR format
    - a.x) Report generation
    - a.xi) Report printing
  - (b) Prostate module – MRI<sup>19</sup>
    - b.i) Automatic sequence identification
    - b.ii) Synchronization of series for lesion identification in different planes of orientation
    - b.iii) Lesion measurement tools
    - b.iv) Automatic subtraction of dynamic series

<sup>19</sup> Also available in artificial intelligence mode

- b.v) Automatic calculation of ADC map
- b.vi) Automatic calculation of Peak Enhancement Intensity (PEI), Wash-In (WI), Wash-Out (WO), and TimeToPeak (TTP) values for each voxel of the DCE series and display of the corresponding maps
- b.vii) Semi-automatic calculation of permeability
- b.viii) Dynamic display of Time Intensity curves for contrast agent uptake analysis
- b.ix) Provides two types of workflows (structured and classic)
- (c) Breast Module – MRI
  - c.i) Automatic generation of subtraction series with or without motion correction
  - c.ii) Automatic calculation of ADC map
  - c.iii) Automatic calculation of Peak Enhancement Intensity (PEI), Wash-In (WI), Wash-Out (WO), and TimeToPeak (TTP) values for each voxel of the DCE series and display of the corresponding maps
  - c.iv) Provides two types of workflows (structured and classic)
  - c.v) Enables identification, segmentation, and classification of lesions
  - c.vi) Includes Silicon Implant protocol that allows display and interpretation of acquired sequences of this type
  - c.vii) Allows working in a dual monitor system
  - c.viii) Report generation
- (d) Liver Module – MRI
  - d.i) Automatic sequence identification
  - d.ii) Synchronization of series for identifying lesions in different planes of orientation
  - d.iii) Lesion measurement tools
  - d.iv) Automatic subtraction of dynamic series
  - d.v) Display of lesions per phase or combined across all phases
  - d.vi) Allows working in dual monitor mode
  - d.vii) Report generation
- (6) Mammo mode
  - a.i) Allows working with mammograms – including tomosynthesis
  - a.ii) Allows customization of the workspace
  - a.iii) Enables identification, segmentation, and quantification of lesions
  - a.iv) Report generation
- (7) Fusion Module
  - a.i) Enables image fusion
    - CT - PET\_CT
    - CT - CT
    - MR -MR
    - Nm – CT
    - CT- CR, etc.
  - a.ii) Allows 2D and 3D fusion
  - a.iii) Lesion segmentation
  - a.iv) Allows automatic SUV calculation) – for PET-CT studies
  - a.v) Allows definition of SUV calculation method based on patient weight or body surface area or body mass
  - a.vi) Color range specific to each 3D reconstruction of anatomical and functional series
  - a.vii) Report generation
- (8) Oncology module
  - a.i) Allows comparison of studies to monitor lesion progression
  - a.ii) Follow-up protocols
  - a.iii) Automatic synchronization of key images;
  - a.iv) Lesion segmentation;
  - a.v) Report generation - PDF, DICOM;
  - a.vi) Lesion progression summary;
  - a.vii) Calculation of lesion evolution since the previous investigation and since the start of treatment;
  - a.viii) Report generation;
  - a.ix) Automatic export to PACS;
  - a.x) Export of measurements to third-party applications or locally (txt or xml format)
- (9) XT-Brain Perf. & Diff module<sup>20</sup>
  - (a) General features
    - a.i) Designed for both daily use in clinics and for research purposes
    - a.ii) Standardized post-processing
    - a.iii) Configurable and customizable

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<sup>20</sup> Olea Sphere® 3.0 – Application developed and certified by OLEA MEDICAL – France

- a.iv) Compatible with any imaging equipment
  - a.v) Compatible with any PACS system
  - a.vi) Can be used in various complex IT environments
  - a.vii) Automated, step-by-step workflows
  - a.viii) Customization of calculations
  - a.ix) One-click post-processing
  - a.x) Simultaneous display of multiple parameters
  - a.xi) Calculates and displays instant results in graphical and/or tabular form
  - a.xii) Available for offline processing to increase productivity
  - a.xiii) Display of DICOM information (3 levels)
  - a.xiv) Show/hide dedicated menu for segmentation
  - a.xv) Text editor
  - a.xvi) Automatic creation of multiple windows
  - a.xvii) Content adaptation/Reset view
  - a.xviii) Show/Hide advanced palette
  - a.xix) Reset MPR axes
  - a.xx) VOI management
  - a.xxi) Series overview
  - a.xxii) Start/stop Cine
  - a.xxiii) Switching between views in Multi Planar Reconstruction (MPR)
  - a.xxiv) Navigation in any DICOM (Digital Imaging and Communications in Medicine) series
  - a.xxv) Display, pan, and zoom tools for multiple views
  - a.xxvi) Interactive tools for active manipulation of views
  - a.xxvii) Tools for image manipulation.
  - a.xxviii) Measurements, image annotations, adding comments, generating curves and histograms, reports,
  - a.xxix) Multiplanar rendering, MIPs and volume rendering, including 3D rendering and window leveling presets
  - a.xxx) Curvilinear reconstruction,
  - a.xxxi) 2D reconstruction,
  - a.xxxii) 3D image reconstruction (re-formatting, oblique, grouping, etc.),
  - a.xxxiii) Anatomical library, including the ability to annotate anatomical images that can be accessed by clicking;
  - a.xxxiv) Export of findings, curves, and histograms;
  - a.xxxv) Export series, trajectories, VOI to PACS, Local, File system
  - a.xxxvi) Reports – encapsulated PDF, structured reports, PDF file that can be saved locally (computer or network) or in PACS systems
- (b) Perfusion
- b.i) Automatic segmentation;
  - b.ii) Motion correction;
  - b.iii) Automatic or manual AIF setting;
  - b.iv) Deconvolution methods: sSVD; cSVD; oSVD, Bayesian;
  - b.v) Maps: K2, MTT, rBV, corrected rBV, TTP, rBF, TMAX, tMIP;
  - b.vi) Data export.
- (c) Diffusion
- c.i) Automatic identification of b-value and orientation (Gx, Gy, Gz);
  - c.ii) Automatic calculation of: DWI (isotropic), ADC\_DWI, Exponential\_ADC;
  - c.iii) Automatic segmentation;
  - c.iv) Motion correction;
  - c.v) Spatial smoothing;
  - c.vi) Diffusion map generation;
  - c.vii) Diffusion map customization (axes, counted voxel diameter, displayed curves)
  - c.viii) Reports: encapsulated PDF, PDF, SR.

#### **IV-2) Breast imaging study post-processing – WSOOne®**

Complete, easy-to-use post-processing solution designed for post-processing breast imaging studies generated by any type of imaging equipment, regardless of manufacturer and modality (MG, MR, US, CR, NM, CT, etc.).

It can be used both independently and integrated with the PACS subsystem.

##### **(1) General features**

- (a) Allows visualization, in the same application, of studies from multiple modalities (MG, MR, US, CR, NM, CT, etc.)

- (b) Allows the visualization of mammograms with tomosynthesis.
  - (c) Allows working with 5MP or 10 MP monitors with standard or accelerated image reconstruction.
  - (d) Support for 3MP monitors
  - (e) Allows working with ISD technology monitors;
  - (f) Receives CAD SR reports from CAD applications;
  - (g) Allows manual or automatic configuration of available monitors;
  - (h) Allows working with high-resolution graphics cards (more than 256 shades of gray);
  - (i) Includes dedicated keypad and mouse with programmable options.
- (2) Connectivity
- (a) DSP (Dicom Storage Provider (accepts images transmitted to the application));
  - (b) Configurable mechanism for automatic reconciliation of incoming images with existing cases based on DICOM labels;
  - (c) Allows reception of compressed data – including lossless JPEG, JPEG, RLE, JPEG-2000, and JPEG-2000 Lossy.
  - (d) Allows configurable decompression on reception (to allow a compromise between network speed, disk speed, and CPU performance);
  - (e) Supports worklists for DICOM modalities and allows configuration to trigger case pre-fetching via Query/Retrieve);
  - (f) DICOM Query/Retrieve (can be used interactively or configured as part of the pre-fetch mechanism). Supports both C-MOVE and C-GET.
  - (g) Allows navigation within a PACS archive and manual download of desired cases;
  - (h) Allows importing DICOMDIR and DICOM part-10 files;
  - (i) Allows importing non-DICOM files;
  - (j) Allows reconciliation of imported patients based on DICOM data of existing patients in its own database;
  - (k) Allows DICOM SEND inclusive for SC, encapsulated PDF, SR, and GSPS;
  - (l) Allows export of files in DICOMDIR and DICOM part-10 format;
  - (m) Allows DICOM PRINT in both color and grayscale formats
  - (n) Allows reception of HL 7 messages to trigger pre-fetch and synchronize status with external applications
  - (o) Allows transmission of HL 7 messages to enable synchronization of external applications in terms of status and/or reports (BIRADS)
- (3) Workflow
- (a) Offers customizable protocols specific to mammography analysis;
  - (b) Allows customization of reading stages and their order
  - (c) Allows progression or regression from one stage to another, using either the mouse or keyboard
  - (d) Allows comparison of both the current study and previous studies on the same screen;
  - (e) Allows systematic viewing of images by applying opaque or transparent masks (oblique, horizontal, vertical);
  - (f) Allows viewing of all pixels at full resolution;
  - (g) Includes a stage for displaying CAD reports (where available);
  - (h) Allows tomosynthesis to be included in the same workflow;
  - (i) Workflows can be configured separately for diagnosis or screening;
  - (j) Allows step-by-step workflow navigation, forward or backward, or directly to user-selected steps;
  - (k) Automatically applies validation check marks once an image has been viewed;
  - (l) Customizable layouts for each stage of the workflow;
  - (m) Configurable warning messages indicating, at the end of the workflow, images that have not been viewed;
- (4) List of studies
- (a) Allows automatic creation of worklists based on information received from third-party applications (PACS, RIS, etc.);

- (b) Allows manual, interactive addition of studies to the study list;
  - (c) Allows studies to be deleted from the list;
  - (d) Allows synchronized navigation with an external worklist;
  - (e) Allows status synchronization when working in peer-to-peer networks;
  - (f) Allows the definition of rules for status synchronization – in cases of joint work (multi reader);
  - (g) Allows hiding marks made by previous users if the study is not complete;
  - (h) Allows sorting and filtering of the work list by status, patient name, procedure, study date, institution, etc.;
  - (i) Allows the definition of standard or advanced list styles (for sorting and filtering according to criteria rules);
  - (j) Allows the display of customizable columns to highlight CAD scores and signals between users.
- (5) Image display and annotation
- (a) Full 3D support for tomosynthesis so that *key images* and *user annotations* are generated and displayed at the frame level (position);
  - (b) Mammography image manipulation – same size, chest alignment, elimination of free spaces, annotations opposite the chest walls;
  - (c) Automatic use of modality-specified windowing levels with user-selectable alternatives;
  - (d) Image inversion is performed only at the tissue level;
  - (e) Allows images to be displayed both according to the IHE standard (same size, actual size, current pixel) and non-IHE (framing each image in the viewport, framing the entire image in the viewport)
  - (f) Allows correction of image information: code sequence, laterality, protocol, etc.;
  - (g) Allows images to be marked for presentation, as well as incorrect images to be rejected;
  - (h) Allows images and tomosynthesis frames to be marked with user-defined key notes;
- (6) Viewing tools
- (a) Single magnifying glass that can be used in all viewports with interactive features for changing the magnification factor and size;
  - (b) Dual magnifier that allows simultaneous viewing, at the same scale and size, of areas on paired viewports (multilateral, unilateral, current and previous studies, etc.)
  - (c) Controllable tools for displaying markers, CAD markings, size scales, contrast adjustment;
  - (d) Masks (oblique, horizontal, vertical), opaque or transparent, for simultaneous viewing of the same area in paired viewports;
  - (e) Correlated arc circles (based on nipple distance) that identify suspicious regions;
  - (f) Interactive tools for customizing contrast, brightness, magnification, pan, synchronized or independent per viewport;
  - (g) Image rotation and mirroring tools
- (7) Quality Control tools
- (a) Allows definition and customization of quality criteria;
  - (b) Allows image labeling correction (view, laterality, protocol);
  - (c) Allows hiding or displaying poor quality images;
  - (d) Allows low-quality images to be marked and KOS objects to be created (according to IHE standard)
- (8) Annotation and Marking Tools
- (a) Interactive marking and measurement tools:
    - a.i) Ellipses and quadrilaterals,
    - a.ii) Irregular regions (free hand),
    - a.iii) Linear measurements,
    - a.iv) Arrows,
    - a.v) Text annotations
  - (b) Allows the configuration of marks to automatically generate measurements – dimensions, areas, pixels, etc.

- (c) Allows markers to be correlated for viewing in any type of overlay and correlated with the image type (laterality, etc.);
  - (d) Allows additional information to be associated with each marker;
  - (e) Allows automatic saving, locally and/or in PACS, of markers at the end of the workflow (in GSPS or SC format);
  - (f) Allows layered display of previous markers (GSPS) at the image or tomosynthesis frame level
- (9) Reporting tools
- (a) Allows recording of tissue density and BIRADS score;
  - (b) Allows report templates to be defined and customized;
  - (c) Allows reports to be saved locally and/or in PACS, in SC, DICOM SR, or encapsulated PDF format;
  - (d) Allows printing and emailing of reports;
  - (e) Allows reports to be sent to external applications via HL7;
  - (f) Report dictation tools;
  - (g) Allows the definition of triggers for the use of dictation systems;
- (10) Printing tools
- (a) Supports 10 and 12 shades of gray scales;
  - (b) Supports LUT schemes – for printing on film;
  - (c) Specialized support for mammograms:
    - c.i) Alignment of the chest with the edge of the film;
    - c.ii) Display of annotations opposite the chest
    - c.iii) 1:1 scale printing with automatic film size selection
  - (d) Allows customization of annotation display, markings – thickness, color, overlay;
  - (e) Allows definition of arbitrary overlays – for multimodality printing on the same page;
  - (f) Allows printing of ultrasounds and tomosynthesis (multiframe);
  - (g) Allows viewport printing (prints exactly as seen on screen)
  - (h) Allows printing on both DICOM printers and paper printers
- (11) Advanced features
- (a) For tomosynthesis
    - a.i) All 2D protocols are also available for tomosynthesis;
    - a.ii) Images can be scrolled automatically or manually, in *cine* mode, synchronized or independently;
    - a.iii) Allows viewing of the frame position in the 3D representation of the stylized breast
    - a.iv) Markers, saved layers, key images, or CAD markers can be applied at the frame level along with user-made key notes;
    - a.v) Markers, saved layers, key images, or CAD markers can all be displayed on the frame to which they were applied
    - a.vi) Allows 3D Slab reconstruction – medium, low, or maximum intensity;
    - a.vii) Allows automatic conversion of Siemens tomosynthesis (generated as CT) to DBT format so that it can be analyzed like any other tomosynthesis;
  - (b) CAD display
    - b.i) CAD report display – SR format;
    - b.ii) Display of detailed information from complex CAD reports;
    - b.iii) Display of CAD reports on the corresponding image;
    - b.iv) Automatically extracts and displays tissue density from SR CAD reports;
- (12) Multimodal viewer
- (a) Allows the display of 2D images generated by CR and DX modalities;
  - (b) Viewer that allows the display of studies generated by modalities such as CT, MR, US – including multiframe, NM
    - b.i) Window level, zoom, pan, cine tools
    - b.ii) Allows the definition of layouts that enable display mixes in different windows, synchronized or independently
    - b.iii) Viewer for displaying DICOM SR, encapsulated PDF, and SC;
    - b.iv) Viewer for displaying external web documents;

- b.v) Plug-in for CAD MRI display<sup>21</sup> ;
- b.vi) Plug-in for CAD US display<sup>22</sup> ;
- b.vii) Plug-in for 3D US display (ABUS, AVUS, iVU)<sup>23</sup>

### **IV-3) Integration with artificial intelligence solutions**

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<sup>21</sup> Licensed separately

<sup>22</sup> Licensed separately

<sup>23</sup> Licensed separately