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## IQon Spectral for CT

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### IQon Spectral CT Configuration

The Philips Spectral CT is a first-of-its-kind innovation that allows you to use color within CT images to identify the composition of what you see. Through this quantitative approach you add spectral resolution to your image quality. So you not only get the anatomical information that you are used to with CT, but also uncover the characterization of structures based on material content.

Philips Spectral CT allows for:

- On-demand retrospective data analysis with your traditional workflow and without a special acquisition mode.
- Takes the guesswork out of multi-energy acquisitions - making it easy to use, and allowing for routine spectral use.
- Retrospective spectral analysis made possible through the iPatient platform, so you can experience spectral CT without the need for any special protocols.
- Spectral imaging benefits without complexity and at low dose.

The Philips Spectral CT was built from the ground up for spectral imaging, so now every scan can be spectral on demand.

The IQon Spectral CT family is built from the ground up for spectral imaging. Key features include:

- On-Demand Spectral Results
- NanoPanel Prism Detector
- iPatient
- HyperSight Spectral Reconstruction
- IMR
- iDose4
- Rate Responsive CV Toolkit
- Step & Shoot Complete
- 40 mm z-axis coverage
- AirGlide Gantry with 0.27 second rotation time
- iMRC x-ray Tube with 120 kW generator
- mA range: 10-1000 mA
- 80, 100, 120, 140 kVp tube voltages (Spectral results available on-demand for 120 kVp and 140 kVp acquisitions)
- Eclipse DoseRight Collimator
- Operator console with dual monitor configuration
- Console UPS
- Long table

See IQon Spectral CT product datasheet for descriptions and disclaimers of aforementioned features and capabilities.

### Features

### *On-Demand Spectral Results*

On demand retrospective spectral data analysis means that with the IQon Spectral CT, spectral results are available to clinicians anytime, virtually anywhere (spectral results available on-demand for 120 kVp and 140 kVp acquisitions). No special mode is required. Retrospective spectral analysis is made possible through the iPatient platform, so you can experience spectral CT without the need for special protocols. You scan as you normally do and the spectral information is there, at your fingertips, when you need it. Now with the Philips IQon Spectral CT, every scan can be spectral on demand.

### *NanoPanel Prism Detector*

Through the Philips detector-based spectral approach facilitated by advancements in materials science, this iconic technology allows for:

- On-Demand Spectral Results
- NanoPanel Prism allows for high light output and low cross-talk.
- Top scintillator thickness is optimized for energy separation and low-energy imaging noise, while the bottom scintillator absorbs 99.5% of the high-energy spectrum.
- Simultaneous detection in both time and space
- High light output at low energy

### *iPatient*

Philips' iPatient is an advanced platform that delivers focused innovations to facilitate patient-centered imaging, now and in the future. This powerful Windows® 7-based platform will put our customers in control of innovative solutions that drive confidence and consistency through personalized patient-centric workflow, increase the ability to do complex and advanced procedures with ease and efficiency. iPatient removes unnecessary complexity and allows our customers to drive confidence and consistency 24/7, and prepares for future innovations that will help improve the care being delivered to the patient.

### *ExamCards*

ExamCards are the evolution of the scanning protocol. With ExamCards, the results are planned, not the acquisition as traditionally done in CT; this reduces decision points and clicks, saves time and improves scan-to-scan consistency. ExamCards can include axials, coronals, sagittals, MPRs, MIPS, and other results, all of which will be automatically reconstructed and can be sent off to where they will be read with no additional work required by the operator.

### *iMRC X-ray Tube with 120 kW generator*

- Segmented anode and direct liquid cooling allow high-throughput scanning
- Smart Focal Spot doubles the number of projections for high image quality
- *Spiral Groove Bearing* Precise anode rotation stability for virtually motion-free, focal spot for high image quality

### *AirGlide Gantry*

- Floats on a frictionless cushion of air for high-speed stability
- 0.27 second rotation time

### *Eclipse DoseRight Collimator*

Helps manage delivered dose by eliminating start of scan and end of scan radiation not contributing to image formation in spiral scanning.

## **Reconstruction**

### *HyperSight Spectral reconstructor*

IQon Spectral CT leverages the computational power behind IMR to achieve fast creation of spectral results. This reconstruction engine enables conventional image reconstruction in less than 3 minutes with IMR.

### *IMR\**

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Iterative Model Reconstruction (IMR) sets a new direction in CT image quality with virtually noise-free images and industry-leading low-contrast resolution. Moreover, for the first time physicians are also able to simultaneously combine image quality improvements on conventional images with significantly lower doses.\*\* This improvement is a breakthrough made possible through Philips first iterative reconstruction built on knowledge-based models.

\* Only applies to conventional images.

\*\* In clinical practice, the use of IMR may reduce CT patient dose depending on the clinical task, patient size, anatomical location, and clinical practice. A consultation with a radiologist and a physicist should be made to determine the appropriate dose to obtain diagnostic image quality for the particular clinical task. Lower image noise, improved spatial resolution, improved low-contrast detectability, and/or dose reduction, were tested using reference body protocols. All metrics were tested on phantoms. Dose reduction assessments were performed using 0.8 mm slices and tested on the MITA CT IQ Phantom (CCT183, The Phantom Laboratory), using human observers. Data on file.

#### *iDose4*

iDose4 improves image quality† through artifact prevention and increased spatial resolution at low dose. The design seamlessly integrates into your CT department, and provides you the look and feel of conventional, higher-dose images without long processing times.

† Improved image quality is defined by improvements in spatial resolution and/or noise reduction as measured in phantom studies.

#### *ConeBeam Reconstruction Algorithm – COBRA*

Philips' patented Cone Beam Reconstruction Algorithm (COBRA) enables true three-dimensional data acquisition and reconstruction in helical scanning.

#### *Fast Preview*

Display real-time 512 × 512 matrix image reconstruction and 5 mm × 5 mm contiguous slice display with helical acquisition or off-line reconstruction. Images can be modified for window width and level, zoom, and pan prior to larger matrix reconstruction at the end of the acquisition.

### **Clinical Enhancements**

#### *Spectral CT Viewer*

The Spectral CT Viewer utilizes the spectral results and extended data that is produced by the scanner to provide advanced, user-oriented imaging tools.

#### *Step & Shoot Complete*

Step & Shoot Complete enables low-dose, prospectively ECG-triggered, axial thoracic imaging. Step & Shoot Complete allows gated, submillimeter, isotropic imaging of the entire thorax (up to 50 cm transaxial field of view), including the coronary arteries. Arrhythmias are managed in real-time using proprietary, prospective-detection algorithms to pause acquisition during unstable heart rhythms.

#### *Rate Responsive Toolkit*

Enables cardiac imaging and includes an ECG monitor, Retrospective Tagging, Prospective Gating, the Cardiac Viewer, Heartbeat-CS, and CT Reporting. Uses Philips' exclusive Adaptive Multicycle Reconstruction algorithm to enhance temporal resolution — as low as 34 ms. Includes automatic arrhythmia detection and management.

#### *0.27 Second Rotation*

1.27 second 360° rotation provides outstanding temporal resolution in advanced clinical

applications such as coronary artery imaging, cardiac perfusion and other high-speed, motion-free imaging. The higher speed especially benefits prospective gating and Step & Shoot Cardiac.

#### *DoseRight Cardiac*

ECG-triggered dose modulation reduces tube current up to 80% during acquisition of non-desired phases (estimated overall dose reduction of ~45% for single-phase, end-diastolic imaging). For example, only one phase may be required for coronary CTA, and the system will reduce the mA during the other portions of the acquisition.

#### *Retrospective Tagging*

Spiral Retrospective Tagging allows the CT system to acquire a volume of data while the patient's ECG is recorded. The acquired data is "tagged" using AccuTag and reconstructed retrospectively at any desired phase of the cardiac cycle. This phase selection is accomplished using the Philips' patented Beat- to-Beat Variable Delay Algorithm, which automatically finds the consistent phase for cardiac CT imaging.

#### *Prospective Gating*

Prospectively triggers axial scans using Philips' patented Beat-to-Beat Variable Delay Algorithm for advanced cardiac imaging.

#### *Integrated ECG Monitor*

Philips' advanced ECG monitor is used for gated cardiac scans. Integrated design reduces the need for an additional ECG monitor and stand in the scan room.

#### *COBRA Reconstruction (COBRA Cardiac)*

Philips' patented Cone Beam Reconstruction Algorithm (COBRA) enables true three-dimensional data acquisition and reconstruction in both axial and helical cardiac scanning.

#### *Cardiac Viewer*

A comprehensive cardiac review application that allows quick visualization of one or more cardiac phases, synchronization of multiple cardiac phases with interactive slab-MIP tools for review purposes, cine mode for cardiac axes views and a calculation of End Systolic Volume (ESV), End Diastolic Volume (EDV), Cardiac Output (CO), and Ejection Fraction (EF) for ventricular functional assessment.

#### *Calcium Scoring*

Provides Agatston, Volume, and Mass scores. Incorporates a database of greater than 5,000 asymptomatic multislice calcium scoring scans.

#### *CT Reporting*

Provides capabilities for editable paper, print, and electronic clinical reports; including display of key images and results. Reports are available for paper or electronic distribution to referring physicians, patients, or for medical records.

#### **Dose Management**

Philips' DoseWise philosophy is a set of techniques, programs, and practices that allows optimal image quality, while protecting people in X-ray environments. The IQon Spectral CT platform employs a number of features that help provide dose efficiency.

#### *NEMA XR-29 Compliance*

This system complies with the NEMA XR-29-2013 Standard Attributes on CT Equipment Related to Dose Optimization and Management. The standard includes a group of CT attributes that

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contribute to or help perform optimization/management of doses of ionizing radiation while still enabling the system to deliver the diagnostic image quality needed by the physician. It encompasses: DICOM Radiation Dose Structured Reporting, Dose Check Feature (Dose Notification and Dose Alerts), Automatic Exposure Control (Dose Modulation) and Reference Adult & Pediatric Protocols.

#### *NEMA XR-25 (DoseCheck)*

Supports an operator notification in each ExamCard that will be shown if an acquisition is planned that exceeds a specified CTDIvol or DLP. In addition, an alert is available such that, if an acquisition is planned and the total exam will exceed a specified CTDIvol or DLP, the operator will be required to enter his or her name and (if configured) a password to proceed, or the operator can adjust the scan parameters. Compliant with NEMA XR-25 and XR-29.

#### *DICOM Structured Report for Dose (DICOM SR)*

Dose SR complies with the IEC, DICOM PS and IHE standards for dose reporting. The report includes CTDIvol and DLP dose values. These can be transferred to external systems such as HIS/RIS, PACS, or dose registries.

#### *Locking Protocols*

Prevents unapproved modification of scanning protocols through password-protection.

#### *Dedicated Pediatric Protocols*

Developed in collaboration with top children's hospitals, age-based and weight-based infant and pediatric protocols enhance image quality at low dose.

#### *DoseRight ACS (Automatic Current Selection)*

Personalizes the dose for each patient based on the planned scan by suggesting the lowest mAs settings to maintain consistent image quality at low dose throughout the scan.

#### *DoseRight Z-DOM (Longitudinal Dose Modulation)*

Automatically controls the tube current, adjusting the signal along the length of the scan, increasing the signal over regions of higher attenuation (e.g., shoulders, pelvis), and decreasing the signal over regions of less attenuation (e.g., neck, legs).

#### *DoseRight 3D-DOM (Three-dimensional Dose Modulation)*

3D-DOM combines angular and longitudinal patient information to modulate dose in three dimensions (x-y-z-axis). It incorporates modulation of tube current-time product (mAs) according to changes in individual patient's size and shape in the transverse (x-y-axis; angular) direction during helical scans, in addition changes in the craniocaudal or caudocranial (z-axis; longitudinal) direction, as the tube rotates.

#### *Dose Displays*

- Volume Computed Tomography Dose Index (CTDIvol)
- Dose-Length Product (DLP)
- Dose Efficiency Warning

### **Scan and Image Acquisition**

#### *Scan Ruler*

Provides a visual, highly interactive view of the entire procedure that allows 1-click updates to important study events.

#### *Spiral Scanning*

Multiple contiguous slices acquired simultaneously with continuous table movement during scans allowing for multiple, bidirectional acquisitions.

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#### *Axial Scanning*

Multiple-slice scan with incremental table movement between scans.

#### *Smart Focal Spot*

Doubles the in-plane and longitudinal data sampling density from the detectors effectively doubling the number of detectors and provides high spatial resolution in axial and spiral scanning.

#### *Test Injection Bolus Timing*

Establishes the appropriate contrast injection delay time using a test injection. A real-time graph of the enhancement in a selected region of interest is displayed. The delay time is then selected to provide ideal peak contrast enhancement and reduced contrast usage.

#### *Bolus Tracking*

An automated injection planning technique that permits a user to monitor actual contrast enhancement and to initiate scanning at a pre-determined enhancement level. Combine with SAS for full automation.

#### *Spiral Auto Start (SAS)*

Spiral Auto Start allows the injector to communicate with the scanner. This allows the technologist to monitor the contrast injection and to start the scan (with a predetermined delay) while in the scan room.

#### **NOTE:**

- Costs to upgrade an approved injector and any cabling is the responsibility of the user.
- Contact Philips to verify compatibility with a specific injector.

### **Image Management, Storage, and Filming**

DICOM 3.0-compliant image format. Lossless image compression/decompression is used during image storage/retrieval to/from all local storage areas. Images can be auto-stored to selected archive media.

#### *DICOM DVD/CD writer*

Stores DICOM images and associated image viewing software on DVD/CD media. Images on these DVD/CDs can be viewed and manipulated on PCs meeting the minimum specifications. Ideally suited for individual result storage and referring physician support.

#### *Filming*

Allows the user to set up and store filming parameters. Pre-stored protocols can be set to include auto-filming. The operator can film immediately after each image, at the end of a series, or after the end of a study, and review images before printing. The operator can also automatically film the study at three different windows and incorporate Combine Images functionality to manage large datasets. Basic monochrome and color DICOM print capability are supported.

#### *Networking*

Supports 10/100/1000 Mbps (10/100/1000 BaseT) networks. For optimal performance, Philips recommends a minimum 100 Mbps network (1 Gbps preferred) and for the CT network to be segmented from the rest of the hospital network.

#### *DICOM Connectivity*

Full implementation of the DICOM 3.0 communications protocol allows connectivity to DICOM 3.0 compliant scanners, workstations, and printers; supports IHE requirements for DICOM Connectivity.

### **Operator Console, Patient Handling, and Setup**

The operators' console includes the necessary hardware to use the scanner including host computer, cabinets, dual monitor configuration, and control box. The system provides applications that assist clinicians to improve workflow and planning as well as post processing analysis and review to help you quickly gain the desired view. All of these combine in a graphical interface that allows you to easily execute scans and analyze images.

#### *Automatic Scan*

Enables automatic execution of pre-planned studies, reconstruction, background image archiving to local or remote storage devices, without operator intervention.

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#### *Gantry Control Panels*

Touchscreen interface with integrated ECG display. Audio notification and visual countdown 10 seconds before X-ray On so that operator and staff can exit room before X-ray On.

#### *Breathing Lights and Patient Aperture Panel*

Visual display of breathing instructions coordinated with recorded breath hold instructions (Auto Voice) to improve the patient's experience and compliance.

#### *Intercom System and Autovoice*

The intercom system provides two-way communication between the scan room and the operator console. Additionally, a standard set of commands for patient communication before, during and after scanning is available in several pre-selected languages. Customized messages can also be created.

#### *Dual Surview Planning*

Provides flexibility in exam planning with both anteroposterior and lateral survivals.

#### *Automatic Procedure Selection*

Maps the procedure selection from the HIS-RIS with individual scan protocol(s) simplifying the scanning process. Only the most relevant scan protocol(s) for any requested procedure are shown to the user, so that only the desired scanning procedures are performed. This is especially useful for infrequent users of the CT scanner.

#### *Table Accessories*

Patient restraint kit, table extension, standard head holder, table pad, IV Pole, arm rests, cushions, and pads.

#### *Load and Unload Foot Pedals*

Load and Unload foot pedals allow the operator to move the patient couch to the load or unload position using a foot pedal thus improving patient handling efficiency by freeing the operator's hands to prepare, restrain, or release the patient.

### **Siting information**

*Power Requirements* 380-480 VAC

50/60 Hz

225 kVA supply (175 kVA momentary) Three-phase distribution source

*Note: Windows is a registered trademark of Microsoft Corporation in the United States and other countries.*

### **Enhanced System Warranty Coverage:**

The Philips IQon Spectral CT System will get the following enhanced service coverage for a period of twelve (12) months after completion of installation or availability for patient use, whichever occurs first.

- Extended service coverage hours, Monday - Friday, 8am to 9pm
  - Flexible Planned Maintenance scheduling from Monday - Friday, 7am to 12am and Saturday, 8am to 5pm
  - Onsite labor response of 2 hours\*
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- Expedited parts delivery on same day\*

\* Please note that response and delivery times are dependent on local factors and conditions

### **Ongoing Clinical Support:**

- Continuing Clinical Education equal to two 16-hour onsite visits. This clinical education must be scheduled by the customer and is recommended as one visit between months 13 and 24 and one visit between months 25 and 36 after installation. Terms and conditions of the Philips Clinical Education Flex Account apply.

### **Clinical Education Program for IQon Spectral CT System:**

**Essentials OffSite Education:** Philips will provide up to two (2) lead technologists, as selected by customer, with in-depth lectures covering basic clinical applications, Philips-specific imaging techniques, protocol optimization and scan parameters. An IQon CT "system emulator" is used during the lab sessions to simulate all basic scanning operations without x-ray exposure. Students will graduate from this class with an 80% understanding of the base system functionality. The remaining 20% is covered during the Handover OnSite experience. This twenty-eight (28) hour class is located in Cleveland, Ohio, and is scheduled based on your equipment configuration, geography, and availability. Due to program updates, the number of class hours is subject to change without notice. Customer will be notified of current, total class hours at the time of registration. This class is a prerequisite to your equipment handover OnSite Education, and should be attended no earlier than two weeks prior to system installation. ASRT CEU credits may be available for each participant that meets the Guidelines provided by Philips during the scheduling process. Travel and lodging are not included, but may be purchased through Philips. **It is highly recommended that 989801292078 (CT Full Travel Pkg OffSite) is purchased with all OffSite courses.**

**Handover OnSite Education:** This twenty-eight (28) hour training event will fine tune and expand upon knowledge learned during the Essentials OffSite with focus on maximizing scanning techniques and protocols. This session is to be attended by the same two (2) technologists from Essentials OffSite, and up to two (2) more of your dedicated CT Technologists, preferably from night or weekend shifts if necessary. ASRT CEU credits may be available for each participant that meets Philips Guidelines. Note: Site must be patient-ready. Philips personnel are not responsible for actual patient contact or operation of equipment during education sessions except to demonstrate proper equipment operation.

**Follow-Up OnSite Education:** Clinical Education Specialists will provide twenty-eight (28) hours of follow-up CT OnSite Education for up to four (4) students, selected by customer, including technologists from night/weekend shifts if necessary. CEUs are not available in all cases.

**Follow-Up OnSite Education:** Clinical Education Specialists will provide twenty-four (24) hours of follow-up CT OnSite Education for up to four (4) students, selected by customer, including technologists from night/weekend shifts if necessary. CEUs are not available in all cases. Please read Guidelines for more information, which will be provided to you during the scheduling process. Note: Philips personnel are not responsible for actual patient contact or operation of equipment during education sessions except to demonstrate proper equipment operation.

**Follow-Up OnSite Education:** Clinical Education Specialist will provide twenty-four (24) hours of additional training on IMR and/or Advanced CT OnSite for up to four (4) students, as selected by customer, including technologists from night/weekend shifts if necessary. CEUs are not available



Ref# 618619620621-20140404

2	**	<b>Long Table</b>	1
		<u>Table Specifications:</u>	
		<i>Longitudinal motion:</i>	
		Manual Stroke: 2100 mm (manual stroke)	
		Scannable range: 2100 mm	
		Acquisition Speed: 0.5 to 143 mm/sec	
		0.5 to 185 mm/sec (iCT)	
		Load/Unload Speed: 0.5 to 185 mm/sec	
		Position accuracy: ±0.25 mm	
		<i>Vertical motion:</i>	
		Range: 578 to 1028 mm; 1.0 mm inc.	
		645 to 1065mm; 1.0 mm inc. (iCT)	
		<i>Table load capacity:</i> 204 kg (450 lbs) with full accuracy	
		<i>Floating tabletop:</i> Carbon-fiber table top with foot pedal and handrail control for easy positioning and quick release.	
3	**	<b>Operator's Manual - English</b>	1
4	**	<b>Keyboard Language - English</b>	1
5	**	<b>Adv. Brain Perfusion License</b>	1
		Philips' Brain Perfusion package differentiates areas of increased blood volume and decreased blood flow and presents this information in a summary map. The summary maps may help clinicians distinguish between still-viable and non-viable infarcted tissue. Philips Advanced Brain Perfusion provides motion correction, noise reduction and improved ease-of-use to maximize efficiency.	
		Using serial CT scans obtained with intravenous injection of contrast, the Brain Perfusion package derives perfusion information from the time-density curves based on the uptake of injected contrast material and subsequent tissue enhancement (or lack of). The package generates quantitative color maps of cerebral blood flow (CBF), cerebral blood volume (CBV), mean transit time (MTT) and time-to-peak (TTP), in addition to the summary maps.	
6	**	<b>Jog Scan</b>	1

This Philips-exclusive feature provides up to 160 mm (iCT TVI or iCT), 80 mm (iCT SP, Ingenuity CT, Ingenuity Core, Ingenuity Core128, Brilliance CT 64-channel, or Brilliance CT 40-channel), or 48mm (Ingenuity Flex32, Ingenuity Flex, Brilliance CT 16-, 10- or 6-slice ) of imaging area for perfusion studies. An axial scan is taken in one location, the couch translates to another location within a few seconds, and another axial scan is taken. These multiple datasets are registered automatically to provide the extended coverage. Combined with Philips advanced Brain Perfusion with summary maps, the Jog Scan application can position CT as the modality of choice for acute stroke evaluation, providing unprecedented functional information over the functionally significant area of the brain.

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**Trade in Allowance**

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Product: AQUILON 4  
Serial Number: SNE0A05Y2228  
Manufacturer: TOSHIBA AMERICA MEDICAL SYSTEMS

De-install Date: Not later than 180 days after receipt of Order