

Detailed Technical Specifications

SOMATOM Definition AS (AS64 FAST CARE)

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	<p>The SOMATOM Definition AS (AS FAST CARE, 64-slice configuration) is founded on Siemens' proprietary UFC detector system and the revolutionary STRATON X-ray source. In combination with Siemens' z-Sharp Technology, FAST (Fully Assisting Scanner Technologies) and CARE (Combined Applications to Reduce Exposure) solutions as well as Siemens exclusive CT Clinical Engines options, the SOMATOM Definition AS (AS FAST CARE, 64-slice configuration) offers unprecedented image quality and detail at significantly reduced patient exposure, as well as substantially increased diagnostic speed and confidence thus raising the standard of patient-centric productivity.</p> <p>The STRATON source provides direct oil cooling of the anode, eliminating the need for heat storage capacity (0 MHU). The resulting small and compact design enables an unprecedented cooling rate of 7.3 MHU/min as well as reliable performance even when operating at a very high rotation time of 0.30 sec. In combination with the HeartView CT option temporal resolution of 150 ms of the SOMATOM Definition AS (AS FAST CARE, 64-slice configuration) allows to reliably scan even high heart rates, e.g. in acute chest pain evaluation, in coronary visualization, and in functional analysis of the heart.</p> <p>Together with the unique z-Sharp Technology that routinely enables the industry's highest isotropic and scan field position independent spatial resolution of up to 0.24 mm voxel size, it visualizes the smallest anatomical structures with exceptional quality, whether the complex inner-ear bones, the finest details of the coronary tree or intracranial, pulmonary, mesenteric, renal and peripheral vessels. It also helps to perform accurate stenosis measurements or stent planning with outstanding precision. Neuro head image quality is significantly improved with Neuro BestContrast, by optimizing grey/white matter differentiation without increase in radiation dose.</p> <p>The UFC (Ultra Fast Ceramics) detector of the SOMATOM Definition AS (AS FAST CARE, 64-slice configuration) acquires 64 slices per rotation.</p> <p>In combination with a 78 cm large bore, 200 cm scan range, and the 100 kW (depends on clinic network) generator power, it adapts to virtually any patient independent of size or condition, helping to save precious time from scan to diagnosis to treatment. When doing interventional CT for example, the easy patient access enables fast positioning of interventional instruments and thus provides a larger and more comfortable sterile environment. Or for emergency room examinations, the large bore of the SOMATOM Definition AS (AS FAST CARE, 64-slice configuration) virtually eliminates the necessity to reposition and adjust life support equipment. Additionally, positioning and scanning of bariatric patients is significantly simplified while improving patients comfort.</p> <p>With all this, the SOMATOM Definition AS (AS FAST CARE, 64-slice configuration) offers the unique combination of industry's highest image detail and a very high sub-millimeter volume coverage enabling fast whole body examinations - adapting to challenging patients such as poly-trauma and incautious or uncooperative patients, leading to an improvement in image quality and patient comfort.</p> <p>Siemens has developed many significant products and protocols that follow the "As Low as Reasonably Achievable" (ALARA) principle to reduce radiation dose to the lowest possible level. This desire for as little radiation exposure as possible lies at the heart of our CARE – Combined Applications to Reduce Exposure - research and development philosophy. The SOMATOM Definition AS (AS FAST CARE, 64-slice configuration) consequently offers a unique portfolio of dose saving features; many of them being industries first like the Adaptive Dose Shield, CARE kV or 70kV scan modes. Using Siemens' CARE solutions radiation dose can be significantly reduced compared to conventional CT systems.</p> <p>With the introduction of Siemens' unique FAST CARE platform, the SOMATOM Definition AS (AS FAST CARE, 64-slice configuration) is set to raise the standard of patient-centric productivity. Utilizing FAST – Fully Assisting Scanner Technologies -, typically time-consuming and complex procedures during the scan process are extremely simplified and automated, not only improving workflow efficiency, but optimizing the overall clinical outcome by creating reproducible results, making diagnosis more reliable and reducing patient burden through streamlined examinations.</p> <p>With its unique Adaptive 4D Spiral scan mode (optional) the SOMATOM Definition AS (AS FAST CARE, 64-slice configuration) overcomes the coverage limitations in dynamic CT imaging when using a static detector and allows</p>

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	<p>for up to 9 cm coverage in dynamic CT imaging.</p> <p>In addition the SOMATOM Definition AS (AS FAST CARE, 64-slice configuration) optionally offers a built in 3D minimal invasive suite, enabling 3D guided interventions with full control of the radiologist due to the all new wireless in-room control.</p> <p>Also the SOMATOM Definition AS (AS FAST CARE, 64-slice configuration) offers the widest range of clinical applications options, which allow performing everything from fast and confident diagnoses to comprehensive reporting in only a matter of minutes, reviewing results before the patient is off the table.</p> <p>1. Gantry: Aperture: 78 cm; power supplied via low-voltage slip ring. Scanning system: Detector system based on Siemens' proprietary UFC (ultra fast ceramics) with 23,552 elements, 64 detector electronic channels (DAS) utilized for up to 64 slices/rotation acquisition, and 1,472 measuring channels per slice (The measuring system can contain replacement components).</p> <p>In cases of very low signal at the detector (e.g. when scanning bariatric patients), the Adaptive Signal Boost improves image quality by amplifying individual pixels based on an analysis of the surrounding image data. It reduces streaks and noise and maintains the correct HU values for large patients.</p> <p>Spiral acquisition modes 64-slice configuration: 64x0.6mm, 32x0.6mm, 16 x 0.3 mm (optional with z-UHR), 40 x 0.6 mm8 x 0.6 mm (UHR), 16 x 1.2 mm</p> <p>Sequence acquisition modes 64-slice configuration: 64 x 0.6, 32x0.6, 30x0.6, 20x0.6 mm, 8x0.6 mm (UHR), 2x1mm, 6x1.2 mm, 16x1.2 mm, 12x1.2mm, 1x5 mm, 1x10 mm</p> <p>Three laser light markers: Horizontal, sagittal, and vertical laser light that shows the isocenter position of the scan plane.</p> <p>2. Tube Assembly: Source: STRATON high performance X-ray source. Tube current range: Single source 20- up to 800 mA; Tube anode heat storage capacity 0 MHU. Cooling rate 7.3 MHU/min (5,400 kJ/min). Focal spot size according to IEC 60336: 0.7 x 0.7 mm/7°, 0.9 x 1.1 mm/7°. Computer controlled monitoring of anode temperature, Multifan principle with flying focal spot.</p> <p>3. High Power X-ray Generator: Microprocessor-controlled, low-noise high-frequency generator with integrated, automatic self-testing system for continuous monitoring of operation. Settings: High-voltage range 70, 80, 100, 120 and 140 kV; power max. 100 kW (depends on clinic network), adjustable in fine steps.</p> <p>4. z-Sharp Technology: The unique STRATON X-ray source utilizes an electron beam that is accurately and rapidly deflected, creating two precise focal spots alternating 4,608 times per second. This doubles the X-ray projections reaching each detector element. The two overlapping projections result in an oversampling in z-direction. The resulting measurements interleave half a detector slice width, doubling the scan information without a corresponding increase in dose. Siemens' proprietary UFC (Ultra Fast Ceramic) detectors and the corresponding 64-slice detector electronics enable a virtually simultaneous readout of two projections for each detector element – resulting in a full 64-slice acquisition. z-Sharp Technology, utilizing the STRATON X-ray sources and the UFC detectors, provides scan speed independent visualization of 0.33 mm isotropic voxels and a corresponding elimination of spiral artifacts in the daily clinical routine at any position within the scan field.</p> <p>5. Control and Evaluation Unit: Control box: CT control with patient intercom, user-recordable patient instruction system, 30 automatic patient instruction (API) text pairs are available in nine languages.</p> <p>syngo Acquisition Workplace: The syngo Acquisition Workplace provides an intelligent and reliable workflow for data acquisition, image reconstruction and routine post-processing at the CT scanner. Built on the unique syngo platform, the syngo Acquisition Workplace is intuitive and user friendly. Computer system: High-performance computer with 1x Xeon QC6700, 2.66GHz, NVIDIA Quadro FX1700 DVI graphics card for fast 3D post-processing. High resolution, flicker free, 19-inch (48 cm) color flat panel display for medical diagnostic applications combining the demanding requirements of medical imaging with the advantages of liquid crystal displays. This display provides a resolution of 1280 x 1024 and has a wide viewing angle, features high contrast even under high</p>

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	<p>ambient light conditions. Display light output stability is ensured by controlled backlight throughout the whole lifetime. Keyboard and mouse, 8 Gbyte RAM, 146 Gbyte image storage for 260,000 uncompressed images, CD-R 700 MB for 1,100 images. DVD DICOM with 4.7 GB media for 8,400 images. External USB 2.0 devices for data storage are supported (recommended: Iomega 160 Gbyte External Hard Drive Hi-Speed USB 2.0; Maxtor One Touch 160 Gbyte External Hard Drive).</p> <p>6. CT Image Computer System: Reconstruction computer for the preprocessing and reconstruction of the CT raw data. The reconstruction computer contains of a cluster of 2.2 GHz dual kernel high-performance processors performing the preprocessing and reconstruction of the CT data with up to 40 images per second. The raw data memory is 750 Gbyte.</p> <p>7. Cooling System: SOMATOM Definition AS (AS FAST CARE, 64-slice configuration) can be equipped with either air or water cooling adapting to your room requirements. This optimizes system availability independently of the ambient conditions and reduces expensive reconstruction costs. System operating temperature: 18-28°C, 18 - 75 % rel. humidity (not condensing).</p> <p>8. syngo User Software: syngo features an intuitive and thus easy-to-learn user interface developed from prototypes in close cooperation with users. syngo visualizes the examination in individual process steps on so-called task cards, such as patient registration or examination card. A large number of functions and input parameters as well as the language used can be selected according to individual requirements. Frequently repeated processes can be automated and saved.</p> <p>Patient registration: The system can accept patient data in different ways. These include entering the data via keyboard or transfer of a worklist via network. DICOM Worklist: Software module for accepting lists of patient data and exam requirements from a Radiology Information Systems (RIS) via DICOM Get Worklist functionality. The program enables very efficient working and ensures consistent patient data. In emergency cases, fast registration is possible. Here the system automatically assigns an emergency number which can later be replaced by the actual patient number. The input profile can be designed individually.</p> <p>Examination card: The SOMATOM Definition AS (AS FAST CARE, 64-slice configuration) is delivered with a large number of predefined examination protocols (e.g. for pediatric applications), making examination planning a very fast and efficient procedure. Example: A three-phase examination of the liver available as independent protocol only needs to be adapted to the patient's individual situation. Each examination is represented pictorially as a so-called "chronicle", which views the individual phases of the examination separately. This has the advantage that the individual phases of the examination can be accessed quickly and selectively and changes to the protocol can be made easily in graphical mode via drag-and-drop using the mouse. With a so-called routine window, it is possible to adapt individual examination parameters, representing a submenu of the essential parameters and giving information at a glance about the parameterization of the examination.</p> <p>Viewing card: On the viewing card it is possible to move interactively with the mouse through the image volume of the ongoing examination. The images of different examinations can be displayed simultaneously for comparison. A large number of functions are available for evaluation, documentation and archiving.</p> <p>Filming card: A virtual film sheet shows a 1:1 display of the film sheets to be printed out, thus enabling an effective preview of filming jobs and rewindowing of the images, as well as providing a large number of evaluation functions. Layout changes are possible interactively with up to 64 images. The printout parameters for the autofilming process running in parallel to acquisition or reconstruction are also defined with the filming card. Freely selectable positioning of images onto film sheet, configurable image text.</p> <p>3D card: Secondary reconstruction calculation: Real-time MPR for real-time reformatting of secondary reconstructions. Slice orientation: coronal, sagittal, oblique and double-oblique. Secondary reconstructions can be determined from the topogram, other MPR views or from a 3D surface reconstruction. Reconstruction with selectable slice thickness.</p> <p>CT Angio: Software for the reconstruction of angular projections from the images of a spiral data record for the display and diagnosis e.g. of aneurysms, plaques, stenoses, vascular anomalies or vascular origins. MIP: Maximum Intensity Projection, MinIP: Minimum Intensity Projection and Thin MIP available. Interfering or irrelevant parts of the image can be eliminated with the integrated volume editor. The angular projections are reconstructed</p>

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	<p>around a definable axis, whereby the maximum CT values in this direction are selected for each angular projection. The resulting images can be viewed with the CINE function as a series of images with a 3D image effect.</p> <p>3D Display: Software for the three-dimensional display of surfaces of a body region from a series of continuous slices, for display and analysis of complex anatomies, e.g. the visceral cranium, pelvis, hips, for the purpose of planning surgical interventions. The 3D objects can be tilted and rotated interactively on the monitor and can also be displayed in relation to multiplanar reconstruction (MPR).</p> <p>Volume card: Volume scans of tissues and organs, based on a "region-growing" algorithm and interactive ROI definition.</p> <p>DynEva card: Software for dynamic evaluation of the contrast enhancement in organs and types of tissues, enabling the reconstruction of</p> <ul style="list-style-type: none"> - Time-density curves (up to 5 ROIs) - Peak-enhancement images - Time-to-peak images. <p>Video Capture and Editing Tool: Software contains integrated solution for imaging and visualization of 4D information, allowing the generation and editing of video files for improved diagnoses, recording and teaching. A wide range of multimedia formats is supported, e.g. AVI, Flash (SWF), GIF, QuickTime (MOV), streaming video.</p> <p>Additional task cards available as an option.</p> <p>9. Examination and Evaluation Functions:</p> <p>Topogram: Scanning perspectives: a.p., p.a., lat.; length of scan field: 128 – 1574mm (optional up to 1974 mm), width of scan field: 512 mm, 1.5 - 16s (optional 20.22s). The topogram can be switched off manually when the desired examination length is reached.</p> <p>Tomogram: Scan field size: 50 cm. Standard scan times: 0.30, 0.33, 0.5 and 1 seconds. Slice thickness in sequence: 0.6, 0.75, 1, 1.2, 1.5, 2.0, 2.4, 3, 3.6, 4.0, 4.8, 5, 6, 7, 7.2, 8, 9, 10, 12, 14.4, 15, 20 mm Slice thickness in spiral: 0.4**, 0.5**, 0.6, 0.75, 1.0, 1.5, 2, 3, 4, 5, 6, 7, 8, 10 mm Real-time image display. Immediate image reconstruction and display without time delay simultaneously to data acquisition in 512 x 512 matrix size.</p> <p>Spiral: Scanning technique for continuous volume scans with continuous table feed in multirotation mode. Max. scan time 100 seconds with full low-contrast resolution. Volume length 1540 mm (optional 1940mm) with full low-contrast resolution (max. 200 cm scan range possible using multiple automatic ranges). Selection of the pitch factor between 0.3 and 1.5 depending on scan mode. Selection of up to 33 separately parameterizable examination ranges in a patient protocol. In addition individual anatomic sections can be successively combined and then scanned automatically. Storage of up to 10,000 examination protocols. Rotation times/cycle: 0.30 sec, 0.33 sec, 0.5 sec and 1 sec.</p> <p>Adaptive 4D Spiral (optional): Continuous multirotational data acquisition with continuous smooth bi-directional table movement. Quantitative evaluation and graphical display of time-density curves over entire organs.</p> <p>The intelligent algorithm Neuro BestContrast improves native head image quality especially grey/white matter differentiation. Images are decomposed into high and medium/low spatial frequencies. While relevant tissue information is contained in medium and low frequencies noise is dominated by high frequencies. Separate processing of medium and low frequency information improves the tissue contrast without amplifying image noise resulting in a better signal to noise ratio.</p> <p>Dynamic: Program for functional dynamic examinations. Serial scanning technique in one slice position with variable scans cycle times.</p> <p>Multiscan spiral examination without table feed: Continuous multirotational data acquisition in one slice position. Quantitative evaluation and graphical display of time-density curves.</p> <p>WorkStream4D with Asynchronous Recon: 4D workflow with direct generation of axial, sagittal, coronal, or double-oblique images from standard scanning protocols. Elimination of manual reconstruction steps. Asynchronous Recon allows for multiple image reconstructions and reformats, parallel to scanning. With this feature, up to eight reconstructions job requests can be loaded into a scan protocol. Immediately upon completion of the scan acquisition, these reconstruction jobs are automatically executed in the background without delaying the start of next patient examination.</p>

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	<p>Image reconstruction and storage: Image reconstruction in full resolution (512 x 512 matrix) takes place during the examination with up to 40 images per second, with full cone beam reconstruction, z-Sharp Technology and full image quality. Reconstruction fields of 5 cm to 50 cm through raw data zoom with the possibility of freely selecting the image center either prospectively before each scan or retrospectively. Reconstructions of different slice thicknesses from a single raw data record, e.g. lung soft tissue and lung high-contrast with CombiScan, with simultaneous suppression of partial volume artifacts. Up to 8 reconstructions per scan range can be predefined with the examination protocol. Patient-related storage of the image and raw data.</p> <p>Image display: 1024 x 1024 display matrix; screen splitting configurable up to 64 image segments; CT value scale from -1024 to +3071 HU. For very dense objects, the CT value scale can be extended from -10240 to +30710 HU (extended CT scale) e.g. for suppressing metal artifacts.</p> <p>Image evaluation: Complete software-controlled image evaluation program for all diagnostic requirements.</p> <p>CINE Display: Dynamic display technique for the visualization of time or volume series. A series of up to 1024 images can be displayed at a frame rate of at least 30 f/s. Automatic or interactive mouse-operated control.</p> <p>Multitasking functions: Simultaneous processing during operation of the scanner.</p> <p>Real-time Display: Image reconstruction in pace with the examination in full image quality (512 x 512 matrix) with up to 40 images/second (with full cone beam reconstruction and z-Sharp Technology).</p> <p>Metro Display: Simultaneous display, processing and evaluation of images from other patients while the current patient is being scanned.</p> <p>Metro Documentation: Simultaneous documentation of images from any previously examined patient while the current patient is being scanned.</p> <p>Metro Copy: Automatic transfer of image data to the syngo CT Workplace (optional) or a DICOM network node.</p> <p>10. Network Module: For the connection to a local Ethernet (10, 100 Mbit or 1-Gigabit) in order to communicate with networked printers, diagnostic and therapy workstations, RIS or HIS systems and teleradiology routers.</p> <p>Scope of functions:</p> <ul style="list-style-type: none"> - Configurable network stations. - Unlimited selection of stations. - DICOM Standard (Digital Imaging and Communications in Medicine) for the transfer of information between DICOM-compatible units from different manufacturers. The scope of functions is described in detail in the DICOM Conformance Statement, and the standard version comprises the functions Send/Receive, Query/Retrieve and BasicPrint, Worklist, Storage Commitment, MPPS (Modality Performed Procedure Step). <p>11. Integrated CARE Solutions: UFC Detector: Up to 30% dose reduction compared to conventional CT detectors. High efficiency for low mAs requirements enable best possible image quality with low patient dose.</p> <p>Adaptive Dose Shield: world's first dynamic tube collimation that protects the patient from clinically irrelevant radiation in every spiral scan.</p> <p>CARE Filter: Specially designed X-ray exposure filter installed at the tube collimator. Up to 25% dose reduction with increased image quality.</p> <p>Pediatric Protocols: Special examination protocols with 80 kV and a large range of adjustable mAs values for optimum adaptation of the radiation exposure to the age and weight of the child to be examined.</p> <p>CARE Topo: Real-time topogram, Manual interruption possible once desired anatomy has been imaged.</p> <p>CARE Bolus: Operating mode for CM-enhancement triggered data acquisition. The objective is optimum utilization of the contrast medium bolus in its "plateau" phase in the target organ. This option has been especially adapted to the increased speed and timing requirements resulting from the multirow capability and faster rotation. The CM</p>

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	<p>enhancement is observed via monitoring scans in a user-defined ROI with a trigger threshold. As soon as the enhancement reaches its predefined threshold, the spiral scan is triggered as quickly as possible. License for software use on one modality.</p> <p>CARE kV: First automated, organ-sensitive voltage setting to improve image quality and contrast-to-noise-ratio while optimizing dose and potentially reducing it by up to 60%.</p> <p>CARE Child: Dedicated pediatric CT imaging, including 70 kV scan modes and specific CARE Dose4D curves and protocols</p> <p>CARE Profile: Visualization of the dose distribution along the topogram prior to the scan</p> <p>CARE Dashboard: Visualization of activated dose reduction features and technologies for each scan range of an examination to analyze and manage the dose to be applied in the scan</p> <p>CARE Dose Configurator: Enhancement of Siemens' renowned real-time dose modulation CARE Dose4D, introducing new reference curves for each body region and for each body habitus allowing to adjust the configuration even more precisely to the patient's anatomy.</p> <p>Dose Notification: As requested by the new release of the standard IEC 60601 3rd edition, the SOMATOM Definition AS (AS+ Excel Edition, 128-slice configuration) provides the ability to set dose reference values (CTDIvol, DLP) for each scan range. If these reference values are exceeded the Dose Notification window informs the user.</p> <p>Dose Alert: As requested by the new release of the standard IEC 60601 3rd edition, the SOMATOM Definition AS (AS+ Excel Edition, 128-slice configuration) automatically adds up CTDIvol and DLP depending on z-position (scan axis). The Dose Alert window appears, if either of these cumulative values exceeds a user-defined threshold.</p> <p>12. Siemens Remote Service: Siemens Remote Service (SRS) offers a wide range of medical equipment-related remote services resulting in increased system availability and efficiency. SRS employs sophisticated authentication and authorization procedures, state-of-the-art encryption technologies and logging routines together with strictly enforced organizational measures that provide optimal patient data security and access protection. The following SRS services are included for all service agreement customers and during warranty period:</p> <p>Remote Diagnosis & Repair: In case of an unforeseen system malfunction, Siemens competent experts may directly connect with the CT system in order to identify the problem quickly. Moreover the remote repair function enables Siemens to often correct software errors immediately. Should an engineer on site be required, Remote Diagnosis & Repair allows Siemens to identify defective parts efficiently and accelerate their delivery, thereby keeping repair times to a minimum.</p> <p>Event Monitoring: Event Monitoring screens the performance of the system. If a parameter deviates from a predefined value, a status message is automatically sent to the Siemens UPTIME Service Center. Service Engineers may evaluate the status message at periodic intervals and may initiate appropriate action within the scope of the service agreement.</p> <p>SOMATOM LifeNet: An information and service portal directly at the CT Scanner consoles, featuring up to date information on CT products, application guides, accessories and training schedules as well as download of the latest scan protocols and 90 day free trial licenses on available software applications.</p> <p>Notes on software use: Use of the entire integrated software, including optional software programs, is restricted exclusively to the application with this system.</p> <p>Note: This product is in compliance with IEC60601-1-2 and fulfills CISPR 11 Class A. Note: In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.</p>
	<p>Dose reduction with CT has been limited by the currently used filtered back projection (FBP) reconstruction algorithm. When using this conventional reconstruction of acquired raw data into image data, a trade-off between spatial resolution and image noise has to be considered. Higher spatial resolution increases the ability to see the smallest detail; however, it is directly correlated with increased image noise in standard filtered back projection reconstructions as they are used in CT scanners today.</p>

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	<p>Iterative reconstruction approaches allow decoupling of spatial resolution and image noise. With the Sinogram Affirmed Iterative Reconstruction (SAFIRE), correction loops are introduced into the image generation process. These iteration loops utilize raw-data information to significantly improve image quality. Additionally, image noise is removed in the iterative corrections the without degrading image sharpness. The noise texture of the images is comparable to standard well-established convolution kernels. The new technique results in an image quality with reduced noise and increased image sharpness that can be translated to dose savings of up to 60 %* for a wide range of clinical applications.</p> <p>*In clinical practice, the use of SAFIRE 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. The following test method was used to determine a 54 to 60% dose reduction when using the SAFIRE reconstruction software. Noise, CT numbers, homogeneity, low-contrast resolution and high contrast resolution were assessed in a Gammex 438 phantom. Low dose data reconstructed with SAFIRE showed the same image quality compared to full dose data based on this test. Data on file.</p>
	<p>Siemens has always been at the forefront to deliver highest image quality and reduce radiation dose at the same time to the lowest possible level. But today, an additional barrier has to be mastered to maximize clinical outcome: overcome the growing restrictions and limitation of resources. With FAST CARE, Siemens opens a new chapter in CT, explicitly focusing on the optimization of patient-centric productivity in modern healthcare delivery. With FAST CARE, time-consuming and complex procedures such as scan or recon preparations are extremely simplified – ideally reduced to a single click. The scanning process gets more intuitive and the results become more reproducible.</p> <p>The FAST CARE platform consists the following features:</p> <p>FAST Scan Assistant: An intuitive user interface for solving conflicts by changing the scan time, resp. the pitch and/or the maximum tube current manually.</p> <p>CARE kV: First automated, organ-sensitive voltage setting to improve image quality and contrast-to-noise-ratio while optimizing dose and potentially reducing it by up to 60%.</p> <p>CARE Child: Dedicated pediatric CT imaging, including 70 kV scan modes and specific CARE Dose4D curves and protocols</p> <p>CARE Profile: Visualization of the dose distribution along the topogram prior to the scan</p> <p>CARE Dashboard: Visualization of activated dose reduction features and technologies for each scan range of an examination to analyze and manage the dose to be applied in the scan</p> <p>CARE Dose Configurator: Enhancement of Siemens' renowned real-time dose modulation CARE Dose4D, introducing new reference curves for each body region and for each body habitus allowing to adjust the configuration even more precisely to the patient's anatomy.</p> <p>Dose Notification: As requested by the new release of the standard IEC 60601 3rd edition, the SOMATOM Definition AS (AS+ Excel Edition, 128-slice configuration) provides the ability to set dose reference values (CTDIvol, DLP) for each scan range. If these reference values are exceeded the Dose Notification window informs the user.</p> <p>Dose Alert: As requested by the new release of the standard IEC 60601 3rd edition, the SOMATOM Definition AS (AS+ Excel Edition, 128-slice configuration) automatically adds up CTDIvol and DLP depending on z-position (scan axis). The Dose Alert window appears, if either of these cumulative values exceeds a user-defined threshold.</p>
	<p>With Siemens' unique STRATON tubes, the tube voltage can now be reduced to 70kV which helps to reduce radiation exposure to patients. With prior tube technology, the minimum tube voltage setting was 80 kV. The new tube voltage setting of 70 kV helps to further reduce the radiation dose to small pediatric or neonate patients.</p> <p>CARE Child consists of:</p> <ul style="list-style-type: none"> - dedicated 70 kV scan modes - new CARE Dose4D curves for children

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	<ul style="list-style-type: none"> - respective Children Protocol utilizing these features
	<p>DoseMAP consists of three parts. These three parts in combination with each other deliver a complete and comprehensive dose management.</p> <p>Report Dose: Create transparency and document dose values.</p> <ul style="list-style-type: none"> - <u>DICOM SR Dose Reports:</u> DICOM structured file allows for the extraction of dose values (CDTIvol, DLP) - <u>DoseLogs:</u> Whenever a limit exceeds the set up reference dose levels (Dose Notification and Dose Alert) automatically a report is created on the system. The report can for example be used for audit purposes. <p>Analyze Dose: Assess the dose situation.</p> <ul style="list-style-type: none"> - <u>CARE Analytics:</u> makes it possible to set a query and retrieve DICOM SR Dose Reports. With CARE Analytics it is possible assess DICOM SR Dose Reports from different DICOM nodes and document dose data to get an insight in radiation dose per case or examination type, cumulative dose per patient or to start in-house dose reporting. Exported and structured dose information makes it possible to monitor the dose over time and gives an insight in the radiation values per examination type. Based on that outcome, measures may eventually be defined to reduce dose. - <u>CARE Dashboard:</u> Pre-examination dose check-up by showing an overview of all the used dose reduction features per scan. - <u>CARE Profile:</u> Pre-examination dose check-up by displaying the dose distribution prior to the scan at every z-position. <p>Protect Dose: Manage access to protocols and potentially protect patients from over-radiation</p> <ul style="list-style-type: none"> - <u>Access protection:</u> by setting a password it is only possible to change and access the scan protocols in the Scan Protocol Assistant by authorized staff members only. - <u>Dose Notification and Dose Alert:</u> Both functionalities may help to protect from over-radiation and warn the operator in case set dose thresholds are exceeded. Dose Notification checks the dose values per chronicle entry. Dose Alerts checks the accumulated dose per z-position.
	<p>The FAST Advanced Package consists the following features:</p> <p>FAST Planning: assists the scan and reconstruction planning, based on a topogram, to provide an easier, faster and standardized workflow in CT scanning. FAST Planning features the selection of the anatomical region of interest from a list prospectively defined scan and reconstruction ranges, automatic detection of the scan region(s) of interest and proposal of corresponding scan range(s) in the topogram (in a narrow or wide lateral FOV), optimized FOV and automatic iso-center adaptation for Head scans.</p> <p>FAST Spine: provides various modes that automatically create anatomically orientated spine reconstructions based on a 3D volume. It provides an easier, faster and standardized workflow in CT scanning. FAST Spine features automatic segmentation of the spinal canal, automatic labeling of the vertebrae, anatomically oriented slices – (orthogonal to the spinal canal), coronal and sagittal reconstructions which refer to the curvature of the spinal column and more. All modes offer the possibility to adapt the results manually.</p> <p>FAST Adjust: assists the user to handle system settings in a fast and easy way by automatically solving of conflicts within user defined limits by one single click on the FAST Adjust button. The limits for scan time and tube current per scan are defined via the Scan Protocol Assistant. FAST Adjust offers an undo functionality to return to previously set values.</p> <p>FAST Cardio Wizard: an intuitive guidance software, fully integrated in the cardio workflow. It allows training the cardiac workflow and provides guidance and support during the examination. It is based on the latest cardio</p>

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	<p>application training material and provides helpful tips to avoid common problems and pit-falls. It features step-by-step on-screen for various cardiac examinations. Text and images are delivered in a default setting based on Siemens' latest application training, but are fully customizable by the user.</p> <p>The FAST Advance Package requires the FAST CARE Platform. FAST Spine requires Workstream 4D. FAST Cardio Wizard requires HeartView CT.</p> <p>In today's clinical environment, there are cases for which it is important to visualize areas outside of the normal 50 cm CT scan field. For this reason, special reconstruction algorithms have been created to allow for visualization of objects using a FOV up to 78 cm. This extra versatility was primarily created to assist with radiation treatment planning applications. The image quality for the area outside the standard 50 cm scan field does not meet the image quality specifications shown in the technical data sheet (non-diagnostic image quality). Image artifacts may be common in the area outside the normal 50 cm scan field, depending on the anatomy scanned.</p> <p>The CT Oncology Engine permits access for one user for the following software modules:</p> <p>syngo.CT Segmentation provides advanced features for easy and fast CT oncology reading. It supports the automated segmentation and evaluation of lesions in lung, liver, lymph nodes and other organs. Additional quantifications like Choi criteria and Advanced HU Statistics provide enhanced clinical insights in assessment of potential cancerous lesions.</p> <p>In detail the application provides:</p> <ul style="list-style-type: none"> - Follow up of multiple time-points - Simultaneous two time point visualization and comparison - 3D evaluation of lesions measurements - Automated single click segmentation of lung and liver lesions, lymph nodes, and general lesions - Easy adaptation of segmentations - Auto-measurements and display of RECIST 1.0 or 1.1, WHO and volume data - Calculation and display of Choi criteria (Mean HU and Std. Dev. HU combined with unidimensional measurements) - Advanced HU Statistics and display of hypodense areas of lesions as potential indicator of therapy response - PET visualization and basic evaluation CT, PET, and MR data. In case additional image data from MRI or PET are available images can be evaluated in the oncology reading environment. Images will be automatically registered and synchronized with the CT data sets. <p>syngo.PET&CT Cross-Timepoint Evaluation enables physicians to quantify changes in tumor activity and size between time points, typically during evaluation of therapeutic response (e.g. pre- and post-therapy) to assess disease status and treatment efficacy, by comparing quantitative analysis of volume, RECIST, WHO, minimum, average and maximum functional uptake.</p> <p>In detail the application provides:</p> <ul style="list-style-type: none"> - Calculation of tumor growth rate, tumor burden, and tumor volume doubling time between different time points - Trending - visually trend lesion measurements (e.g. RECIST / volume) over time - Follow up of multiple time points - Simultaneous four time point visualization, comparison and synchronous navigation including anatomical, functional and fused data <p>syngo.CT Colonography combines the advantages of 2D and 3D reading strategies. Flexible screen layouts and dual monitor support permit instant switching between the 3D endoscopic view and the corresponding 2D images. Even more, the reading physician can choose to perform a synchronized flight in both prone and supine positions. The registered navigation offers both endoscopic views in a side-by-side display on up to two monitors for an easier differentiation of potential lesions. The Findings Navigator automatically collects and stores all the potential lesions when marked.</p> <p>In detail the application provides:</p>

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	<ul style="list-style-type: none"> - Non-invasive, virtual colonography based on low-dose, high-resolution CT scans - Synchronized real-time display and analysis of two scans (prone and supine) on up to two monitors - Support of dual monitor setup - Synchronized update of endoscopic, axial and global views - Real-time virtual endoscopic viewing in premium image quality, using high performance rendering techniques - Fully automated flight path finding - Solid or barium enema-type display of entire colon for easy overview of path - Overview segment containing flight path and marked pathologic findings - Semi-automated polyp measurement in 3D endoscopic view - Visualization of stool tagging - A panoramic endoscopic view of the colon allows the user to visualize the colon in both directions, enabling visualization of the area behind folds while flying in one direction. - The Findings Navigator collects, stores, and exports findings of potential lesions. - Findings can be reviewed from the Findings Navigator and reported easily according to C-RADS standard. <p>All results are stored in <i>syngo.via</i>'s findings navigator.</p>
	<p>The CT Oncology Engine Pro permits access for one user for the following software modules:</p> <p>syngo.CT Lung CAD is a computer-aided detection tool designed to assist radiologists in the detection of solid pulmonary nodules during review of CT examinations of the chest. Results are automatically processed immediately after the dataset is sent to <i>syngo.via</i> and are ready for reading as soon as the patient case is loaded. The software is an adjunctive tool to alert the radiologist to regions of interest (ROI) that may have been initially overlooked. <i>syngo.CT Lung CAD</i> is intended to be used as a second reader tool after the initial read has been completed. All <i>syngo.CT Lung CAD</i> findings are stored – sorted by size – in <i>syngo.via</i>'s findings navigator.</p> <p>syngo.CT Colonography - PEV is a fully automated computer assisted second reading tool for automated detection of colon polyps. The software is an adjunctive tool to alert the radiologist to regions of interest (ROI) that may have been initially overlooked. Results are automatically processed immediately after the dataset is sent to <i>syngo.via</i> and are ready for reading as soon as the patient case is loaded. All PEV results are presented in the Findings Navigator, where relevant findings can be reviewed and reported easily according to C-RADS standard.</p> <p>syngo.CT Colonography - Advanced is an option to <i>syngo.CT Colonography</i> consisting of the Polyp Lens, the Stool Removal functionality, and Virtual Dissection.</p> <p>The Polyp Lens provides advanced visualization by color coding the CT values behind the surface of tagged fecal residue in the virtual endoscopic display. This allows the user to distinguish potential polyps from residual stool, lipoma and other structures.</p> <p>The Stool Removal functionality enables the user to remove residual stool from the visualization in the 2D MPRs and the 3D endoluminal view. The user can quickly toggle between Stool Removal and regular display to assess potential polyps which might be hidden in residual stool cavities.</p> <p>Virtual Dissection provides an advanced visualization which unfolds the colon so that the mucosal surface is displayed in one plane. For visualization of the colon in its entire length the user can scroll the organ from one end to the other.</p> <p>syngo.PET&CT Onco Multi-Timepoint enables simultaneous visualization of up to 8 time points with specific layouts enabling synchronous scrolling and navigation through all datasets. Especially in cases with many prior examinations combined with multi-modality acquisitions, e.g. PET/CT, this functionality assists in visually keeping track of the complete patient history.</p>
	<p>The option supports adaptive prospective ECG-triggered sequence scanning and adaptive retrospective ECG-gated spiral scanning to obtain CT images of the heart in defined phases of the cardiac cycle at a minimum rotation time of 0.33 s. With prospective ECG-triggered sequence scanning, quick scans are triggered by ECG signals. A temporal resolution of up to 165 ms can be achieved. Retrospective gating is based on a continuous spiral scan with simultaneous ECG recording. The cardio spiral reconstruction allows volume imaging in selectable phases of the cardiac cycle.</p>

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	<p>With retrospective ECG-gated spiral scans the ECG signal can be edited for improved image quality in the case of severe arrhythmia. A dedicated "Preview" tool enables the planning of the volume reconstruction during an optimal cardiac phase on the basis of axial single slices. With ECG-pulsed control of the tube current a dose reduction of approx. 50% can be achieved with retrospective ECG-gated spiral scans. The special scan protocols "Cardio-Care" and "Cardio-Sharp" offer a special filter technique for cardiac examinations for improved sharpness and a lower dose.</p> <p>ECG-controlled imaging techniques are the basis for both the quantification of calcified plaques in the coronary arteries (calcium scoring) and 3D reconstructions of the heart and coronary arteries in contrast media studies (CT angiography of the heart). Retrospective ECG gating also allows functional imaging of the heart. Moreover, these techniques suppress pulsation or motion artifacts in the lung and in vessels close to the heart (e.g. ascending aorta). The ECG signal is supplied by an ECG device integrated in the gantry.</p>
	<p><i>syngo</i> Calcium Scoring supports easy volumetric processing of the data and treats individual calcified lesions as 3D objects. For effective visualization <i>syngo</i> Calcium Scoring allows axial images to be displayed together with fast, interactive MIPs. On each image the user can mark calcified regions in up to four coronary arteries. The tabular display showing the score of the four arteries is updated automatically.</p> <p>The software supports all the usual quantification algorithms: Agatston scoring, volumetric scoring and calcium mass quantification. The effect of overlapping slices is compensated. The volume and mass can be determined on the basis of basic volumetric scoring or volumetric scoring with continuous interpolation. The calcium mass is determined in equivalent CaHA units and is calibrated automatically for SOMATOM systems via the scan mode. The threshold for identifying coronary calcifications is configurable.</p> <ul style="list-style-type: none"> - User input of calibration factors (allows evaluation of calcium mass for non - Siemens images, if the factors are known) - Automated selection of coronary calcifications by "3D picking" functionality, which allows automatic volumetric region growing of connected lesions in successive slices. - Interactive selection/deselection of regions which contribute to calcium scoring. - User-defined assignment of lesions to one of the four arteries (LM, LAD, CX, RCA) or to other lesions or structures. - 3D editing of lesions. - Image annotation - Built in Framingham Risk calculator - Built in Procam Risk calculator - Patient size adjusted calculation of calcium mass, based on the recommendations of the "International Consortium for Multi-Detector CT Evaluation of Coronary Calcium" <p>Report Generation via List & Label including free text and clinical images</p> <ul style="list-style-type: none"> - Saving on floppy disk/hard disk and/or printing - Interface to user-defined reference table can be used for risk - Stratification. The corresponding risk percentile information can be included in the report - Easy and fast Report Configuration for customized hospital/office - information on the final report - Printing of results on laser film and paper printer. - Export of results to RTF, PDF, JPEG, etc. - Export of results as Dicom SR <p>Prerequisites: Correct operation of the software option is guaranteed only for image data collected using SOMATOM scanners with HeartView Option.</p>
	<p>The application computes a bone subtracted volume dataset maintaining all information about vascular and soft tissue structures for further processing. The result of the application is a new CTA volume without bones but maintaining all other information for further processing in the Neuro DSA (Digital Subtraction Angiography) CT application or any other suitable application.</p>

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	<p>Workflow</p> <ul style="list-style-type: none"> - The completely automated algorithm makes this application easy to use - The NECT dataset can either be reconstructed from a standard spiral CT scan acquired for diagnostic purposes or from an additional low dose NECT scan - CTA dataset will be loaded first, followed by either a volume dataset without contrast media (NECT) or a calculated dataset (Neuro DSA dataset) - Calculation subtracts both scans - During evaluation, toggling between CTA dataset and Neuro DSA dataset is possible <p>Image display</p> <ul style="list-style-type: none"> - Display settings in VRT and MPR modes (thick and thin MPR, MIP, thin MIP) are supported <p>Documentation</p> <ul style="list-style-type: none"> - <i>syngo</i> filming and saving can be used to save result images in the database.
	<p>The i-Control CT* wireless remote control module allows for</p> <ul style="list-style-type: none"> - Control of scan range - Selection of table movement (incremental and continuous - Control table position, e.g. store last table position, move to stored or scanned position - Toggle between different datasets - Scrolling through datasets - Windowing of datasets <p>The ICM can be attached to the side-rails of the table*, an ICM trolley* or can be used freehand in the scan room.</p> <p>* optional</p>
	<p>Consisting of: Monitor, video transmitter, video receiver, power supply cable and a 30 m fiber-optic cable set for connecting the flat screen monitor.</p>
	<p>The space-saving ceiling installation along with the large movement range of the support allow maximum operating convenience when positioning the monitor.</p> <p>Consisting of: Ceiling support with installation kit, voltage supply.</p>
	<p>Scope of delivery and functions:</p> <ul style="list-style-type: none"> - High-resolution, flicker-free monitor with 48 cm (19 in) flat screen, 1280 x 1024 resolution, 75 frames/s for parallel viewing and visual checking during the examination. The max. depth of the monitor is only 111 mm. Display suitable for medical diagnostic applications (room class 1 and 2 acc. To DIN 6868-157). <p>In addition, a ceiling support or a monitor cart is required for installing the flat screen monitor (optional).</p>
	<p>The unique STRATON X-ray source utilizes an electron beam that is accurately and rapidly deflected, creating two precise focal spots alternating 4,608 times per second. This doubles the X-ray projections reaching each detector element. The two overlapping projections result in an oversampling in z-direction. The resulting measurements interleave half a detector slice width, doubling the scan information without a corresponding increase in dose. Siemens' proprietary UFC (Ultra Fast Ceramic) detectors and the corresponding 64-slice detector electronics enable a virtually simultaneous readout of two projections for each detector element – resulting in a full 64-slice acquisition. This sampling scheme is identical to that of a 64 x 0.3 mm allowing for reconstruction of 192 slices using 0.1 mm reconstruction interval increment. z-Sharp Technology, utilizing the STRATON X-ray sources and the UFC detectors, provides scan speed independent visualization of 0.33 mm isotropic voxels and a corresponding elimination of spiral artifacts in the daily clinical routine at any position within the scan field.</p>
	<p>This SOMATOM Definition scanner offers two specific scan protocols to provide Lung Imaging at 1.5 mGy CTDI or</p>

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	<p>greater and for use with post-processing applications</p> <p>LungLowDose Uses CARE Dose 4D in conjunction with CARE kV and adaptive dose shield to provide imaging of the lung with a default scanner protocol set at 1.5 mGy CTDI. This protocol provides images from .6 mm and are acquired using .6 mm collimation and a z-sharp mm of 64X0.6 mm off. Default settings of a reference kVp of 120 and quality Reference mAs of 20 with rotation speed of .50 are used to achieve this dose. This protocol is set using a Kernel of B70f, B31F and B70F for axial viewing.</p> <p>LungCARE Uses CARE Dose 4D in conjunction with CARE kV and adaptive dose shield to provide imaging of the lung with a default scanner protocol set at 1.5 mGy CTDI. This protocol provides images from .6 mm and are acquired using .6 mm collimation and a z-sharp mm of 64X0.6 mm off. Default settings of a reference kVp of 120 and quality Reference mAs of 20 with rotation speed of .50 are used to achieve this dose. This protocol is set using a Kernel of B80f, B31F and B60f to be automatically transferred and post-processed on a Siemens workstation.</p>
	<p>Eaton Surge Protective Device (SPD) Panel, 250kA per phase rating, 277/480VAC Wye, Three Phase (4W+G), Surge Counter, Dimensions 12.05"H x 7.47"W x 6.69" D, Weight: 13.5 lbs, 10 Year Limited Warranty</p>
	<p>FAST 3D Align automatically corrects misalignment of anatomic structures, organs of the patient. It aligns those to fit it to the selected reconstruction plane for a highly automated reconstruction workflow. Additionally it minimizes the black area in the image through automatically adjusts recon field of view selection.</p> <p>FAST 3D Align requires Workstream 4D.</p>
	<p>The iMAR metal artifact reduction algorithm combines three successful approaches to reduce metal artifacts: beam hardening correction (in sinogram regions of less severe metal attenuation), normalized sinogram inpainting (in sinogram regions of high metal attenuation), and frequency split (to mix back noise texture and sharp details that are potentially lost during inpainting).</p> <p>The correction process is then iteratively refined by repeating the normalized sinogram inpainting and the mixing steps thanks to the Adaptive Sinogram Mixing.</p> <p>Along with the new algorithm comes the simple user interface of iMAR. Besides the typical reconstruction parameters it only requires to select the desired protocol from a drop down menu which contains the following type of implants: dental fillings, neuro coil, thoracic coil, hip implants, extremity implants, pacemakers, spine implants and shoulder implants.</p>