

DISCLAIMER: TO THE EXTENT ALLOWED BY LOCAL LAW, THIS INFORMATION IS PROVIDED TO YOU BY THE AMERICAN ASSOCIATION OF PHYSICISTS IN MEDICINE, A NON-PROFIT ORGANIZATION ORGANIZED TO PROMOTE THE APPLICATION OF PHYSICS TO MEDICINE AND BIOLOGY, ENCOURAGE INTEREST AND TRAINING IN MEDICAL PHYSICS AND RELATED FIELDS ("AAPM"), 'AS IS' WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, WHETHER ORAL OR WRITTEN, EXPRESS OR IMPLIED. AAPM SPECIFICALLY DISCLAIMS ANY IMPLIED WARRANTIES OR CONDITIONS OF MERCHANTABILITY, SATISFACTORY QUALITY, NONINFRINGEMENT AND FITNESS FOR A PARTICULAR PURPOSE. SOME JURISDICTIONS DO NOT ALLOW EXCLUSIONS OF IMPLIED WARRANTIES OR CONDITIONS, SO THE ABOVE EXCLUSION MAY NOT APPLY TO YOU. YOU MAY HAVE OTHER RIGHTS THAT VARY ACCORDING TO LOCAL LAW.

TO THE EXTENT ALLOWED BY LOCAL LAW, IN NO EVENT WILL AAPM OR ITS SUBSIDIARIES, AFFILIATES OR VENDORS BE LIABLE FOR DIRECT, SPECIAL, INCIDENTAL, CONSEQUENTIAL OR OTHER DAMAGES (INCLUDING LOST PROFIT, LOST DATA, OR DOWNTIME COSTS), ARISING OUT OF THE USE, INABILITY TO USE, OR THE RESULTS OF USE OF THE PROVIDED INFORMATION, WHETHER BASED IN WARRANTY, CONTRACT, TORT OR OTHER LEGAL THEORY, AND WHETHER OR NOT ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. YOUR USE OF THE INFORMATION IS ENTIRELY AT YOUR OWN RISK. THIS INFORMATION IS NOT MEANT TO BE USED AS A SUBSTITUTE FOR THE REVIEW OF SCAN PROTOCOL PARAMETERS BY A QUALIFIED AND CERTIFIED PROFESSIONAL. USERS ARE CAUTIONED TO SEEK THE ADVICE OF A QUALIFIED AND CERTIFIED PROFESSIONAL BEFORE USING ANY PROTOCOL BASED ON THE PROVIDED INFORMATION. AAPM IS NOT RESPONSIBLE FOR A USER'S FAILURE TO VERIFY OR CONFIRM APPROPRIATE PERFORMANCE OF THE PROVIDED SCAN PARAMETERS. SOME JURISDICTIONS DO NOT ALLOW THE EXCLUSION OR LIMITATION OF LIABILITY FOR DAMAGES, SO THE ABOVE LIMITATION MAY NOT APPLY TO YOU.

ROUTINE ADULT HEAD (BRAIN)

Indications

- Acute head trauma;
- Suspected acute intracranial hemorrhage;
- Immediate postoperative evaluation following brain surgery;
- Suspected shunt malfunctions, or shunt revisions;
- Mental status change;
- Increased intracranial pressure;
- Headache;
- Acute neurologic deficits;
- Suspected hydrocephalus;
- Evaluating psychiatric disorders;
- Brain herniation;
- Drug toxicity;
- Suspected mass or tumor;
- Seizures;
- Syncope;
- Detection of calcification;
- When magnetic resonance imaging (MRI) imaging is unavailable or contraindicated, or if the supervising physician deems CT to be most appropriate.

Diagnostic Task

- Detect collections of blood;
- Identify brain masses;
- Detect brain edema or ischemia;
- Identify shift in the normal locations of the brain structures including in the cephalad or caudal directions;
- Evaluate the location of shunt hardware and the size of the ventricles;
- Evaluate the size of the sulci and relative changes in symmetry;
- Detect abnormal collections;
- Detect calcifications in the brain and related structures;
- Evaluate for fractures in the calvarium (skull);
- Detect any intracranial air.

Key Elements

- Patient positioning;
- Scan may be performed axial/sequentially, but may be performed helically in higher end scanners (see below for discussion of pros and cons of axial vs. helical);
- Contrast enhancement (if indicated by radiologist).

Radiation Dose Management

- Tube Current Modulation (or Automatic Exposure Control) may be used, but is often turned off;
- According to ACR CT Accreditation Program guidelines:
 - The diagnostic reference level (in terms of volume CTDI) is 75 mGy.
 - The pass/fail limit (in terms of volume CTDI) is 80 mGy.
 - These values are for a routine adult head exam and may be significantly different (higher or lower) for a given patient with unique indications.

NOTE: All volume CTDI values are for the 16-cm diameter CTDI phantom.

(continued)

ROUTINE ADULT HEAD (BRAIN) (continued)**PATIENT POSITIONING:**

- Patient should be supine, head first into the gantry, with the head in the head-holder whenever possible.
- Center the table height such that the external auditory meatus (EAM) is at the center of the gantry.
- To reduce or avoid ocular lens exposure, the scan angle should be parallel to a line created by the supraorbital ridge and the inner table of the posterior margin of the foramen magnum. This may be accomplished by either tilting the patient's chin toward the chest ("tucked" position) or tilting the gantry. While there may be some situations where this is not possible due to scanner or patient positioning limitations, it is considered good practice to perform one or both of these maneuvers whenever possible.

SCAN RANGE: Top of C1 lamina through top of calvarium.

CONTRAST:

- **Oral:** None.
- **Injected:** Some indications require injection of intravenous or intrathecal contrast media during imaging of the brain.
- Intravenous contrast administration should be performed as directed by the supervising radiologist using appropriate injection protocols and in accordance with the *ACR Practice Guideline for the Use of Intravascular Contrast Media*. A typical amount would be 100 cc at 300 mg/cc strength, injected at 1 cc/sec. A delay of 4 minutes between contrast injection and the start of scanning is typical.

AXIAL VERSUS HELICAL SCAN MODE (both are provided in the following sample protocols):

There are advantages and disadvantages to using either axial or helical scans for routine head CT exams. ***The decision as to whether to use axial or helical should be influenced by the specific patient indication, scanner capabilities, and image quality requirements.*** Users of this document should consider the information in the following table and consult with both the manufacturer¹ and a medical physicist to assist in determining which mode to use.

AXIAL SCANS	CHARACTERISTICS	HELICAL SCANS
Slightly longer	Acquisition Time	Slightly shorter
Less artifacts in some cases, especially for < 16 detector row scanners	Artifacts	More artifacts for < 16 detector row scanners; close to or equivalent to axial for ≥ 64 detector row scanners
Better in some cases, especially for < 16 detector row scanners	Image Quality	Equivalent in many cases; close to or equivalent to axial for ≥ 64 detector row scanners
Depends more on protocol than on axial or helical	Radiation Dose	Depends more on protocol than on axial or helical
Present in both helical and axial scans	Over Beaming (x-ray beam extending beyond the edge of active detector rows)	Present in both helical and axial scans
None or very little over ranging (limited to that caused by over beaming)	Over Ranging (irradiation of tissue inferior and superior to desired scan range)	Helical scans all have over ranging ² . Some scanners have features that minimize this
Detector configuration is often narrower than for body scans	Detector Configuration (N x T mm)	Detector configuration is often narrower than for body scans
Limited to thicknesses allowed by detector configuration	Image Thickness	Limited to thicknesses allowed by detector configuration

¹Manufacturers may have recommendations for specific scanner models regarding use of axial versus helical for routine head CT. Please consult manufacturer specific protocols below (if a scan mode is not recommended, this will be noted).

²The amount of tissue inferior and superior to the prescribed scan range that is irradiated by over ranging can vary, depending on the scanner model and how the scan is performed (pitch value, collimation, etc.).

ROUTINE ADULT HEAD (BRAIN) (continued)

INDEX OF ROUTINE ADULT HEAD (BRAIN) PROTOCOLS

AXIAL / SEQUENTIAL scan protocols (by manufacturer)

[GE](#)
[Hitachi](#)
[Neusoft](#)
[Neurologica](#)
[Philips](#)
[Siemens](#)
[Toshiba](#)

HELICAL / SPIRAL scan protocols (by manufacturer)

[GE](#)
[Hitachi](#)
[Neusoft](#)
[Philips](#)
[Siemens](#)
[Toshiba](#)

Additional Resources

ACR–ASNR Practice Guideline For The Performance Of Computed Tomography (CT) Of The Brain,
<http://www.acr.org/Quality-Safety/Standards-Guidelines/Practice-Guidelines-by-Modality/CT>.

ACR CT Accreditation Program information, including Clinical Image Guide and Phantom Testing Instructions,
<http://www.acr.org/Quality-Safety/Accreditation/CT>.

ADULT HEAD – ROUTINE (AXIAL) (selected GE scanners)[\(Back to INDEX\)](#)

SCOUT: Lateral, S150-I50. 120 kV, 10 mA. PA Scout optional.

GE	LightSpeed Ultra (8)	BrightSpeed 16 Select	LightSpeed 16 BrightSpeed 16	LightSpeed Pro 16
Scan Type	AXIAL	AXIAL	AXIAL	AXIAL
Rotation Time (s)	2	2	2	2
Detector Configuration	4 x 2.5 (10mm, 2i)	4 x 2.5 (10mm, 2i)	16 x 0.625 (10mm, 2i)	16 x 0.625 (10mm, 2i)
Pitch	-	-	-	-
Table Feed/Interval (mm)	10	10	10	20
kV	120	120	120	120
mA	140	140	140	140
Auto-mA	no	No	no	no
SFOV	HEAD	HEAD	HEAD	HEAD
Breath-hold	--	--	--	--
Prep Delay	--	--	--	--
CTDI-vol (mGy)	58.2	62.8	57.7	62.2

Recon 1

Recon Start	Base of Skull	Base of Skull	Base of Skull	Base of Skull
Recon End	Vertex	Vertex	Vertex	Vertex
Plane	Axial	Axial	Axial	Axial
Algorithm	Std	Std	Std	Std
Recon Mode	Full	Full	Full	Full
Thickness (mm)	5	5	5	5
Interval (mm)	5	5	5	5

Recon 2

Recon Start	Base of Skull	Base of Skull	Base of Skull	Base of Skull
Recon End	Vertex	Vertex	Vertex	Vertex
Plane	Axial	Axial	Axial	Axial
Algorithm	Bone	Bone	Bone	Bone
Recon Mode	Full	Full	Full	Full
Thickness (mm)	5	5	5	5
Interval (mm)	5	5	5	5

ADULT HEAD – ROUTINE (AXIAL) (selected GE scanners)[\(Back to INDEX\)](#)

SCOUT: Lateral, S150-I50. 120 kV, 10 mA. PA Scout optional.

GE	LightSpeed VCT	Discovery CT750 HD	LightSpeed VCT (w/ASiR)	Discovery CT750 HD (w/ASiR)
Scan Type	AXIAL	AXIAL	AXIAL	AXIAL
Rotation Time (s)	1	1	1	1
Detector Configuration	32 x 0.625 (20 mm, 4i)	32 x 0.625 (20 mm, 4i)	32 x 0.625 (20 mm, 8i/4i)	32 x 0.625 (20 mm, 8i/4i)
Pitch	-	-	-	-
Table Feed/Interval (mm)	20	20	20	20
kV	140 / 120 Base / Cerebrum	140 / 120 Base / Cerebrum	140 / 120 Base / Cerebrum	140 / 120 Base / Cerebrum
mA	200 / 300 Base / Cerebrum	200 / 320 Base / Cerebrum	200 / 190 (DR 40%) Base / Cerebrum	250 / 210 Base / Cerebrum
Auto-mA	no	no	no	no
SFOV	HEAD	HEAD	HEAD	HEAD
ASiR	no	no	SS40 / SS40 Base / Cerebrum	SS40 / SS40 Base / Cerebrum
Breath-hold	--	--	--	--
Prep Delay	--	--	--	--
CTDI-vol (mGy)	53.3 / 61.4 Base / Cerebrum	55.8 / 63.9 Base / Cerebrum	53.3 / 36.4 Base / Cerebrum	69.7 / 41.9 Base / Cerebrum

Recon 1

Recon Start	Base of Skull	Base of Skull	Base of Skull	Base of Skull
Recon End	Vertex	Vertex	Vertex	Vertex
Plane	Axial	Axial	Axial	Axial
Algorithm	Std	Std	Std	Std
Recon Mode	Full	Full	Full	Full
Thickness (mm)	5 / 5 Base / Cerebrum	5 / 5 Base / Cerebrum	2.5 / 5 Base / Cerebrum	2.5 / 5 Base / Cerebrum
Interval (mm)	5 / 5 Base / Cerebrum	5 / 5 Base / Cerebrum	2.5 / 5 Base / Cerebrum	2.5 / 5mm Base / Cerebrum

Recon 2

Recon Start	Base of Skull	Base of Skull	Base of Skull	Base of Skull
Recon End	Vertex	Vertex	Vertex	Vertex
Plane	Axial	Axial	Axial	Axial
Algorithm	Bone	Bone	Bone	Bone
Recon Mode	Full	Full	Full	Full
Thickness (mm)	5	5	5	5
Interval (mm)	5	5	5	5

ADULT HEAD – ROUTINE (AXIAL) (selected HITACHI scanners)[\(Back to INDEX\)](#)

SCANOGRAM: Lateral, 250mm coverage, 120 kV, 25mA. PA is optional.;

HITACHI	CXR4	ECLOS 16	Supria 16	Scenaria 64
Scan Type	Axial (Normal)	Axial (Normal)	Axial (Normal)	Axial (Normal)
Rotation Time (s)	1.0	1.0	1.0	1.0
Detector Configuration	2i (2.5 x 4)	0.625x16	0.625x16	0.624 x 32
Table Feed (mm)	10	10	10	20
kVp	120	120	120	120
mA	300	250	300	350
Adaptive mA/IntelliEC	No	No	No	No
SFOV (mm)	240	240	240	240
Breath-hold	None	None	None	None
Scan Delay (s)	Scanner minimum	Scanner minimum	Scanner minimum	Scanner minimum
CTDI-vol (mGy)	59.5	49.7	58.6	60.8

Multi-Recon 1

Series Description	Brain Routine	Brain Routine	Brain Routine	Brain Routine
Type	Axial	Axial	Axial	Axial
Start	Base of Skull	Base of Skull	Base of Skull	Base of Skull
End	Top of Head	Top of Head	Top of Head	Top of Head
Gantry Angle	None	None	None	None
Image Order	Inferior to Sup.	Inferior to Sup.	Inferior to Sup.	Inferior to Sup.
Image Filter	Head STD 1	Head STD 12	Head STD 12	Head STD 12C
Slice Thickness (mm)	5	5	5	5
Interval (mm)	5	5	5	5
DFOV (mm)	Patient size	Patient size	Patient size	Patient size

Multi-Recon 2

Series Description	Bone	Bone	Bone	Bone
Type	Axial	Axial	Axial	Axial
Start	Base of Skull	Base of Skull	Base of Skull	Base of Skull
End	Top of Head	Top of Head	Top of Head	Top of Head
Gantry Angle	None	None	None	None
Image Order	Inferior to Superior	Inferior to Superior	Inferior to Superior	Inferior to Superior
Image Filter	Lung/Bone 9	Bone 42	Bone 42	Bone 42
Slice Thickness (mm)	2.5	2.5	2.5	2.5
Interval (mm)	2.5	2.5	2.5	2.5
DFOV (mm)	Patient size	Patient size	Patient size	Patient size

ADULT HEAD – ROUTINE (AXIAL) (selected NEUSOFT scanners)[\(Back to INDEX\)](#)**SURVIEW:** Lateral, 120 kVp, 40 mA, from vertex to base of the skull, angle to Reid's baseline to avoid orbits

NEUSOFT	NeuViz DUAL	NeuViz 16
Scan Type	Axial	Axial
Rotation Time (s)	1.0	1.5
Collimation	32x0.625mm	12 x 1.5 mm
kV	120	120
Reference mAs	400	360
Pitch	--	--
Dose Modulation	O-Dose	---
FOV (mm)	250	250
CTDI-vol (mGy)	55.5	57.3

RECON 1

Series Description	Axial	Axial
Start	Base of Skull	Base of Skull
End	Vertex	Vertex
Recon. Filter	F20	Brain Standard (SB)
Thickness (mm)	5.0	4.5
Increment (mm)	5.0	4.5

RECON 1

Series Description	Axial for Bone	Axial for Bone
Start	Base of Skull	Base of Skull
End	Vertex	Vertex
Recon. Filter	F60	EB
Thickness (mm)	5.0	4.5
Increment (mm)	5.0	4.5

ADULT HEAD – ROUTINE (AXIAL) (selected NEUROLOGICA scanners)[\(Back to INDEX\)](#)

Scout: PA and Lateral, 200 mm coverage, 120kV at 3mA for both views

NeuroLogica	CereTom	BodyTom
Scan Type	Axial	Axial
Acquisition Mode	8 x 1.25 mm	8 x 1.25 mm
/collimation	/ 10mm	/10mm
Scan Voltage (kV)	120	120
Scan Current (mA)	7	200
Scan Time (s)	2	1
Rotation Time (s)	2	1
Slice Thickness (mm)	5	5
Field of View (FOV) (cm)	25.3	30
Primary Reconstruction Kernel	Posterior Fossa	Posterior Fossa
Image Format	DICOM	DICOM
Dose (CTDIvol) (mGy)	41.26	47.32

RECON 1

Plane	Axial	Axial
Algorithm	Soft Tissue	Soft Tissue
Recon Mode	Full	Full
Thickness (mm)	5	5
Interval (mm)	5	5

RECON 2

Plane	Axial	Axial
Algorithm	Bone	Bone
Recon Mode	Full	Full
Thickness (mm)	5	5
Interval (mm)	5	5

ADULT HEAD – ROUTINE (AXIAL) (selected PHILIPS scanners)[\(Back to INDEX\)](#)

SURVIEW: Lateral, 120 kVp, 30 mA.

PHILIPS	Brilliance 16 slice	Brilliance 64 channel	Ingenuity CT	Brilliance iCT SP	Brilliance iCT
Scan Type	Axial	Axial	Axial	Axial	Axial
Rotation Time (s)	1.5	1.5	1.5	0.75	0.75
Collimation	16 x 1.5 mm	16 x 0.625 mm	16 x 0.625 mm	16 x 0.625 mm	16 x 0.625 mm
kV	120	120	120	120	120
mAs	400	350	350	300	300
Couch Increment (mm)	12	10	10	10	10
FOV (mm)	250	250	250	250	250
CTDI-vol (mGy)	53.4	55.6	55.6	55.1	55.1

RECON 1

Type	Axial	Axial	Axial	Axial	Axial
Reconstruction Filter	UB	UB	UB	UB	UB
Thickness (mm)	6	5	5	5	5
Increment (mm)	6	5	5	5	5

RECON 2

Type	Axial	Axial	Axial	Axial	Axial
Reconstruction Filter	D	D	D	D	D
Thickness (mm)	6	5	5	5	5
Increment (mm)	6	5	5	5	5

ADULT HEAD – ROUTINE (SEQUENTIAL) (selected SIEMENS scanners)[\(Back to INDEX\)](#)

PATIENT POSITIONING: For all head studies, it is very important for image quality to position the patient in the center of the scan field. Use the lateral laser beam to make sure that the patient is positioned in the center. Patient lying in supine position, arms resting along the body, secure head well in the head holder, support lower legs.

In order to optimize image quality versus radiation dose, scans are provided within a maximum scan field of 300 mm with respect to the iso-center. No recon job with a field of view exceeding those limits will be possible. Therefore, patient positioning has to be performed accurately to ensure a centered location of the skull.

GENERAL: Gantry tilt is available for sequence scanning, not for spiral scanning. Gantry tilt is not available for dual source scanners.

TOPOGRAM: Lateral, 256 mm, 120 or 130 kV and 55 to 98 mA, according to the system reference values

SIEMENS	Emotion 16	Scope Power	Perspective 64 Perspective 128	Sensation 64
Scan Mode	Sequential	Sequential	Sequential	Sequential
Rotation Time (s)	1.5	1.0	1.0	1.0
Detector Configuration (mm)	6 x 2	2 x 5	32 x 0.6 ^b 64x0.6 ^b	24x1.2
Pitch	-	-	-	-
kV	130	130	130	120
Quality.ref.mAs	250	270/190 ^d	220/190 ^d	430
CARE Dose4D	ON	ON	ON	OFF
CARE kV	-	-	-	-
CTDIvol (mGy)	58.7 ^e	51.9 ^e	59.7 ^e	60 ^e

RECON 1

Type	Axial	Axial	Axial	Axial
Kernel	H31s/J30s (3) ^d	H31s/J30s (3) ^d	H31s/J30s (3) ^d	H31s
Slice (mm)	4.0	5.0	5.0	4.8
Increment (mm)	-	-	-	-

RECON 2

Type	Axial – Bone	Axial – Bone	Axial – Bone	Axial – Bone
Kernel	H60	H60/J70(2) ^d	H60/J70(2) ^d	H60
Slice (mm)	5.0	5.0	5.0	4.8
Increment (mm)	5.0	5.0	-	-

^a indicates that a z-axis “flying focal spot” technique is used to obtain twice as many projections per rotation as detector rows

^b IVR (Interleaved Volume Reconstruction) is available to improve spatial resolution

^c if scanner is equipped with automatic kV selection (CARE kV), this should be activated by selecting ON; for head exams, the “Dose saving optimized for” slider position of 3 is recommended

^d with ADMIRE, SAFIRE or IRIS. For ADMIRE and SAFIRE, the number in brackets indicates the setting recommended for the strength

ADULT HEAD – ROUTINE (SEQUENTIAL) (Selected SIEMENS Scanners) (Continued)

SIEMENS	Definition AS+/Edge	Definition (Dual Source)	Definition Flash (Dual source 128-slice)	Force (Dual source 192-slice)
Scan Mode	Sequential	Sequential	Sequential	Sequential
Rotation Time (s)	1.0	1.0	1.0	1.0
Detector Configuration (mm)	128 x 0.6 ^a (64 x 0.6=38.4)	24 x 1.2	32 x 1.2	192 x 0.6 ^a (96 x 0.6=57.6)
Pitch	-	-	-	-
kV	120	120	120	120
Quality ref.mAs	390/275 ^d	390/275 ^d	390/275 ^d	275 ^d
CARE Dose4D	ON	ON	ON	ON
CARE kV	ON ^c	ON ^c	ON ^c	ON ^c
CTDIvol (mGy)	62.3 ^e	59.2 ^e	67.5 ^e	46.7 ^e

RECON 1

Type	Axial	Axial	Axial	Axial
Kernel	H31s/J30s (3) ^d	H31s/J30s (3) ^d	H31s/J30s (3) ^d	Hr40 (3) ^d
Slice (mm)	5.0	4.8	5.0	5.0
Increment (mm)	5.0	-	5.0	5.0

RECON 2

Type	Axial – Bone	Axial – Bone	Axial	Axial – Bone
Kernel	H60s/J70s(2) ^d	H60s/J70s(2) ^d	H60s/J70s(2) ^d	Hr59(3) ^d
Slice (mm)	5.0	5.0	5.0	5.0
Increment (mm)	5.0	5.0	5.0	5.0

^a indicates that a z-axis “flying focal spot” technique is used to obtain twice as many projections per rotation as detector rows

^b IVR (Interleaved Volume Reconstruction) is available to improve spatial resolution

^c if scanner is equipped with automatic kV selection (CARE kV), this should be activated by selecting ON; for head exams, the “Dose saving optimized for” slider position of 3 is recommended

^d with ADMIRE, SAFIRE or IRIS. For ADMIRE and SAFIRE, the number in brackets indicates the setting recommended for the strength

^eCTDIvol is displayed upon acquisition of the topogram. CARE Dose4D will adjust exposure to the patient based on the topogram

ADULT HEAD – ROUTINE (AXIAL) (selected TOSHIBA scanners)[\(Back to INDEX\)](#)

SCANOGRAPH: Lateral and AP.

TOSHIBA	Aq32	Aq64	AqPrime	AqONE/ONE Vision
Scan Type	Axial	Axial	Axial	Volume
Rotation Time (s)	1.0	1.0	1.0	0.75
Detector Configuration (mm)	4 x 4	4 x 4	4 x 4	280 x 0.5
Couch Movement (mm)	16	16	16	N/A
kV	120	120	120	135
mA	250	250	250	300
^{SURE} Exposure	No	No	No	No
QDS+ / AIDR 3D	QDS+	QDS+/AIDR 3D	AIDR 3D	AIDR 3D
Scan FOV (mm)	240 (S)	240 (S)	240 (S)	240 (S)
Breath-hold	--	--	--	--
Prep Delay (s)	--	--	--	--
CTDI-vol (mGy)	53.8	53.8	55.3	58

Recon 1

Type	Axial	Axial	Axial	Volume
Start	Base of skull	Base of skull	Base of skull	Base of skull
End	Vertex	Vertex	Vertex	Vertex
^{SURE} IQ*	Head Brain	Head Brain	Head Brain	Head Brain
Image Thickness (mm)	4	4	4	0.5
Reconstruction Interval (mm)	4	4	4	0.3
DFOV (mm)	Patient	Patient	Patient	Patient

Recon 2

Type	Axial	Axial	Axial	Axial
^{SURE} IQ*	Bone Sharp	Bone Sharp	Bone Sharp	Bone Sharp
Image Thickness (mm)	4	4	4	5
Reconstruction Interval (mm)	4	4	4	5
DFOV (mm)	Patient	Patient	Patient	Patient

Recon 3-5

Type	Coronal/Sagittal	Coronal/Sagittal	Coronal/Sagittal	Axial/Coronal/Sagittal
^{SURE} IQ*	Head Brain	Head Brain	Head Brain	Head Brain
Image Thickness (mm)	4	4	4	5
Reconstruction Interval (mm)	4	4	4	5
DFOV (mm)	Patient	Patient	Patient	Patient

*The ^{SURE}IQ setting determines the reconstruction FC as well as other post-processing and reconstruction options, such as AIDR. The ^{SURE}IQ settings listed here refer to the manufacturer default settings.

ADULT HEAD – ROUTINE (HELICAL) (selected GE scanners)[\(Back to INDEX\)](#)

SCOUT: Lateral, S150-I50. 120 kV, 10 mA. PA Scout optional.

GE	LightSpeed VCT	Discovery CT750 HD	LightSpeed VCT (w/ASiR)	Discovery CT750 HD (w/ASiR)
Scan Type	Helical	Helical	Helical	Helical
Rotation Time (s)	0.5	0.5	0.5	0.5
Detector Configuration	32 x 0.625	32 x 0.625	32 x 0.625	32 x 0.625
Pitch	0.531:1	0.531:1	0.531:1	0.531:1
Table Feed/Speed (mm/rot)	10.62	10.62	10.62	10.62
kV	120	120	120	120
mA	300	300	180 (DR 40%)	210
Auto-mA	no	No	no	no
SFOV	HEAD	HEAD	HEAD	HEAD
ASiR	no	No	SS40	SS50
Breath-hold	--	--	--	--
Prep Delay	--	--	--	--
CTDI-vol (mGy)	54.15	54.90	32.49	38.43

Recon 1

Recon Start	Base of Skull	Base of Skull	Base of Skull	Base of Skull
Recon End	Vertex	Vertex	Vertex	Vertex
Plane	Axial	Axial	Axial	Axial
Algorithm	Std	Std	Std	Std
Recon Mode	Plus	Plus	Plus	Plus
Thickness (mm)	5	5	5	5
Interval (mm)	5	5	5	5

Recon 2

Recon Start	Base of Skull	Base of Skull	Base of Skull	Base of Skull
Recon End	Vertex	Vertex	Vertex	Vertex
Plane	Axial	Axial	Axial	Axial
Algorithm	Bone	Bone	Bone	Bone
Recon Mode	Full	Full	Full	Full
Thickness (mm)	5	5	5	5
Interval (mm)	5	5	5	5

ADULT HEAD – ROUTINE (HELICAL) (selected HITACHI scanners)[\(Back to INDEX\)](#)

SCANOGRAPH: Lateral, 250mm coverage, 120 kV, 25mA. PA is optional.

HITACHI	CXR4	ECLOS 16	Supria 16	Scenaria 64
Scan Type	Helical (Volume)	Helical (Volume)	Helical (Volume)	Helical (Volume)
Rotation Time (s)	0.8	1.0	1.0	1.0
Detector Configuration	1.25 x 4	0.625 x 16	0.625 x 16	0.624 x32
Pitch	1.25	1.0625	0.8	0.8
Table Speed (mm/rot)	6.25	10.63	8.1	16.9
kVp	120	120	120	120
mA	350	300	250	300
Adaptive mA/IntelliEC	No	No	No	No
SFOV (mm)	240	240	240	240
Breath-hold	None	None	None	None
Scan Delay (s)	Scanner minimum	Scanner minimum	Scanner minimum	Scanner minimum
CTDI-vol (mGy)	44.4	56.1	60.1	61.8

Multi-Recon 1

Series Description	Brain Routine	Brain Routine	Brain Routine	Brain Routine
Type	Axial	Axial	Axial	Axial
Start	Base of Skull	Base of Skull	Base of Skull	Base of Skull
End	Top of Head	Top of Head	Top of Head	Top of Head
Gantry Angle	None	None	None	None
Image Order	Inferior to Sup.	Inferior to Sup.	Inferior to Sup.	Inferior to Sup.
Image Filter	Head STD 1	Head STD 12	Head STD 12	Head STD 12
Slice Thickness (mm)	5	5	5	5
Interval (mm)	5	5	5	5
DFOV (mm)	Patient size	Patient size	Patient size	Patient size

Multi-Recon 2

Series Description	Bone	Bone	Bone	Bone
Type	Axial	Axial	Axial	Axial
Start	Base of Skull	Base of Skull	Base of Skull	Base of Skull
End	Top of Head	Top of Head	Top of Head	Top of Head
Gantry Angle	None	None	None	None
Image Order	Inferior to Sup.	Inferior to Sup.	Inferior to Sup.	Inferior to Sup.
Image Filter	Lung/Bone 9	Bone 42	Bone 42	Bone 42
Slice Thickness (mm)	2.5	2.5	2.5	2.5
Interval (mm)	2.5	2.5	2.5	2.5
DFOV (mm)	Patient size	Patient size	Patient size	Patient size

ADULT HEAD – ROUTINE (HELICAL) (selected NEUSOFT scanners)[\(Back to INDEX\)](#)**SURVIEW:** Lateral, 120 kVp, 40 mA, from vertex to base of the skull.

NEUSOFT	NeuViz DUAL	NeuViz 16
Scan Type	Helical	Helical
Rotation Time (s)	1.5	0.673
Collimation	2 x 2.5 mm	16 x 0.75 mm
kV	120	120
mAs	250	226
Pitch	1.5	0.75
FOV (mm)	240	250
CTDI-vol (mGy)	58.6	52.4

RECON 1

Series Description	Adult Head	Adult Head
Start	Base of Skull	Base of Skull
End	Vertex	Vertex
Recon. Filter	Head Standard (B)	Brain Standard (SB)
Thickness (mm)	5.0	5.0
Increment (mm)	5.0	5.0

ADULT HEAD – ROUTINE (HELICAL) (selected PHILIPS scanners)[\(Back to INDEX\)](#)

SURVIEW: Lateral, 120 kVp, 30 mA.

PHILIPS	Brilliance 16 slice	Brilliance 64 channel	Ingenuity CT	Brilliance iCT SP	Brilliance iCT
Scan Type	Helical	Helical	Helical	Helical	Helical
Rotation Time (s)	0.5	0.5	0.5	0.5	0.5
Collimation	16 × 0.75 mm	64 × 0.625 mm	64 × 0.625 mm	64 × 0.625 mm	64 × 0.625 mm
kV	120	120	120	120	120
mAs/slice	350	400	400	400	400
Pitch	0.5	0.4	0.4	0.4	0.4
FOV (mm)	250	250	250	250	250
CTDI-vol (mGy)	53.3	51.1	51.1	54.4	54.4

RECON 1

Type	Axial	Axial	Axial	Axial	Axial
Reconstruction Filter	HR / UB	HR / UB	HR / UB	HR / UB	HR / UB
Thickness (mm)	5	5	5	5	5
Increment (mm)	5	5	5	5	5

RECON 2

Type	Axial	Axial	Axial	Axial	Axial
Reconstruction Filter	YD	YD	YD	YD	YD
Thickness (mm)	0.9	0.8	0.8	0.8	0.8
Increment (mm)	0.45	0.4	0.4	0.4	0.4

ADULT HEAD – ROUTINE (SPIRAL) (selected SIEMENS scanners)[\(Back to INDEX\)](#)

PATIENT POSITIONING: For all head studies, it is very important for image quality to position the patient in the center of the scan field. Use the lateral laser beam to make sure that the patient is positioned in the center.

Patient lying in supine position, arms resting along the body, secure head well in the head holder, support lower legs.

In order to optimize image quality versus radiation dose, scans are provided within a maximum scan field of 300 mm with respect to the isocenter. No recon job with a field of view exceeding those limits will be possible. Therefore, patient positioning has to be performed accurately to ensure a centered location of the skull.

GENERAL: Gantry tilt is available for sequence scanning, not for spiral scanning. Gantry tilt is not available for dual source scanners.

TOPOGRAM: Lateral, 256 mm, 120/130 kV, cranio-caudal direction.

SIEMENS	Emotion 16	Scope power	Perspective 64	Perspective 128
Scan Mode	Spiral	Spiral	Spiral	Spiral
Rotation Time (s)	1.5	1.5	1.5	1.5
Detector Configuration (mm)	6 x 1	16 x 0.6	32 x 0.6 ^b	64 x 0.6 ^b
Pitch	0.4	0.55	0.55	0.55
kV	110	130	130	130
Quality ref.mAs	430	220/190 ^d	240/190 ^d	240/190 ^d
CARE Dose4D	ON	ON	ON	ON
CARE kV	-	-	-	-
CTDIvol (mGy)	39.6 ^e	51.9 ^e	58.3 ^e	58.3 ^e

RECON 1

Type	Axial	Axial	Axial	Axial
Kernel	H31s	H31s/J30s (3) ^d	H31s/J30s (3) ^d	H31s/J30s (3) ^d
Slice (mm)	5.0	5.0	5.0	5.0
Increment (mm)	5.0	5.0	5.0	5.0

RECON 2

Type	Axial – Bone	Axial – Bone	Axial – Bone	Axial – Bone
Kernel	H60	H60/J70(2) ^d	H60/J70(2) ^d	H60/J70(2) ^d
Slice (mm)	5.0	5.0	5.0	5.0
Increment (mm)	5.0	5.0	5.0	5.0

^a indicates that a z-axis “flying focal spot” technique is used to obtain twice as many projections per rotation as detector rows

^b IVR (Interleaved Volume Reconstruction) is available to improve spatial resolution

^c if scanner is equipped with automatic kV selection (CARE kV), this should be activated by selecting ON; for head exams, the “Dose saving optimized for” slider position of 3 is recommended

^d with ADMIRE, SAFIRE or IRIS. For ADMIRE and SAFIRE, the number in brackets indicates the setting recommended for the strength

^eCTDIvol is displayed upon acquisition of the topogram. CARE Dose4D will adjust exposure to the patient based on the topogram

[†] Spiral scanning w/CARE Dose4D turned ON is the Siemens default recommended protocol

ADULT HEAD – ROUTINE (SPIRAL) (Selected SIEMENS Scanners) (Continued)

SIEMENS	Definition Edge	Definition (Dual Source)	Definition Flash (Dual source 128-	Force (Dual source 192-slice)
Scan Mode	Spiral	Spiral	Spiral	Spiral
Rotation Time (s)	1.0	1.0	1.0	1.0
Detector Configuration (mm)	128 x 0.6 ^a (64 x 0.6=38.4)	64 x 0.6 ^a (32 x 0.6=19.2)	128 x 0.6 ^a (64 x 0.6=38.4)	192 x 0.6 ^a (96 x 0.6=57.6)
Pitch	0.55	0.55	0.55	0.55
kV	120	120	120	120
Quality ref.mAs	350/273 ^d	390/273 ^d	350/273 ^d	332 ^d
CARE Dose4D	ON	ON	ON	ON
CARE kV	ON ^c	ON ^c	ON ^c	ON ^c
CTDIvol (mGy)	50.3 ^e	59.8 ^e	53.4 ^e	47.3 ^e

RECON 1

Type	Axial	Axial	Axial	Axial
Kernel	H31s/J30s (3) ^d	H31s/J30s (3) ^d	H31s/J30s (3) ^d	^d Hr40 (3) ^d
Slice (mm)	5.0	5.0	5.0	5.0
Increment (mm)	5.0	5.0	5.0	5.0

RECON 2

Type	Axial – Bone	Axial – Bone	Axial – Bone	Axial – Bone
Kernel	H60/J70(2) ^d	H60/J70(2) ^d	H60/J70(2) ^d	Hr59(3) ^d
Slice (mm)	5.0	5.0	5.0	5.0
Increment (mm)	5.0	5.0	5.0	5.0

^a indicates that a z-axis “flying focal spot” technique is used to obtain twice as many projections per rotation as detector rows

^b IVR (Interleaved Volume Reconstruction) is available to improve spatial resolution

^c if scanner is equipped with automatic kV selection (CARE kV), this should be activated by selecting ON; for head exams, the “Dose saving optimized for” slider position of 3 is recommended

^d with ADMIRE, SAFIRE or IRIS. For ADMIRE and SAFIRE, the number in brackets indicates the setting recommended for the strength

^eCTDIvol is displayed upon acquisition of the topogram. CARE Dose4D will adjust exposure to the patient based on the topogram

^f Spiral scanning w/CARE Dose4D turned ON is the Siemens default recommended protocol

ADULT HEAD – ROUTINE (HELICAL) (selected TOSHIBA scanners)[\(Back to INDEX\)](#)

SCANOGRAM: Lateral and AP.

TOSHIBA	Aq RXL	Aq 32 Aq 64	Aq PRIME	Aq Premium / ONE / ONE Vision
Scan Type	Helical	Helical	Helical	Helical
Rotation Time (s)	0.75	0.75	0.75	0.75
Detector Configuration	16 x 0.5 mm	32 x 0.5 mm	40 x 0.5 mm	32 x 0.5 mm
Pitch	Detail (0.688)	Detail (0.656)	Detail (0.625)	Detail (0.656)
Speed (mm/rot)	5.5	10.5	12.5	10.5
kV	120	120	120	120
mA	200	240	220	200
^{SURE} Exposure	No	No	No	No
QDS+ / AIDR 3D	QDS+	QDS+ AIDR 3D	AIDR 3D	AIDR 3D
SFOV (mm)	240 mm (S)	240 mm (S)	240 mm (S)	240 mm (S)
CTDI-wol (mGy)	53.3	61.8	54.3	57.9

Volume 1

Type	Volume	Volume	Volume	Volume
^{SURE} IQ Setting*	Head Brain	Head Brain	Head Brain	Head Brain
Thickness (mm)	0.5	0.5	0.5	0.5
Interval (mm)	0.3	0.3	0.3	0.3

Multiview 1 - Axial

Type	Axial	Axial	Axial	Axial
^{SURE} IQ Setting*	Head Brain	Head Brain	Head Brain	Head Brain
Thickness (mm)	5	5	5	5
Interval (mm)	5	5	5	5

Multiview 1 - Coronal

Type	Coronal	Coronal	Coronal	Coronal
^{SURE} IQ Setting*	Head Brain	Head Brain	Head Brain	Head Brain
Thickness (mm)	5	5	5	5
Interval (mm)	5	5	5	5

Multiview 1 - Sagittal

Type	Sagittal	Sagittal	Sagittal	Sagittal
^{SURE} IQ Setting*	Head Brain	Head Brain	Head Brain	Head Brain
Thickness (mm)	5	5	5	5
Interval (mm)	5	5	5	5

Multiview 2- Axial

Type	Axial	Axial	Axial	Axial
^{SURE} IQ Setting*	Bone Sharp	Bone Sharp	Bone Sharp	Bone Sharp
Thickness (mm)	5	5	5	5
Interval (mm)	5	5	5	5

*The ^{SURE}IQ setting determines the reconstruction FC as well as other post-processing and reconstruction options, such as AIDR. The ^{SURE}IQ settings listed here refer to the manufacturer default settings.