\\USER\head\UK Biobank_v4.0_0001\protocol_v4.0\AAHead_Scout_32ch-head-coil TA:0:14 PAT:3 Voxel size:1.6×1.6×1.6 mm Rel. SNR:1.00 :fl

Properties—			
	Prio Recon	Off	
	Load to viewer	On	
	Inline movie	Off	
	Auto store images	On	
	Load to stamp segm	ents Off	
	Load images to grap	ohic segments On	
	Auto open inline dis	play Off	
	Wait for user to star	t Off	
	Start measurements	single	
-Routine			
	Nr. of slab groups	1	
	Slabs	1	
	Dist. factor	20 %	
	Position	Isocenter	
	Orientation	Sagittal	
	Phase enc. dir.	A >> P	
	Phase oversampling	0 %	
	Slice oversampling	0.0 %	
	FoV read	260 mm	
	FoV phase	100.0 %	
	Slice thickness	1.6 mm	
	TR	3.15 ms	
	TE	1.37 ms	
	Averages	1	
	Concatenations	1	
	Filter	Distortion Corr.(2D), Prescan Normalize	
	Coil elements	HEA;HEP	
	AutoAlign	Head	
-Contrast			
	Flip angle	8 deg	
	Averaging mode	Short term	
	Measurements	1	
	Reconstruction	Magnitude	

Resolution—			
	Base resolution	160	
	Phase resolution	100 %	
	Phase partial Fourier	6/8	
	PAT mode	GRAPPA	
	Accel. factor PE	3	
	Ref. lines PE	24	
	Reference scan mode	Integrated	
	Image Filter	Off	
	Distortion Corr.	On	
	Accel. factor 3D	1	
	Mode	2D	
	Unfiltered images	Off	
	Unfiltered images	Off	
	Prescan Normalize	On	
	Normalize	Off	
	B1 filter	Off	
	Raw filter	Off	
	Elliptical filter	Off	
	Slice resolution	69 %	
	Slice partial Fourier	6/8	
Geometry			
	Nr. of slab groups	1	
	Slabs	1	
	Dist. factor	20 %	
	Position	Isocenter	
	Phase enc. dir.	A >> P	
	Phase oversampling	0 %	
	Slice oversampling	0.0 %	
	Slices per slab	128	
	Multi-slice mode	Sequential	
	Series	Ascending	
	Nr. of sat. regions	0	
	Position mode	L-P-H	
	Special sat.	None	
	Table position	P	

System—			
	Body	Off	
	HEP	On	
	HEA	On	
	SP5	Off	
	SP6	Off	
	SP7	Off	
	SP8	Off	
	SP1	Off	
	SP2	Off	
	SP3	Off	
	SP4	Off	
	Position mode	L-P-H	
	Positioning mode	ISO	
	Table position	Н	
	Table position	0 mm	
	MSMA	S - C - T	
	Sagittal	R >> L	
	Coronal	A >> P	
	Transversal	F >> H	
	Save uncombined	Off	
	Coil Combine Mode	Adaptive Combine	
	Coil Select Mode	On - AutoCoilSelect	
	Shim mode	Tune up	
	Adjust with body coil	Off	
	Confirm freq. adjustment	Off	
	Assume Dominant Fat	Off	
	Assume Silicone	Off	
	Adjustment Tolerance	Auto	
	? Ref. amplitude 1H	0.000 V	
	Position	Isocenter	
	Rotation	0.00 deg	
	R >> L	350 mm	
	A >> P	263 mm	
	F >> H	350 mm	
	Frequency 1H	123.251654 MHz	
	Correction factor	1	
	SRFExcit 1H	59.556 V	
	Gain	Low	
	Table position	0 mm	
	Img. Scale. Cor.	1.000	
-Physio-			

-Inline

Distortion correction

25/09/2014	25,	′09	/20)1	4
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Off

Sequence—		
Introduction	On	
Dimension	3D	
Averaging mode	Short term	
Multi-slice mode	Sequential	
Asymmetric echo	Weak	
Contrasts	1	
Bandwidth	540 Hz/Px	
RF pulse type	Fast	
Gradient mode	Normal	
Excitation	Non-sel.	
RF spoiling	On	
TX/RX delta frequency	0 Hz	
TX Nucleus	None	
TX delta frequency	0 Hz	
Coil elements	HEA;HEP	
Acquisition duration	0 ms	
Mode	Off	
-BOLD-		
Time to center	6.2 s	
Subtract	Off	
StdDev	Off	
MIP-Sag	Off	
MIP-Cor	Off	
MIP-Tra	Off	
MIP-Time	Off	
Save original images	On	
Distortion Corr.	On	
Mode	2D	
Mode		

Contrasts

Save original images

\\USER\head\UK Biobank_v4.0_0001\protocol_v4.0\T1_p2_1mm_fov256_sag_TI_880 TA:4:54 PAT:2 Voxel size:1.0×1.0×1.0 mm Rel. SNR:1.00 :tfl

1

On

Prio Recon Off Load to viewer On Inline movie Off Auto store images On Load to stamp segments Off
Inline movie Off Auto store images On
Auto store images On
Load to stamp segments Off
Load to stamp segments Off
Load images to graphic segments Off
Auto open inline display Off
Wait for user to start Off
Start measurements single
-Routine-
Nr. of slab groups 1
Slabs 1
Dist. factor 50 %
Position Isocenter
Orientation Sagittal
Phase enc. dir. A >> P
AutoAlign Head > Basis
Phase oversampling 5 %
Slice oversampling 0.0 %
FoV read 256 mm
FoV phase 100.0 %
Slice thickness 1.00 mm
TR 2000.0 ms
TE 2.01 ms
Averages 1
Concatenations 1
Filter Prescan Normalize
Coil elements HEA;HEP
Contrast
Magn. preparation Non-sel. IR
TI 880 ms
Flip angle 8 deg
Fat suppr. None
Water suppr. None
Averaging mode Long term
Measurements 1
Reconstruction Magnitude
Multiple series Each measurement

-Resolution-		
	Base resolution	256
	Phase resolution	100 %
	Phase partial Fourier	Off
	Interpolation	Off
	PAT mode	GRAPPA
	Accel. factor PE	2
	Ref. lines PE	24
	Reference scan mode	Integrated
	Image Filter	Off
	Distortion Corr.	Off
	Accel. factor 3D	1
	Unfiltered images	On
	Prescan Normalize	On
	Normalize	Off
	B1 filter	Off
	Raw filter	Off
	Elliptical filter	Off
	Slice resolution	100 %
	Slice partial Fourier	Off
-Geometry-		

-Geometry-			
	Nr. of slab groups	1	
	Slabs	1	
	Dist. factor	50 %	
	Position	Isocenter	
	Phase enc. dir.	A >> P	
	Phase oversampling	5 %	
	Slice oversampling	0.0 %	
	Slices per slab	208	
	Multi-slice mode	Single shot	
	Series	Ascending	
	Nr. of sat. regions	0	
	Position mode	L-P-H	
	Fat suppr.	None	
	Water suppr.	None	
	Special sat.	None	
	Table position	P	

¬System—			
System	Body	Off	
	HEP	On	
	HEA	On	
	SP5	Off	
	SP6	Off	
	SP7	Off	
	SP8	Off	
	SP1	Off	
	SP2	Off	
	SP3	Off	
	SP4	Off	
	Position mode	L-P-H	
	Positioning mode	REF	
	Table position	Н	
	Table position	0 mm	
	MSMA	S - C - T	
	Sagittal	R >> L	
	Coronal	A >> P	
	Transversal	F >> H	
	Save uncombined	Off	
	Coil Combine Mode	Adaptive Combine	
	AutoAlign	Head > Basis	
	Coil Select Mode	Off - All	
	Shim mode	Standard	
	Adjust with body coil	Off	
	Confirm freq. adjustment	Off	
	Assume Dominant Fat	Off	
	Assume Silicone	Off	
	Adjustment Tolerance	Auto	
	? Ref. amplitude 1H	0.000 V	
	Position	Isocenter	
	Rotation	0.00 deg	
	F >> H	256 mm	
	A >> P	256 mm	
	R >> L	208 mm	
	Frequency 1H	123.251654 MHz	
	Correction factor	1	
	SLoopIRns1 1H	602.255 V	
	Gain	Low	
	Table position	0 mm	
	Img. Scale. Cor.	6.000	

-Physio			
J	1st Signal/Mode	None	
	Magn. preparation	Non-sel. IR	
	TI	880 ms	
	Dark blood	Off	
	Resp. control	Off	
-Inline			
	Distortion correction	Off	
-Sequence			
	Introduction	Off	
	Dimension	3D	
	Elliptical scanning	Off	
	Averaging mode	Long term	
	Multi-slice mode	Single shot	
	Reordering	Linear	
	Asymmetric echo	Allowed	
	Bandwidth	240 Hz/Px	
	Flow comp.	No	
	Echo spacing	6.1 ms	
	Turbo factor	208	
	RF pulse type	Fast	
	Gradient mode	Fast*	
	Excitation	Non-sel.	
	RF spoiling	On	
	TX/RX delta frequency	0 Hz	
	TX Nucleus	None	
	TX delta frequency	0 Hz	
	Coil elements	HEA;HEP	
	Acquisition duration	0 ms	
	Mode	Off	
-BOLD			
	Subtract	Off	
	StdDev	Off	
	MIP-Sag	Off	
	MIP-Cor	Off	
	MIP-Tra	Off	
	MIP-Time	Off	
	Save original images	On	
	Distortion Corr.	Off	
	Save original images	On	

\\USER\head\UK Biobank_v4.0_0001\protocol_v4.0\MB8_FMRI_fov210_2.4mm_resting TA:6:10 PAT:Off Voxel size:2.4×2.4×2.4 mm Rel. SNR:1.00 :epfid

Properties—			
_	Prio Recon	Off	
	Load to viewer	On	
	Inline movie	Off	
	Auto store images	On	
	Load to stamp segments	Off	
	Load images to graphic segments	Off	
	Auto open inline display	Off	
	Wait for user to start	Off	
	Start measurements	single	
Routine			
	Nr. of slice groups	1	
	Slices	64	
	Dist. factor	0 %	
	Position	Isocenter	
	Orientation	T > C-16.0	
	Phase enc. dir.	A >> P	
	AutoAlign	Head > Brain	
	Phase oversampling	0 %	
	FoV read	210 mm	
	FoV phase	100.0 %	
	Slice thickness	2.40 mm	
	TR	735 ms	
	TE	39.00 ms	
	Multi-band accel. factor	8	
	Filter	None	
	Coil elements	HEA;HEP	
-Contrast			
	MTC	Off	
	Magn. preparation	None	
	Flip angle	52 deg	
	Fat suppr.	Fat sat.	
	Averaging mode	Long term	
	Measurements	490	
	Delay in TR	0 ms	
	Reconstruction	Magnitude	
	Multiple series	Off	

-Resolution-		
	Base resolution	88
	Phase resolution	100 %
	Phase partial Fourier	Off
	Interpolation	Off
	PAT mode	None
	Distortion Corr.	Off
	Hamming	Off
	Prescan Normalize	Off
	Raw filter	Off
	Elliptical filter	Off
Geometry—		
	Nr. of slice groups	1
	Slices	64
	Dist. factor	0 %
	Position	Isocenter
	Phase enc. dir.	A >> P

Phase oversampling

Multi-slice mode

Nr. of sat. regions Position mode

Series

Fat suppr.

Special sat.

Special sat. Table position

System—		
	Body	Off
	HEP	On
	HEA	On
	Position mode	L-P-H
	Positioning mode	REF
	Table position	Н
	Table position	0 mm
	MSMA	S - C - T
	Sagittal	R >> L
	Coronal	A >> P
	Transversal	F >> H
	Coil Combine Mode	Sum of Squares
	AutoAlign	Head > Brain
	Coil Select Mode	Off - All
	Shim mode	Standard
	Adjust with body coil	Off
	Confirm freq. adjustment	Off
	Assume Dominant Fat	Off
	Assume Silicone	Off
	Adjustment Tolerance	Maximum
	? Ref. amplitude 1H	$0.000~\mathrm{V}$
	Position	Isocenter
	Rotation	0.00 deg
	R >> L	210 mm
	A >> P	210 mm
	F >> H	154 mm
	Frequency 1H	123.251654 MHz
	Correction factor	1
	MBExc 1H	621.738 V
	Gain	High
	Table position	0 mm
	Img. Scale. Cor.	2.000
-Physio		
	1st Signal/Mode	None
	Magn. preparation	None
Inline——		_
	Distortion correction	Off

-Sequence-		
Introduction	Off	
Averaging mode	Long term	
Multi-slice mode	Interleaved	
Bandwidth	2030 Hz/Px	
Echo spacing	0.64 ms	
EPI factor	88	
Gradient mode	Fast	
Online multi-band recon.	Online	
Triggering scheme	Standard	
TX/RX delta frequency	0 Hz	
TX Nucleus	None	
TX delta frequency	0 Hz	
Coil elements	HEA;HEP	
Acquisition duration	0 ms	
BOLD		
GLM Statistics	Off	
Dynamic t-maps	Off	
Ignore meas. at start	0	

-BOLD	
GLM Statistics	Off
Dynamic t-maps	Off
Ignore meas. at start	0
Ignore after transition	0
Model transition states	On
Temp. highpass filter	On
Threshold	4.00
Paradigm size	3
Motion correction	Off
Spatial filter	Off
Delay in TR	0 ms
Distortion Corr.	Off

\\USER\head\UK Biobank_v4.0_0001\protocol_v4.0\\MB8_FMRI_fov210_2.4mm_task TA:4:13 PAT:Off Voxel size:2.4×2.4×2.4 mm Rel. SNR:1.00 :epfid

Properties	
Prio Recon	Off
Load to viewer	On
Inline movie	Off
Auto store images	On
Load to stamp segments	Off
Load images to graphic segments	Off
Auto open inline display	Off
Wait for user to start	Off
Start measurements	single

-Routine			
	Nr. of slice groups	1	
	Slices	64	
	Dist. factor	0 %	
	Position	Isocenter	
	Orientation	T > C-16.0	
	Phase enc. dir.	A >> P	
	AutoAlign	Head > Brain	
	Phase oversampling	0 %	
	FoV read	210 mm	
	FoV phase	100.0 %	
	Slice thickness	2.40 mm	
	TR	735 ms	
	TE	39.00 ms	
	Multi-band accel. factor	8	
	Filter	None	
	Coil elements	HEA;HEP	
Contrast			
	MTC	Off	
	Magn. preparation	None	
	Flip angle	52 deg	
	Fat suppr.	Fat sat.	
	Averaging mode	Long term	
	Measurements	332	
	Delay in TR	0 ms	
	Reconstruction	Magnitude	
	Multiple series	Off	
-Resolution-			
	Base resolution	88	
	Phase resolution	100 %	
	Phase partial Fourier	Off	
	Interpolation	Off	
	PAT mode	None	
	Distortion Corr.	Off	
	Hamming	Off	
	Prescan Normalize	Off	
	Prescan Normalize Raw filter	Off Off	

Geometry—		
•	Nr. of slice groups	1
	Slices	64
	Dist. factor	0 %
	Position	Isocenter
	Phase enc. dir.	A >> P
	Phase oversampling	0 %
	Multi-slice mode	Interleaved
	Series	Interleaved
	Nr. of sat. regions	0
	Position mode	L-P-H
	Fat suppr.	Fat sat.
	Special sat.	None
	Special sat.	None
	Table position	P

System—		
	Body	Off
	HEP	On
	HEA	On
	SP5	Off
	SP6	Off
	SP7	Off
	SP8	Off
	SP1	Off
	SP2	Off
	SP3	Off
	SP4	Off
	Position mode	L-P-H
	Positioning mode	REF
	Table position	Н
	Table position	0 mm
	MSMA	S - C - T
	Sagittal	R >> L
	Coronal	A >> P
	Transversal	F >> H
	Coil Combine Mode	Sum of Squares
	AutoAlign	Head > Brain
	Coil Select Mode	Off - All
	Shim mode	Standard
	Adjust with body coil	Off
	Confirm freq. adjustment	Off
	Assume Dominant Fat	Off
	Assume Silicone	Off
	Adjustment Tolerance	Maximum
	? Ref. amplitude 1H	0.000 V
	Position	Isocenter
	Rotation	0.00 deg
	R >> L	210 mm
	A >> P	210 mm
	F >> H	154 mm
	Frequency 1H	123.251654 MHz
	Correction factor	1
	MBExc 1H	621.738 V
	Gain	High
	Table position	0 mm
	Img. Scale. Cor.	2.000
-Physio-		
	1st Signal/Mode	None
	Magn. preparation	None

Inline —			
	Distortion correction	Off	
Sequence—			
	Introduction	Off	
	Averaging mode	Long term	
	Multi-slice mode	Interleaved	
	Bandwidth	2030 Hz/Px	
	Echo spacing	0.64 ms	
	EPI factor	88	
	Gradient mode	Fast	
	Online multi-band recon.	Online	
	Triggering scheme	Standard	
	TX/RX delta frequency	0 Hz	
	TX Nucleus	None	
	TX delta frequency	0 Hz	
	Coil elements	HEA;HEP	
	Acquisition duration	0 ms	
BOLD			
	GLM Statistics	Off	
	Dynamic t-maps	Off	
	Ignore meas. at start	0	
	Ignore after transition	0	
	Model transition states	On	
	Temp. highpass filter	On	
	Threshold	4.00	
	Paradigm size	3	
	Motion correction	Off	
	Spatial filter	Off	
	Delay in TR	0 ms	
	Distortion Corr.	Off	

\\USER\head\UK Biobank_v4.0_0001\protocol_v4.0\t2_flair_sag_p2_1mm_FS_ellip_pf78 TA:5:52 PAT:2 Voxel size:1.0×1.0×1.1 mm Rel. SNR:1.00 :spcir

Properties—			
_ Top Tries	Prio Recon	Off	
	Load to viewer	On	
	Inline movie	Off	
	Auto store images	On	
	Load to stamp segments	Off	
	Load images to graphic segme	nts Off	
	Auto open inline display	Off	
	Wait for user to start	Off	
	Start measurements	single	
Routine			
	Nr. of slab groups	1	
	Slabs	1	
	Position	Isocenter	
	Orientation	Sagittal	
	Phase enc. dir.	A >> P	
	AutoAlign	Head > Basis	
	Phase oversampling	0 %	
	Slice oversampling	0.0 %	
	FoV read	256 mm	
	FoV phase	100.0 %	
	Slice thickness	1.05 mm	
	TR	5000 ms	
	TE	395.0 ms	
	Concatenations	1	
	Filter	Raw filter, Prescan Normalize	
	Coil elements	HEA;HEP	
-Contrast			
	MTC	Off	
	Magn. preparation	Non-sel. T2-IR	
	TI 1	1800 ms	
	Fat suppr.	Fat sat.	
	Fat sat. mode	Strong	
	Restore magn.	Off	
	Measurements	1	
	Reconstruction	Magnitude	
	Multiple series	Each measurement	

-Resolution	
Base resolution	256
Phase resolution	100 %
Phase partial Fourier	Allowed
Interpolation	Off
PAT mode	GRAPPA
Accel. factor PE	2
Ref. lines PE	24
Reference scan mode	Integrated
Image Filter	Off
Distortion Corr.	Off
Accel. factor 3D	1
Unfiltered images	On
Prescan Normalize	On
Normalize	Off
B1 filter	Off
Raw filter	On
Intensity	Weak
Slope	25
Elliptical filter	Off
Slice resolution	100 %
Slice partial Fourier	7/8
Geometry—	
Nr. of slab groups	1
Slabs	1
Position	Isocenter
Phase enc. dir.	A >> P
Phase oversampling	0 %
Slice oversampling	0.0 %
Slices per slab	192
Series	Interleaved
Nr. of sat. regions	0
Position mode	L-P-H
Fat suppr.	Fat sat.
Special sat.	None
Fat sat. mode	Strong
Special sat.	None
Table position	P
Restore magn.	Off

System—			
System	Body	Off	
	НЕР	On	
	HEA	On	
	SP5	Off	
	SP6	Off	
	SP7	Off	
	SP8	Off	
	SP1	Off	
	SP2	Off	
	SP3	Off	
	SP4	Off	
	Position mode	L-P-H	
	Positioning mode	REF	
	Table position	Н	
	Table position	0 mm	
	MSMA	S - C - T	
	Sagittal	R >> L	
	Coronal	A >> P	
	Transversal	F >> H	
	Save uncombined	Off	
	Coil Combine Mode	Adaptive Combine	
	AutoAlign	Head > Basis	
	Coil Select Mode	Off - All	
	Shim mode	Standard	
	Adjust with body coil	Off	
	Confirm freq. adjustment	Off	
	Assume Dominant Fat	Off	
	Assume Silicone	Off	
	Adjustment Tolerance	Maximum	
	? Ref. amplitude 1H	0.000 V	
	Position	Isocenter	
	Rotation	0.00 deg	
	F >> H	256 mm	
	A >> P	256 mm	
	R >> L	202 mm	
	Frequency 1H	123.251654 MHz	
	Correction factor	1	
	SLoopFCSatNS 1H	99.097 V	
	Gain	High	
	Table position	0 mm	
	Img. Scale. Cor.	5.000	

-Physio			
,	1st Signal/Mode	None	
	Trigger delay	0 ms	
	Magn. preparation	Non-sel. T2-IR	
	TI 1	1800 ms	
	Dark blood	Off	
	Resp. control	Off	
-Inline	-		
	Distortion correction	Off	
Sequence			
	Introduction	On	
	Dimension	3D	
	Elliptical scanning	On	
	Reordering	Linear	
	Bandwidth	781 Hz/Px	
	Flow comp.	No	
	Allowed delay	30 s	
	Echo spacing	3.53 ms	
	Adiabatic-mode	Off	
	Turbo factor	284	
	Echo train duration	893	
	RF pulse type	Normal	
	Gradient mode	Fast	
	Excitation	Non-sel.	
	Flip angle mode	T2 var	
	TX/RX delta frequency	0 Hz	
	TX Nucleus	None	
	TX delta frequency	0 Hz	
	Coil elements	HEA;HEP	
	Acquisition duration	0 ms	
	Organ under exam.	Standard	
	Tissue T1	940 ms	
	Tissue T2	100 ms	
BOLD			
	Subtract	Off	
	StdDev	Off	
	MIP-Sag	Off	
	MIP-Cor	Off	
	MIP-Tra	Off	
	MIP-Time	Off	
	Save original images	On	
	Distortion Corr.	Off	
	Save original images	On	

 $\label{lem:condition} $$ \USER \rightarrow UK Biobank_v4.0_0001 \protocol_v4.0 \diff_PA_MPopt_MB3_3b0_lowflip $$ TA:0:36 PAT:Off Voxel size: 2.0 \times 2.0 \times 2.0 mm Rel. SNR:1.00:epse$

Prio Recon Load to viewer Con Inline movie Auto store images On Load to stamp segments Off Auto open inline display Wait for user to start Start measurements Off Start measurements Off Position Position Isocenter Orientation Phase enc. dir. AutoAlign Phase oversampling FoV read Slice thickness Slice thickness TE Slice thickness TE Slice To That MTC Off Magn. preparation Flit groups MTC Massurements MTC Massurements Off Magn. preparation Fat sat. Grad. rev. fat suppr. Grad. TR Reconstruction Magnitude Multiple series Off	Properties—			\neg
Inline movie Auto store images On Load to stamp segments Off Load images to graphic segments Off Auto open inline display Wait for user to start Start measurements Nr. of slice groups Inline Inline Nr. of slice groups Inline Inli		Prio Recon	Off	
Auto store images Load to stamp segments Off Load images to graphic segments Off Auto open inline display Off Wait for user to start Start measurements Nr. of slice groups ISlices Position Position Isocenter Orientation T > C-16.0 Phase enc. dir. AutoAlign Phase oversampling Po' read Slice thickness Slice thickness Slice thickness TE Slice hickness Te Off Multi-band accel. factor Te Off Magn. preparation Filip angle Fat suppr. Grad. rev. fat suppr. Averaging mode Averaging mode Measurements I Delay in TR Mesonstruction Magn. pres Magn. Disabled Averaging mode Long term Measurements Long term Magnitude		Load to viewer	On	
Load to stamp segments Load images to graphic segments Auto open inline display Wait for user to start Start measurements Nr. of slice groups Slices Position Position Phase enc. dir. AutoAlign Phase oversampling FoV read Slice thickness Slice thickness TE 92.00 mm TR Multi-band accel. factor Tilter MTC Magn. preparation Filip angle Fat suppr. Grad. rev. fat suppr. Averaging mode Measurements Poff Magn. preparation Measurements Play in TR Measurements Play in TR Measurements Pol ms Magnitude		Inline movie	Off	
Load images to graphic segments Auto open inline display Wait for user to start Start measurements Nr. of slice groups Slices Dist. factor Orientation Phase enc. dir. A >> P AutoAlign Head > Brain Phase oversampling FoV read Slice thickness Slice thickness TE 92.00 ms Multi-band accel. factor Te Contrast MTC Magn. preparation Fig angle Measurements Measurements Measurements I Delay in TR O ms Reconstruction Magnitude Noff Magnitude Magnitude		Auto store images	On	
Auto open inline display Off Wait for user to start Off Start measurements Single		Load to stamp segments	Off	
Wait for user to start Start measurements Single		Load images to graphic segments	Off	
Nr. of slice groups		Auto open inline display	Off	
Nr. of slice groups		Wait for user to start	Off	
Nr. of slice groups 1 Slices 72 Dist. factor 0 % Position Isocenter Orientation T > C-16.0 Phase enc. dir. A >> P AutoAlign Head > Brain Phase oversampling 0 % FoV read 210 mm FoV phase 100.0 % Slice thickness 2.00 mm TR 3600 ms TE 92.00 ms Multi-band accel. factor 3 Filter None Coil elements HEA;HEP **Contrast** MTC Off Magn. preparation None Flip angle 78 deg Fat suppr. Fat sat. Grad. rev. fat suppr. Disabled Averaging mode Long term Measurements 1 Delay in TR 0 ms Reconstruction Magnitude		Start measurements	single	
Slices 72 Dist. factor 0 % Position Isocenter Orientation T > C-16.0 Phase enc. dir. A >> P AutoAlign Head > Brain Phase oversampling 0 % FoV read 210 mm FoV phase 100.0 % Slice thickness 2.00 mm TR 3600 ms TE 92.00 ms Multi-band accel. factor 3 Filter None Coil elements HEA;HEP Contrast MTC Magn. preparation None Flip angle 78 deg Fat suppr. Fat sat. Grad. rev. fat suppr. Disabled Averaging mode Long term Measurements 1 Delay in TR 0 ms Reconstruction Magnitude	Routine			\exists
Dist. factor Position Isocenter Orientation T > C-16.0 Phase enc. dir. A >> P AutoAlign Phase oversampling Phase oversampling FoV read FoV phase Slice thickness TE Pauto-band accel. factor Teller Total elements Teller Total elements The AutoAlign The AutoAlign FoV read AutoAlign FoV phase AutoAlign FoV read AutoAlign FoV read AutoAlign FoV phase AutoAlign For Magn For Magn For Magn For Magn For Fat sat. Grad. rev. fat suppr. Averaging mode Averaging mode Averaging mode Long term Measurements Delay in TR O ms Reconstruction Magnitude		Nr. of slice groups	1	
Position Isocenter Orientation T > C-16.0 Phase enc. dir. A >> P AutoAlign Head > Brain Phase oversampling 0 % FoV read 210 mm FoV phase 100.0 % Slice thickness 2.00 mm TR 3600 ms TE 92.00 ms Multi-band accel. factor 3 Filter None Coil elements HEA;HEP Contrast MTC Off Magn. preparation None Flip angle 78 deg Fat suppr. Fat sat. Grad. rev. fat suppr. Disabled Averaging mode Long term Measurements 1 Delay in TR 0 ms Reconstruction Magnitude		Slices	72	
Orientation T > C-16.0 Phase enc. dir. A >> P AutoAlign Head > Brain Phase oversampling 0 % FoV read 210 mm FoV phase 100.0 % Slice thickness 2.00 mm TR 3600 ms TE 92.00 ms Multi-band accel. factor 3 Filter None Coil elements HEA;HEP Contrast MTC Off Magn. preparation None Flip angle 78 deg Fat suppr. Fat sat. Grad. rev. fat suppr. Disabled Averaging mode Long term Measurements 1 Delay in TR 0 ms Reconstruction Magnitude		Dist. factor	0 %	
Phase enc. dir. A >> P AutoAlign Phase oversampling Phase oversampling O % FoV read FoV phase 100.0 % Slice thickness 2.00 mm TR 3600 ms TE 92.00 ms Multi-band accel. factor 3 Filter None Coil elements HEA;HEP Contrast MTC Off Magn. preparation Flip angle Fat suppr. Fat sat. Grad. rev. fat suppr. Disabled Averaging mode Averaging mode Long term Measurements Delay in TR Reconstruction Magnitude		Position	Isocenter	
AutoAlign Head > Brain Phase oversampling 0 % FoV read 210 mm FoV phase 100.0 % Slice thickness 2.00 mm TR 3600 ms TE 92.00 ms Multi-band accel. factor 3 Filter None Coil elements HEA;HEP Contrast MTC Off Magn. preparation None Flip angle 78 deg Fat suppr. Fat sat. Grad. rev. fat suppr. Disabled Averaging mode Long term Measurements 1 Delay in TR 0 ms Reconstruction Magnitude		Orientation	T > C-16.0	
Phase oversampling 0 % FoV read 210 mm FoV phase 100.0 % Slice thickness 2.00 mm TR 3600 ms TE 92.00 ms Multi-band accel. factor 3 Filter None Coil elements HEA;HEP Contrast MTC Off Magn. preparation None Flip angle 78 deg Fat suppr. Fat sat. Grad. rev. fat suppr. Disabled Averaging mode Long term Measurements 1 Delay in TR 0 ms Reconstruction Magnitude		Phase enc. dir.	A >> P	
FoV read FoV phase Slice thickness Slice thickness TR 3600 ms TE 92.00 ms Multi-band accel. factor Silter Coil elements MTC MTC MTC Magn. preparation Flip angle Fat suppr. Grad. rev. fat suppr. Averaging mode Measurements Delay in TR Delay in TR Reconstruction Slice thickness 100.0 % 1		AutoAlign	Head > Brain	
FoV phase 100.0 % Slice thickness 2.00 mm TR 3600 ms TE 92.00 ms Multi-band accel. factor 3 Filter None Coil elements HEA;HEP Contrast MTC Off Magn. preparation None Flip angle 78 deg Fat suppr. Fat sat. Grad. rev. fat suppr. Disabled Averaging mode Long term Measurements 1 Delay in TR 0 ms Reconstruction Magnitude		Phase oversampling	0 %	
Slice thickness TR 3600 ms TE 92.00 ms Multi-band accel. factor Filter Coil elements MTC Magn. preparation Flip angle Fat suppr. Grad. rev. fat suppr. Averaging mode Measurements Delay in TR Reconstruction S600 ms 192.00 ms Mne HEA;HEP Off None The Averaging mode Long term Measurements Delay in TR O ms Magnitude		FoV read	210 mm	
TR TE 92.00 ms Multi-band accel. factor 3 Filter Coil elements MTC Magn. preparation Flip angle Fat suppr. Grad. rev. fat suppr. Averaging mode Measurements Delay in TR Delay in TR Reconstruction Multi-band accel. factor 3 Fy 92.00 ms Measurements None MEA;HEP Off None Flat Sat. Off Disabled Long term Measurements 1 0 ms Magnitude		FoV phase	100.0 %	
TE Multi-band accel. factor Silter None Coil elements MTC Off Magn. preparation Flip angle Fat suppr. Grad. rev. fat suppr. Disabled Averaging mode Measurements Delay in TR Reconstruction Multi-band accel. factor 3 HEA;HEP Off None FEA; Fat sat. Off Disabled Long term Magnitude		Slice thickness	2.00 mm	
Multi-band accel. factor Filter Coil elements MTC Magn. preparation Flip angle Fat suppr. Grad. rev. fat suppr. Averaging mode Averaging mode Measurements Delay in TR Reconstruction None The Magn. Preparation		TR	3600 ms	
Filter None Coil elements HEA;HEP Contrast MTC Off Magn. preparation None Flip angle 78 deg Fat suppr. Fat sat. Grad. rev. fat suppr. Disabled Averaging mode Long term Measurements 1 Delay in TR 0 ms Reconstruction Magnitude		TE	92.00 ms	
Contrast MTC Magn. preparation Flip angle Fat suppr. Grad. rev. fat suppr. Averaging mode Measurements Delay in TR Reconstruction MTC Off Magn. Preparation None 78 deg Fat sat. Disabled Long term Measurements 1 Demonstruction Magnitude		Multi-band accel. factor	3	
MTC Off Magn. preparation None Flip angle 78 deg Fat suppr. Fat sat. Grad. rev. fat suppr. Disabled Averaging mode Long term Measurements 1 Delay in TR 0 ms Reconstruction Magnitude		Filter	None	
MTC Magn. preparation None Flip angle Fat suppr. Grad. rev. fat suppr. Disabled Averaging mode Measurements Delay in TR Reconstruction Off None Fat suppr Table Ta		Coil elements	HEA;HEP	
Magn. preparation Flip angle Fat suppr. Grad. rev. fat suppr. Averaging mode Measurements Delay in TR Reconstruction None 78 deg Fat sat. Disabled Long term 0 ms Magnitude	Contrast			ヿ
Flip angle 78 deg Fat suppr. Fat sat. Grad. rev. fat suppr. Disabled Averaging mode Long term Measurements 1 Delay in TR 0 ms Reconstruction Magnitude		MTC	Off	
Fat suppr. Grad. rev. fat suppr. Disabled Averaging mode Long term Measurements 1 Delay in TR Reconstruction Disabled Long term 1 Magnitude		Magn. preparation	None	
Grad. rev. fat suppr. Averaging mode Measurements Delay in TR Reconstruction Disabled Long term 0 ms Magnitude		Flip angle	78 deg	
Averaging mode Long term Measurements 1 Delay in TR 0 ms Reconstruction Magnitude		Fat suppr.	Fat sat.	
Measurements1Delay in TR0 msReconstructionMagnitude		Grad. rev. fat suppr.	Disabled	
Delay in TR 0 ms Reconstruction Magnitude		Averaging mode	Long term	
Reconstruction Magnitude		Measurements	1	
		Delay in TR	0 ms	
Multiple series Off		Reconstruction	Magnitude	
		Multiple series	Off	

Fat sat.

Disabled

None

None

P

Resolution-		
	Base resolution	104
	Phase resolution	100 %
	Phase partial Fourier	6/8
	Interpolation	Off
	PAT mode	None
	Distortion Corr.	Off
	Prescan Normalize	Off
	Raw filter	Off
	Elliptical filter	Off
	Dynamic Field Corr.	Off
Geometry—		
	Nr. of slice groups	1
	Slices	72
	Dist. factor	0 %
	Position	Isocenter
	Phase enc. dir.	A >> P
	Phase oversampling	0 %
	Multi-slice mode	Interleaved
	1 0	Interleaved Interleaved
	Multi-slice mode	
	Multi-slice mode Series	Interleaved

Fat suppr.
Special sat.

Special sat.

Table position

Grad. rev. fat suppr.

System—		
	Body	Off
	HEP	On
	HEA	On
	Position mode	L-P-H
	Positioning mode	REF
	Table position	Н
	Table position	0 mm
	MSMA	S - C - T
	Sagittal	R >> L
	Coronal	A >> P
	Transversal	F >> H
	Coil Combine Mode	Sum of Squares
	AutoAlign	Head > Brain
	Coil Select Mode	Off - All
	Shim mode	Standard
	Adjust with body coil	Off
	Confirm freq. adjustment	Off
	Assume Dominant Fat	Off
	Assume Silicone	Off
	Adjustment Tolerance	Maximum
	? Ref. amplitude 1H	0.000 V
	Position	Isocenter
	Rotation	0.00 deg
	R >> L	210 mm
	A >> P	210 mm
	F >> H	144 mm
	Frequency 1H	123.251654 MHz
	Correction factor	1
	AddCSaCSatNS 1H	99.097 V
	Gain	High
	Table position	0 mm
	Img. Scale. Cor.	1.000
-Physio-		
•	1st Signal/Mode	None
	Magn. preparation	None
	Resp. control	Off
-Inline	-	
	Distortion correction	Off

Sequence-		
	Introduction	Off
	Averaging mode	Long term
	Multi-slice mode	Interleaved
	Bandwidth	1780 Hz/Px
	Echo spacing	0.67 ms
	EPI factor	104
	Gradient mode	Fast
	Online multi-band recon.	Online
	TX/RX delta frequency	0 Hz
	TX Nucleus	None
	TX delta frequency	0 Hz
	Coil elements	HEA;HEP
	Acquisition duration	0 ms
-BOLD-		

Delay in TR $0 \, \text{ms}$ Diffusion mode Free Diff. weightings b-value 2000 s/mm² Diff. weighted images On Trace weighted images Off Off ADC maps FA maps Off Mosaic Off Tensor Off Distortion Corr. Off 0 s/mm^2 b-Value >= **Exponential ADC Maps** Off Off **Invert Gray Scale** Off Calculated Image

SIEMENS MAGNETOM Skyra syngo MR D13

\\USER\head\UK Biobank_v4.0_0001\protocol_v4.0 \\diff_AP_MPopt_MB3_50b1000_50b2000_8b0_lowflip TA:6:32 PAT:Off Voxel size:2.0×2.0×2.0 mm Rel. SNR:1.00 :epse

Properties—			
	Prio Recon	Off	
	Load to viewer	On	
	Inline movie	Off	
	Auto store images	On	
	Load to stamp segments	Off	
	Load images to graphic segments	Off	
	Auto open inline display	Off	
	Wait for user to start	Off	
	Start measurements	single	
Routine			
	Nr. of slice groups	1	
	Slices	72	
	Dist. factor	0 %	
	Position	Isocenter	
	Orientation	T > C-16.0	
	Phase enc. dir.	A >> P	
	AutoAlign	Head > Brain	
	Phase oversampling	0 %	
	FoV read	210 mm	
	FoV phase	100.0 %	
	Slice thickness	2.00 mm	
	TR	3600 ms	
	TE	92.00 ms	
	Multi-band accel. factor	3	
	Filter	None	
	Coil elements	HEA;HEP	
Contrast			
	MTC	Off	
	Magn. preparation	None	
	Flip angle	78 deg	
	Fat suppr.	Fat sat.	
	Grad. rev. fat suppr.	Disabled	
	Averaging mode	Long term	
	Measurements	1	
	Delay in TR	0 ms	
	Reconstruction	Magnitude	
	Multiple series	Off	

Fat sat.

Disabled

None

None

P

-Resolution-		
resoration	Base resolution	104
	Phase resolution	100 %
	Phase partial Fourier	6/8
	Interpolation	Off
	PAT mode	None
	Distortion Corr.	Off
	Prescan Normalize	Off
	Raw filter	Off
	Elliptical filter	Off
	Dynamic Field Corr.	Off
-Geometry-		
	Nr. of slice groups	1
	Slices	72
	Dist. factor	0 %
	Position	Isocenter
	Phase enc. dir.	A >> P
	Phase oversampling	0~%
	Multi-slice mode	Interleaved
	Series	Interleaved
	Nr. of sat. regions	0
	Position mode	L-P-H

Fat suppr.
Special sat.

Special sat.

Table position

Grad. rev. fat suppr.

System—		
	Body	Off
	HEP	On
	HEA	On
	Position mode	L-P-H
	Positioning mode	REF
	Table position	Н
	Table position	0 mm
	MSMA	S - C - T
	Sagittal	R >> L
	Coronal	A >> P
	Transversal	F >> H
	Coil Combine Mode	Sum of Squares
	AutoAlign	Head > Brain
	Coil Select Mode	Off - All
	Shim mode	Standard
	Adjust with body coil	Off
	Confirm freq. adjustment	Off
	Assume Dominant Fat	Off
	Assume Silicone	Off
	Adjustment Tolerance	Maximum
	? Ref. amplitude 1H	0.000 V
	Position	Isocenter
	Rotation	0.00 deg
	R >> L	210 mm
	A >> P	210 mm
	F >> H	144 mm
	Frequency 1H	123.251654 MHz
	Correction factor	1
	AddCSaCSatNS 1H	99.097 V
	Gain	High
	Table position	0 mm
	Img. Scale. Cor.	1.000
-Physio-		
•	1st Signal/Mode	None
	Magn. preparation	None
	Resp. control	Off
-Inline	-	
	Distortion correction	Off

Sequence	Introduction	Off	
	Averaging mode	Long term	
		· ·	
	Multi-slice mode	Interleaved	
	Bandwidth	1780 Hz/Px	
	Echo spacing	0.67 ms	
	EPI factor	104	
	Gradient mode	Fast	
	Online multi-band recon.	Online	
	TX/RX delta frequency	0 Hz	
	TX Nucleus	None	
	TX delta frequency	0 Hz	
	Coil elements	HEA;HEP	
	Acquisition duration	0 ms	

0 ms Delay in TR Diffusion mode Free Diff. weightings 0 s/mm² b-value 1 Diff. weighted images On Trace weighted images Off Off ADC maps FA maps Off Mosaic On Tensor Off Distortion Corr. Off 0 s/mm² b-Value >= **Exponential ADC Maps** Off Off **Invert Gray Scale** Off Calculated Image

SIEMENS MAGNETOM Skyra syngo MR D13

\\USER\head\UK Biobank_v4.0_0001\protocol_v4.0\SWI_3mm_Updated_v1.1 TA:2:34 PAT:2 Voxel size:0.8×0.8×3.0 mm Rel. SNR:1.00 :fl_r

Properties—			
	Prio Recon	Off	
	Load to viewer	On	
	Inline movie	Off	
	Auto store images	On	
	Load to stamp segments	On	
	Load images to graphic s	egments Off	
	Auto open inline display	Off	
	Wait for user to start	Off	
	Start measurements	single	
Routine			=
	Nr. of slab groups	1	
	Slabs	1	
	Dist. factor	20 %	
	Position	Isocenter	
	Orientation	T > C-16.0	
	Phase enc. dir.	R >> L	
	AutoAlign	Head > Brain	
	Phase	0 %	
	oversampling	0 70	
	Slice oversampling	8.3 %	
	FoV read	230 mm	
	FoV phase	88.9 %	
	Slice thickness	3.00 mm	
	TR	27.0 ms	
	TE 1	9.42 ms	
	Averages	1	
	Concatenations	1	
	Filter	Prescan Normalize, Elliptical filter,	
		Image Filter	
	Coil elements	HEA;HEP	
-Contrast	MTC	Off	
	MTC	Off	
	Magn. preparation	None	
	Flip angle	15 deg	
	Fat suppr.	None	
	Water suppr.	None	
	SWI	Off	
	Averaging mode	Short term	
	Measurements	1	
	Reconstruction	Magn./Phase	
	Multiple series	Each measurement	

-Resolution-			
	Base resolution	288	
	Phase resolution	100 %	
	Phase partial Fourier	7/8	
	Interpolation	Off	
	PAT mode	GRAPPA	
	Accel. factor PE	2	
	Ref. lines PE	24	
	Reference scan mode	Integrated	
	Image Filter	On	
	Intensity	Medium	
	Edge Enhancement	3	
	Smoothing	3	
	Unfiltered images	Off	
	Distortion Corr.	Off	
	Accel. factor 3D	1	
	Unfiltered images	On	
	Prescan Normalize	On	
	Normalize	Off	
	B1 filter	Off	
	Raw filter	Off	
	Elliptical filter	On	
	Mode	Inplane	
	Slice resolution	100 %	
	Slice partial Fourier	7/8	
-Geometry -			\equiv
	Nr. of slab groups	1	
	Slabs	1	
	Dist. factor	20 %	
	Position	Isocenter	
	Phase enc. dir.	R >> L	
	Phase oversampling	0 %	
	Slice oversampling	8.3 %	
	Slices per slab	48	
	Multi-slice mode	Interleaved	
	Series	Interleaved	
	Saturation mode	Standard	
	Nr. of sat. regions	0	
	Position mode	L-P-H	
	Fat suppr.	None	
	Water suppr.	None	
	Special sat.	None	
	Special sat.	None	
	Table position	P	

-System-			
	Body	Off	
	HEP	On	
	HEA	On	
	Position mode	L-P-H	
	Positioning mode	REF	
	Table position	Н	
	Table position	0 mm	
	MSMA	S - C - T	
	Sagittal	R >> L	
	Coronal	A >> P	
	Transversal	F >> H	
	Save uncombined	On	
	Coil Combine Mode	Sum of Squares	
	AutoAlign	Head > Brain	
	Coil Select Mode	Off - All	
	Shim mode	Standard	
	Adjust with body coil	Off	
	Confirm freq. adjustment	Off	
	Assume Dominant Fat	Off	
	Assume Silicone	Off	
	Adjustment Tolerance	Maximum	
	? Ref. amplitude 1H	0.000 V	
	Position	Isocenter	
	Rotation	89.90 deg	
	A >> P	230 mm	
	R >> L	205 mm	
	F >> H	144 mm	
	Frequency 1H	123.251654 MHz	
	Correction factor	1	
	SRFExcit 1H	170.313 V	
	Gain	Low	
	Table position	0 mm	
	Img. Scale. Cor.	1.000	
-Physio	6		
J = =	1st Signal/Mode	None	
	Segments	1	
	Magn. preparation	None	
	Dark blood	Off	
	Resp. control	Off	
-Inline	1		
	Distortion correction	Off	

Sequence—			
	Introduction	On	
	Dimension	3D	
	Elliptical scanning	Off	
	Averaging mode	Short term	
	Multi-slice mode	Interleaved	
	Asymmetric echo	Off	
	Contrasts	2	
	Bandwidth 1	140 Hz/Px	
	Flow comp. 1	Yes	
	Readout mode	Bipolar	
	Allowed delay	0 s	
	RF pulse type	Normal	
	Gradient mode	Fast	
	Excitation	Slab-sel.	
	RF spoiling	On	
	TX/RX delta frequency	0 Hz	
	TX Nucleus	None	
	TX delta frequency	0 Hz	
	Coil elements	HEA;HEP	
	Acquisition duration	0 ms	
	Mode	Off	
BOLD			
	Subtract	Off	
	Liver registration	Off	
	StdDev	Off	
	MIP-Sag	Off	
	MIP-Cor	Off	
	MIP-Tra	Off	
	MIP-Time	Off	
	Save original images	On	
	Distortion Corr.	Off	
	Contrasts	2	
	Save original images	On	
	Wash - In	Off	
	Wash - Out	Off	
	TTP	Off	
	PEI	Off	
	MIP - time	Off	

Table of contents