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Protocol: OxBAC-BIRAX Healthy Ageing (OHBA 3T)

Open Access Status

Open Access Status

Open Access

Stable URL

https://open.oxcin.ox.ac.uk/protocols/stable/19222a9b-17f2-4ea6-a224-a2cc855b5caa

Version Info

Original Creation Date

2025-May-12 9:01:14

Version

Version 1 @ 2026-Jan-09 15:30:36

Version History

- This is the latest version

Scanning Info

Scanner

MAGNETOM 3T Prisma - Syngo VE11C-SP01

Application

In Vivo

Total Acquisition Time

0h:49m:40s

Coils

- 3T Siemens Head Coil 32ch

Protocol Info

Project

2021_112 bhcHC-BIRAX

File Attachments

1. OxBAC-BIRAX_Healthy_Ageing_OHBA_3T.docx
2. OHBA_3T_BHC_ASL_Appendix.pdf

Description

Acquisition protocol for the studies: Oxford UK Biobank Aligned Controls (OxBAC) and British Israel Research Academic Exchange (BIRAX) study on Microstructural MRI in Healthy Ageing.

The protocol includes sequences matched to the UK Biobank imaging study as well as a specific sequence to study the brain microstructure.

The UK Biobank-matched sequences are the same as those acquired in memory clinic patients of the Oxford Brain Health Clinic on the same scanner (protocol referenced below), to provide a matched healthy control group.

Keywords

Adult Aging Alzheimer's Disease ASL Biobank BOLD Brain Cohort Studies Dementia Diffusion DTI DWI FLAIR fMRI harmonisation Healthy Volunteers Multiband rs-fMRI Structural SWI T1 T2 T2* TOF

Usage Guidance

See attached radiographers scanning procedure for full usage guidance.

Citing this protocol: http://doi.org/tbc

References for scans part of the Oxford Brain Health Clinic protocol:

Clare O'Donoghue, Jasmine Blane, Juliet Semple, Sebastian Rieger, Nicola Aikin, Jon Campbell, Pieter Pretorius, Ludovica Griffanti, Grace Gillis, Thomas W Okell, Mark Chiew, Stephen M Smith, Karla L Miller, & Clare E Mackay. (2022). WIN MR Protocol: Oxford Brain Health Centre (2019_102_BHC). Zenodo. https://doi.org/10.5281/zenodo.6598036

Griffanti L, Gillis G, O'Donoghue MC, Blane J, Pretorius PM, Mitchell R, Aikin N, Lindsay K, Campbell J, Semple J, Alfaro-Almagro F, Smith SM, Miller KL, Martos L, Raymont V, Mackay CE. Adapting UK Biobank imaging for use in a routine memory clinic setting: The Oxford Brain Health Clinic. Neuroimage Clin. 2022;36:103273. doi: 10.1016/j.nicl.2022.103273. Epub 2022 Nov 21. https://pubmed.ncbi.nlm.nih.gov/36451375/

References for HARDI, CHARMED, AxCaliber:

Assaf Y, Basser PJ. Composite hindered and restricted model of diffusion (CHARMED) MR imaging of the human brain. Neuroimage. 2005 Aug 1;27(1):48-58.

Assaf Y, Blumenfeld-Katzir T, Y ovel Y, Basser PJ. Axcaliber: A method for measuring axon diameter distribution from diffusion MRI. Magn Reson Med. 2008 Jun;59(6):1347-54.

Acknowledgments: The development of this resource was funded by the Britain-Israel research and Academic Exchange partnership (BIRAX) with Rosetrees and the Israel Ministry of Innovation, Science and Technology. This work was also supported by the NIHR Oxford Health Biomedical Research Centre (NIHR203316) and the Oxford Centre for Integrative Neuroimaging (OxCIN). The Oxford Centre for Integrative Neuroimaging was supported by core funding from the Wellcome Trust (203139/Z/16/Z). JB is supported by the Medical Research Council (MR/N013468/1).

Protocol Structure

- Protocol v3
  - localiser_3plane_32ch
  - ep2d_diff_3scan_trace_p2_130
  - TE_10_TE_20_TR 30_Magnitude&Phase_t2_swi_tra_p2_.8x.8x1.5mm_PF78
  - T1_p2_1mm_fov256_sag_TI_880(biobank)
  - t2_flair_sag_p2_1mm_FS_ellip_pf78

- TOF_3D_neck
- diff_PA_MPopt_MB3_3b0_lowflip
- diff_AP_MPopt_MB3_50b1000_50b2000_8b0_lowflip
- to_ep2d_PCASL
- MB8_FMRI_fov210_2.4mm_resting
- dMRI_MB4_185dirs_d15D45_AP
- dMRI_MB4_6dirs_d15D45_APrev

Protocol v3 → Sequence 1: localiser_3plane_32ch

Keywords

Localiser

Acquisition Time

0h:0m:14s

Description

Single sagittal, coronal and axial slices used for positioning the following sequences.

Protocol v3 → Sequence 2: ep2d_diff_3scan_trace_p2_130

Keywords

Diffusion **DWI**

Acquisition Time

0h:0m:43s

Description

Clinical-grade Diffusion Weighted Imaging (DWI) sequence, 3 diffusion directions. Suitable for standard clinical radiology reporting.

Protocol v3 → Sequence 3: TE_10_TE_20_TR 30_Magnitude&Phase_t2_swi_tra_p2_.8x.8x1.5mm_PF78

Keywords

SWI

Acquisition Time

0h:4m:46s

Description

Susceptibility-weighted MRI (swMRI) scan adapted from the UK Biobank imaging study.

Suitable for SWI and QSM analyses. Coil uncombined images need to be generated at the time of scanning (please refer to the scanning procedure document for details).

Protocol v3 → Sequence 4: T1_p2_1mm_fov256_sag_TI_880(biobank)

Keywords

Biobank **Structural** **T1**

Acquisition Time

0h:4m:54s

Description

T1-weighted structural scan, of 1mm isotropic resolution, matched with the UK Biobank imaging study.

Suitable for structural MRI analyses and base for registration to a standard template (also to aid registration in a functional MRI, diffusion MRI or ASL protocol).

Protocol v3 → Sequence 5: t2_flair_sag_p2_1mm_FS_ellip_pf78

Keywords

Biobank **FLAIR** **Structural** **T2** **T2-FLAIR**

Acquisition Time

0h:5m:52s

Description

T2-weighted FLAIR scan, matched with the UK Biobank imaging study.

Suitable for structural MRI analyses and lesion segmentation.

Protocol v3 → Sequence 6: TOF_3D_neck

Keywords

Localiser **TOF**

Acquisition Time

0h:0m:42s

Description

Used to localise neck vessels for positioning the Arterial Spin Labelling (ASL) tagging plane.

Protocol v3 → Sequence 7: diff_PA_MPopt_MB3_3b0_lowflip

Keywords

Biobank **Diffusion** **DTI** **Multiband**

Acquisition Time

0h:0m:36s

Description

B0 scan (non-diffusion-weighted), reversed phase encoding direction with respect to the main diffusion-weighted scan, to correct for susceptibility-induced distortions. Matched with the UK Biobank imaging study.

Protocol v3 → Sequence 8: diff_AP_MPopt_MB3_50b1000_50b2000_8b0_lowflip

Keywords

Biobank **Diffusion** **DTI** **Multiband**

Acquisition Time

0h:6m:32s

Description

Diffusion-weighted scan, multi-shell, matched with the UK Biobank imaging study.

Suitable for fitting diffusion models and run tractography.

Protocol v3 → Sequence 9: to_ep2d_PCASL

Keywords

ASL

Acquisition Time

0h:7m:17s

Description

Pseudo-continuous Arterial Spin Labelling sequence.

Suitable for perfusion imaging (e.g. to estimate Cerebral Blood Flow and Arterial Transit Time).

Protocol v3 → Sequence 10: MB8_FMRI_fov210_2.4mm_resting

Keywords

Biobank **fMRI** **Multiband** **rs-fMRI**

Acquisition Time

0h:6m:10s

Description

Resting-state functional MRI scan, multiband factor 8, matched with the UK Biobank imaging study.

Suitable for resting-state functional connectivity analyses.

Protocol v3 → Sequence 11: dMRI_MB4_185dirs_d15D45_AP

Keywords

Diffusion **DTI**

Acquisition Time

0h:11m:10s

Description

HARDI, CHARMED, AxCaliber – a diffusion-weighted sequence with 88 gradient directions at multiple b-values at image resolution of 1.6 mm3.

Protocol v3 → Sequence 12: dMRI_MB4_6dirs_d15D45_APrev

Keywords

Diffusion **DTI**

Acquisition Time

0h:0m:44s

Description

HARDI, CHARMED, AxCaliber – B0 scan (non-diffusion-weighted), reversed phase encoding direction with respect to the main diffusion-weighted scan, to correct for susceptibility-induced distortions.

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TA: 0:14 PM: REF Voxel size: 0.5×0.5×7.0 mmPAT: Off Rel. SNR: 1.00 : fl

Properties

Prio recon	Off
Load images to viewer	On
Inline movie	Off
Auto store images	On
Load images to stamp segments	On
Load images to graphic segments	On
Auto open inline display	Off
Auto close inline display	Off
Start measurement without further preparation	Off
Wait for user to start	Off
Start measurements	Single measurement

Routine

Slice group	1
Slices	1
Dist. factor	20 %
Position	L0.0 A30.6 F4.8 mm
Orientation	Sagittal
Phase enc. dir.	A >> P
Slice group	2
Slices	1
Dist. factor	20 %
Position	L0.0 A20.6 F4.8 mm
Orientation	Transversal
Phase enc. dir.	A >> P
Slice group	3
Slices	1
Dist. factor	20 %
Position	L0.0 A20.6 F4.8 mm
Orientation	Coronal
Phase enc. dir.	R >> L
AutoAlign	---
Phase oversampling	0 %
FoV read	250 mm
FoV phase	100.0 %
Slice thickness	7.0 mm
TR	8.6 ms
TE	4.00 ms
Averages	2
Concatenations	3
Filter	Normalize, Elliptical filter
Coil elements	HEA;HEP

Contrast - Common

TR	8.6 ms
TE	4.00 ms
TD	0 ms
MTC	Off
Magn. preparation	None
Flip angle	20 deg
Fat suppr.	None
Water suppr.	None
SWI	Off

Contrast - Dynamic

Averages	2
Averaging mode	Short term
Reconstruction	Magnitude
Measurements	1

Contrast - Dynamic

Multiple series	Each measurement

Resolution - Common

FoV read	250 mm
FoV phase	100.0 %
Slice thickness	7.0 mm
Base resolution	256
Phase resolution	91 %
Phase partial Fourier	Off
Interpolation	On

Resolution - iPAT

PAT mode	None

Resolution - Filter Image

Image Filter	Off
Distortion Corr.	Off
Prescan Normalize	Off
Normalize	On
B1 filter	Off

Resolution - Filter Rawdata

Raw filter	Off
Elliptical filter	On

Geometry - Common

Slice group	1
Slices	1
Dist. factor	20 %
Position	L0.0 A30.6 F4.8 mm
Orientation	Sagittal
Phase enc. dir.	A >> P
Slice group	2
Slices	1
Dist. factor	20 %
Position	L0.0 A20.6 F4.8 mm
Orientation	Transversal
Phase enc. dir.	A >> P
Slice group	3
Slices	1
Dist. factor	20 %
Position	L0.0 A20.6 F4.8 mm
Orientation	Coronal
Phase enc. dir.	R >> L
FoV read	250 mm
FoV phase	100.0 %
Slice thickness	7.0 mm
TR	8.6 ms
Multi-slice mode	Sequential
Series	Interleaved
Concatenations	3

Geometry - AutoAlign

Slice group	1
Position	L0.0 A30.6 F4.8 mm
Orientation	Sagittal
Phase enc. dir.	A >> P
Slice group	2
Position	L0.0 A20.6 F4.8 mm
Orientation	Transversal

Geometry - AutoAlign

Phase enc. dir.	A >> P
Slice group	3
Position	L0.0 A20.6 F4.8 mm
Orientation	Coronal
Phase enc. dir.	R >> L
AutoAlign	---
Initial Position	L0.0 A30.6 F4.8
L	0.0 mm
A	30.6 mm
F	4.8 mm
Initial Rotation	0.00 deg
Initial Orientation	Sagittal

Geometry - Saturation

Saturation mode	Standard
Fat suppr.	None
Water suppr.	None
Special sat.	None

System - Miscellaneous

Positioning mode	REF
Table position	H
Table position	0 mm
MSMA	S - C - T
Sagittal	R >> L
Coronal	A >> P
Transversal	F >> H
Coil Combine Mode	Adaptive Combine
Save uncombined	Off
Matrix Optimization	Off
AutoAlign	---
Coil Select Mode	On - AutoCoilSelect

System - Adjustments

B0 Shim mode	Tune up
B1 Shim mode	TrueForm
Adjust with body coil	Off
Confirm freq. adjustment	Off
Assume Dominant Fat	Off
Assume Silicone	Off
Adjustment Tolerance	Auto

System - Adjust Volume

Position	Isocenter
Orientation	Transversal
Rotation	0.00 deg
A >> P	263 mm
R >> L	350 mm
F >> H	350 mm
Reset	Off

System - pTx Volumes

B1 Shim mode	TrueForm
Excitation	Slice-sel.

System - Tx/Rx

Frequency 1H	123.219356 MHz
Correction factor	1
Gain	High
Img. Scale Cor.	1.000
Reset	Off
? Ref. amplitude 1H	0.000 V

Physio - Signal1

1st Signal/Mode	None
TR	8.6 ms
Concatenations	3
Segments	1

Physio - Cardiac

Magn. preparation	None
Fat suppr.	None
Dark blood	Off
FoV read	250 mm
FoV phase	100.0 %
Phase resolution	91 %

Physio - PACE

Resp. control	Off
Concatenations	3

Inline - Common

Subtract	Off
Measurements	1
StdDev	Off
Liver registration	Off
Save original images	On

Inline - MIP

MIP-Sag	Off
MIP-Cor	Off
MIP-Tra	Off
MIP-Time	Off
Save original images	On

Inline - Soft Tissue

Wash - In	Off
Wash - Out	Off
TTP	Off
PEI	Off
MIP - time	Off
Measurements	1

Inline - Composing

Distortion Corr.	Off

Sequence - Part 1

Introduction	On
Dimension	2D
Phase stabilisation	Off
Asymmetric echo	Allowed
Contrasts	1
Flow comp.	No
Multi-slice mode	Sequential
Bandwidth	320 Hz/Px

Sequence - Part 2

Segments	1
Acoustic noise reduction	None
RF pulse type	Normal
Gradient mode	Normal
Excitation	Slice-sel.
RF spoiling	On

Sequence - Assistant

Mode	Off
Allowed delay	0 s

\\USER\OHBA Projects VE11C\2021_112 bhcHC-BIRAX\Protocol v3\ep2d_diff_3scan_trace_p2_130

TA: 0:43 PM: REF Voxel size: 0.8×0.8×4.0 mmPAT: 2 Rel. SNR: 1.00 : epse

Properties

Prio recon	Off
Load images to viewer	On
Inline movie	Off
Auto store images	On
Load images to stamp segments	On
Load images to graphic segments	Off
Auto open inline display	Off
Auto close inline display	Off
Start measurement without further preparation	Off
Wait for user to start	Off
Start measurements	Single measurement

Routine

Slice group	1
Slices	27
Dist. factor	30 %
Position	R1.8 A9.4 H9.7 mm
Orientation	T > C2.0 > S-1.7
Phase enc. dir.	A >> P
AutoAlign	---
Phase oversampling	0 %
FoV read	220 mm
FoV phase	100.0 %
Slice thickness	4.0 mm
TR	3800 ms
TE	61.0 ms
Concatenations	1
Filter	Raw filter, Prescan Normalize
Coil elements	HEA;HEP

Contrast - Common

TR	3800 ms
TE	61.0 ms
MTC	Off
Magn. preparation	None
Fat suppr.	Fat sat.
Fat sat. mode	Strong

Contrast - Dynamic

Averaging mode	Long term
Reconstruction	Magnitude
Measurements	1
Delay in TR	0 ms

Resolution - Common

FoV read	220 mm
FoV phase	100.0 %
Slice thickness	4.0 mm
Base resolution	130
Phase resolution	100 %
Phase partial Fourier	Off
Interpolation	On

Resolution - iPAT

Accel. mode	GRAPPA
Accel. factor PE	2
Ref. lines PE	40
Reference scan mode	EPI/separate

Resolution - Filter Image

Distortion Corr.	Off
Prescan Normalize	On
Dynamic Field Corr.	Off

Resolution - Filter Rawdata

Raw filter	On
Elliptical filter	Off

Geometry - Common

Slice group	1
Slices	27
Dist. factor	30 %
Position	R1.8 A9.4 H9.7 mm
Orientation	T > C2.0 > S-1.7
Phase enc. dir.	A >> P
FoV read	220 mm
FoV phase	100.0 %
Slice thickness	4.0 mm
TR	3800 ms
Multi-slice mode	Interleaved
Series	Interleaved
Concatenations	1

Geometry - AutoAlign

Slice group	1
Position	R1.8 A9.4 H9.7 mm
Orientation	T > C2.0 > S-1.7
Phase enc. dir.	A >> P
AutoAlign	---
Initial Position	R1.8 A9.4 H9.7
R	1.8 mm
A	9.4 mm
H	9.7 mm
Initial Rotation	0.00 deg
Initial Orientation	T > C
T > C	2.0
> S	-1.7

Geometry - Saturation

Fat suppr.	Fat sat.
Fat sat. mode	Strong
Special sat.	None

Geometry - Navigator

System - Miscellaneous

Positioning mode	REF
Table position	H
Table position	0 mm
MSMA	S - C - T
Sagittal	R >> L
Coronal	A >> P
Transversal	F >> H
Coil Combine Mode	Adaptive Combine
Matrix Optimization	Off
AutoAlign	---
Coil Select Mode	Off - AutoCoilSelect

System - Adjustments

B0 Shim mode	Standard

System - Adjustments

B1 Shim mode	TrueForm
Adjust with body coil	Off
Confirm freq. adjustment	Off
Assume Dominant Fat	Off
Assume Silicone	Off
Adjustment Tolerance	Auto

System - Adjust Volume

Position	R1.8 A9.4 H9.7 mm
Orientation	T > C2.0 > S-1.7
Rotation	0.00 deg
A >> P	220 mm
R >> L	220 mm
F >> H	140 mm
Reset	Off

System - pTx Volumes

B1 Shim mode	TrueForm
Excitation	Standard

System - Tx/Rx

Frequency 1H	123.219356 MHz
Correction factor	1
Gain	High
Img. Scale Cor.	1.000
Reset	Off
? Ref. amplitude 1H	0.000 V

Physio - Signal1

1st Signal/Mode	None
TR	3800 ms
Concatenations	1

Physio - PACE

Resp. control	Off
Concatenations	1

Diff - Neuro

Diffusion mode	3-Scan Trace
Diff. directions	3
Diffusion Scheme	Monopolar
Diff. weightings	2
b-value 1	0 s/mm²
b-value 2	1000 s/mm²
b-value 1	2
b-value 2	2
Diff. weighted images	Off
Trace weighted images	On
ADC maps	On
FA maps	Off
Mosaic	Off
Tensor	Off
Noise level	40

Diff - Body

Diffusion mode	3-Scan Trace
Diff. directions	3
Diffusion Scheme	Monopolar
Diff. weightings	2
b-value 1	0 s/mm²
b-value 2	1000 s/mm²
b-value 1	2
b-value 2	2

Diff - Body

Diff. weighted images	Off
Trace weighted images	On
ADC maps	On
Exponential ADC Maps	Off
FA maps	Off
Invert Gray Scale	Off
Calculated Image	Off
b-Value >=	0 s/mm²
Noise level	40

Diff - Composing

Distortion Corr.	Off

Sequence - Part 1

Introduction	On
Optimization	None
Multi-slice mode	Interleaved
Free echo spacing	Off
Echo spacing	0.6 ms
Bandwidth	1924 Hz/Px

Sequence - Part 2

EPI factor	130
RF pulse type	Normal
Gradient mode	Performance
Excitation	Standard

Sequence - pTX Pulses

\\USER\OHBA Projects VE11C\2021_112 bhcHC-BIRAX\Protocol v3\TE_10_TE_20_TR 30_Magnitude &Phase_t2_swi_tra_p2_.8x.8x1.5mm_PF78

TA: 4:46 PM: REF Voxel size: 0.8×0.8×1.5 mmPAT: 2 Rel. SNR: 1.00 : swi_r

Properties

Prio recon	Off
Load images to viewer	On
Inline movie	Off
Auto store images	On
Load images to stamp segments	Off
Load images to graphic segments	Off
Auto open inline display	Off
Auto close inline display	Off
Start measurement without further preparation	Off
Wait for user to start	On
Start measurements	Single measurement

Routine

Slab group	1
Slabs	1
Dist. factor	20 %
Position	R2.8 A25.4 H6.2 mm
Orientation	T > C-5.3 > S-1.3
Phase enc. dir.	R >> L
AutoAlign	---
Phase oversampling	0 %
Slice oversampling	10.0 %
Slices per slab	80
FoV read	230 mm
FoV phase	88.9 %
Slice thickness	1.50 mm
TR	30.0 ms
TE 1	10.00 ms
TE 2	20.00 ms
Averages	1
Concatenations	1
Filter	Prescan Normalize
Coil elements	HEA;HEP

Contrast - Common

TR	30.0 ms
TE 1	10.00 ms
TE 2	20.00 ms
MTC	Off
Magn. preparation	None
Flip angle	15 deg
Fat suppr.	None
Water suppr.	None
SWI	On

Contrast - Dynamic

Averages	1
Averaging mode	Short term
Reconstruction	Magn./Phase
Measurements	1
Multiple series	Each measurement

Resolution - Common

FoV read	230 mm
FoV phase	88.9 %
Slice thickness	1.50 mm
Base resolution	288
Phase resolution	100 %

Resolution - Common

Slice resolution	100 %
Phase partial Fourier	7/8
Slice partial Fourier	7/8
Interpolation	Off

Resolution - iPAT

PAT mode	GRAPPA
Accel. factor PE	2
Ref. lines PE	24
Accel. factor 3D	1
Reference scan mode	Integrated

Resolution - Filter Image

Image Filter	Off
Distortion Corr.	Off
Prescan Normalize	On
Unfiltered images	Off
Normalize	Off
B1 filter	Off

Resolution - Filter Rawdata

Raw filter	Off
Elliptical filter	Off

Geometry - Common

Slab group	1
Slabs	1
Dist. factor	20 %
Position	R2.8 A25.4 H6.2 mm
Orientation	T > C-5.3 > S-1.3
Phase enc. dir.	R >> L
Slice oversampling	10.0 %
Slices per slab	80
FoV read	230 mm
FoV phase	88.9 %
Slice thickness	1.50 mm
TR	30.0 ms
Multi-slice mode	Interleaved
Series	Interleaved
Concatenations	1

Geometry - AutoAlign

Slab group	1
Position	R2.8 A25.4 H6.2 mm
Orientation	T > C-5.3 > S-1.3
Phase enc. dir.	R >> L
AutoAlign	---
Initial Position	R2.8 A25.4 H6.2
R	2.8 mm
A	25.4 mm
H	6.2 mm
Initial Rotation	90.00 deg
Initial Orientation	T > C
T > C	-5.3
> S	-1.3

Geometry - Saturation

Saturation mode	Standard
Fat suppr.	None

Geometry - Saturation

Water suppr.	None
Special sat.	None

System - Miscellaneous

Positioning mode	REF
Table position	H
Table position	0 mm
MSMA	S - C - T
Sagittal	R >> L
Coronal	A >> P
Transversal	F >> H
Coil Combine Mode	Adaptive Combine
Save uncombined	Off
Matrix Optimization	Off
AutoAlign	---
Coil Select Mode	Off - AutoCoilSelect

System - Adjustments

B0 Shim mode	Standard
B1 Shim mode	TrueForm
Adjust with body coil	Off
Confirm freq. adjustment	Off
Assume Dominant Fat	Off
Assume Silicone	Off
Adjustment Tolerance	Auto

System - Adjust Volume

Position	R2.8 A25.4 H6.2 mm
Orientation	T > C-5.3 > S-1.3
Rotation	90.00 deg
R >> L	205 mm
A >> P	230 mm
F >> H	120 mm
Reset	Off

System - pTx Volumes

B1 Shim mode	TrueForm
Excitation	Slab-sel.

System - Tx/Rx

Frequency 1H	123.219356 MHz
Correction factor	1
Gain	Low
Img. Scale Cor.	1.000
Reset	Off
? Ref. amplitude 1H	0.000 V

Physio - Signal1

1st Signal/Mode	None
TR	30.0 ms
Concatenations	1
Segments	1

Physio - Cardiac

Magn. preparation	None
Fat suppr.	None
Dark blood	Off
FoV read	230 mm
FoV phase	88.9 %
Phase resolution	100 %

Physio - PACE

Resp. control	Off

Physio - PACE

Concatenations	1

Inline - Common

Subtract	Off
Measurements	1
StdDev	Off
Liver registration	Off
Save original images	On

Inline - MIP

MIP-Sag	Off
MIP-Cor	Off
MIP-Tra	Off
MIP-Time	Off
Save original images	On

Inline - Soft Tissue

Wash - In	Off
Wash - Out	Off
TTP	Off
PEI	Off
MIP - time	Off
Measurements	1

Inline - Composing

Distortion Corr.	Off

Sequence - Part 1

Introduction	On
Dimension	3D
Elliptical scanning	Off
Phase stabilisation	Off
Asymmetric echo	Off
Contrasts	2
Flow comp. 1	Yes
Readout mode	Bipolar
Multi-slice mode	Interleaved
Bandwidth 1	120 Hz/Px
Bandwidth 2	260 Hz/Px

Sequence - Part 2

Segments	1
Acoustic noise reduction	None
RF pulse type	Fast
Gradient mode	Normal
Excitation	Slab-sel.
RF spoiling	On

Sequence - Assistant

Mode	Off
Allowed delay	30 s

\\USER\OHBA Projects VE11C\2021_112 bhcHC-BIRAX\Protocol v3\T1_p2_1mm_fov256_sag_TI_880 (biobank)

TA: 4:54 PM: REF Voxel size: 1.0×1.0×1.0 mmPAT: 2 Rel. SNR: 1.00 : tfl

Properties

Prio recon	Off
Load images to viewer	On
Inline movie	Off
Auto store images	On
Load images to stamp segments	Off
Load images to graphic segments	Off
Auto open inline display	Off
Auto close inline display	Off
Start measurement without further preparation	Off
Wait for user to start	On
Start measurements	Single measurement

Routine

Slab group	1
Slabs	1
Dist. factor	50 %
Position	R2.1 A13.5 F21.4 mm
Orientation	Sagittal
Phase enc. dir.	A >> P
AutoAlign	Head > Basis
Phase oversampling	5 %
Slice oversampling	0.0 %
Slices per slab	208
FoV read	256 mm
FoV phase	100.0 %
Slice thickness	1.00 mm
TR	2000.0 ms
TE	2.03 ms
Averages	1
Concatenations	1
Filter	Prescan Normalize
Coil elements	HEA;HEP

Contrast - Common

TR	2000.0 ms
TE	2.03 ms
Magn. preparation	Non-sel. IR
TI	880 ms
Flip angle	8 deg
Fat suppr.	None
Water suppr.	None

Contrast - Dynamic

Averages	1
Averaging mode	Long term
Reconstruction	Magnitude
Measurements	1
Multiple series	Each measurement

Resolution - Common

FoV read	256 mm
FoV phase	100.0 %
Slice thickness	1.00 mm
Base resolution	256
Phase resolution	100 %
Slice resolution	100 %
Phase partial Fourier	Off
Slice partial Fourier	Off

Resolution - Common

Interpolation	Off

Resolution - iPAT

PAT mode	GRAPPA
Accel. factor PE	2
Ref. lines PE	24
Accel. factor 3D	1
Reference scan mode	Integrated

Resolution - Filter Image

Image Filter	Off
Distortion Corr.	Off
Prescan Normalize	On
Unfiltered images	On
Normalize	Off
B1 filter	Off

Resolution - Filter Rawdata

Raw filter	Off
Elliptical filter	Off

Geometry - Common

Slab group	1
Slabs	1
Dist. factor	50 %
Position	R2.1 A13.5 F21.4 mm
Orientation	Sagittal
Phase enc. dir.	A >> P
Slice oversampling	0.0 %
Slices per slab	208
FoV read	256 mm
FoV phase	100.0 %
Slice thickness	1.00 mm
TR	2000.0 ms
Multi-slice mode	Single shot
Series	Ascending
Concatenations	1

Geometry - AutoAlign

Slab group	1
Position	R2.1 A13.5 F21.4 mm
Orientation	Sagittal
Phase enc. dir.	A >> P
AutoAlign	Head > Basis
Initial Position	R2.1 A13.5 F21.4
R	2.1 mm
A	13.5 mm
F	21.4 mm
Initial Rotation	0.00 deg
Initial Orientation	Sagittal

Geometry - Navigator

System - Miscellaneous

Positioning mode	REF
Table position	H
Table position	0 mm
MSMA	S - C - T

System - Miscellaneous

Sagittal	R >> L
Coronal	A >> P
Transversal	F >> H
Coil Combine Mode	Adaptive Combine
Save uncombined	Off
Matrix Optimization	Off
AutoAlign	Head > Basis
Coil Select Mode	Off - All

System - Adjustments

B0 Shim mode	Standard
B1 Shim mode	TrueForm
Adjust with body coil	Off
Confirm freq. adjustment	Off
Assume Dominant Fat	Off
Assume Silicone	Off
Adjustment Tolerance	Auto

System - Adjust Volume

Position	R2.1 A13.5 F21.4 mm
Orientation	Sagittal
Rotation	0.00 deg
A >> P	256 mm
F >> H	256 mm
R >> L	208 mm
Reset	Off

System - pTx Volumes

B1 Shim mode	TrueForm
Excitation	Non-sel.

System - Tx/Rx

Frequency 1H	123.219356 MHz
Correction factor	1
Gain	Low
Img. Scale Cor.	6.000
Reset	Off
? Ref. amplitude 1H	0.000 V

Physio - Signal1

1st Signal/Mode	None
TR	2000.0 ms
Concatenations	1

Physio - Cardiac

Magn. preparation	Non-sel. IR
TI	880 ms
Fat suppr.	None
Dark blood	Off
FoV read	256 mm
FoV phase	100.0 %
Phase resolution	100 %

Physio - PACE

Resp. control	Off
Concatenations	1

Inline - Common

Subtract	Off
Measurements	1
StdDev	Off
Save original images	On

Inline - MIP

MIP-Sag	Off
MIP-Cor	Off
MIP-Tra	Off
MIP-Time	Off
Save original images	On

Inline - Composing

Distortion Corr.	Off

Sequence - Part 1

Introduction	Off
Dimension	3D
Elliptical scanning	Off
Reordering	Linear
Asymmetric echo	Allowed
Flow comp.	No
Multi-slice mode	Single shot
Echo spacing	6.1 ms
Bandwidth	240 Hz/Px

Sequence - Part 2

RF pulse type	Fast
Gradient mode	Fast*
Excitation	Non-sel.
RF spoiling	On
Incr. Gradient spoiling	Off
Turbo factor	208

Sequence - Assistant

Mode	Off

\\USER\OHBA Projects VE11C\2021_112 bhcHC-BIRAX\Protocol v3\t2_flair_sag_p2_1mm_FS_ellip_pf78

TA: 5:52 PM: FIX Voxel size: 1.0×1.0×1.1 mmPAT: 2 Rel. SNR: 1.00 : spcir

Properties

Prio recon	Off
Load images to viewer	On
Inline movie	Off
Auto store images	On
Load images to stamp segments	Off
Load images to graphic segments	Off
Auto open inline display	Off
Auto close inline display	Off
Start measurement without further preparation	Off
Wait for user to start	On
Start measurements	Single measurement

Routine

Slab group	1
Slabs	1
Position	R2.1 A13.5 F21.4 mm
Orientation	Sagittal
Phase enc. dir.	A >> P
AutoAlign	Head > Basis
Phase oversampling	0 %
Slice oversampling	0.0 %
Slices per slab	192
FoV read	256 mm
FoV phase	100.0 %
Slice thickness	1.05 mm
TR	5000 ms
TE	397 ms
Averages	1.0
Concatenations	1
Filter	Raw filter, Prescan Normalize
Coil elements	HEA;HEP

Contrast - Common

TR	5000 ms
TE	397 ms
MTC	Off
Magn. preparation	Non-sel. T2-IR
TI 1	1800 ms
Fat suppr.	Fat sat.
Fat sat. mode	Strong
Blood suppr.	Off
Restore magn.	Off

Contrast - Dynamic

Averages	1.0
Reconstruction	Magnitude
Measurements	1
Multiple series	Each measurement

Resolution - Common

FoV read	256 mm
FoV phase	100.0 %
Slice thickness	1.05 mm
Base resolution	256
Phase resolution	100 %
Slice resolution	100 %
Phase partial Fourier	Allowed

Resolution - Common

Slice partial Fourier	7/8
Interpolation	Off

Resolution - iPAT

PAT mode	GRAPPA
Accel. factor PE	2
Ref. lines PE	24
Accel. factor 3D	1
Reference scan mode	Integrated

Resolution - Filter Image

Image Filter	Off
Distortion Corr.	Off
Prescan Normalize	On
Unfiltered images	On
Normalize	Off
B1 filter	Off

Resolution - Filter Rawdata

Raw filter	On
Elliptical filter	Off

Geometry - Common

Slab group	1
Slabs	1
Position	R2.1 A13.5 F21.4 mm
Orientation	Sagittal
Phase enc. dir.	A >> P
Slice oversampling	0.0 %
Slices per slab	192
FoV read	256 mm
FoV phase	100.0 %
Slice thickness	1.05 mm
TR	5000 ms
Series	Interleaved
Concatenations	1

Geometry - AutoAlign

Slab group	1
Position	R2.1 A13.5 F21.4 mm
Orientation	Sagittal
Phase enc. dir.	A >> P
AutoAlign	Head > Basis
Initial Position	R2.1 A13.5 F21.4
R	2.1 mm
A	13.5 mm
F	21.4 mm
Initial Rotation	0.00 deg
Initial Orientation	Sagittal

Geometry - Saturation

Fat suppr.	Fat sat.
Fat sat. mode	Strong
Restore magn.	Off
Special sat.	None

Geometry - Navigator

System - Miscellaneous

Positioning mode	FIX
Table position	H
Table position	0 mm
MSMA	S - C - T
Sagittal	R >> L
Coronal	A >> P
Transversal	F >> H
Coil Combine Mode	Adaptive Combine
Save uncombined	Off
Matrix Optimization	Off
AutoAlign	Head > Basis
Coil Select Mode	Off - All

System - Adjustments

B0 Shim mode	Standard
B1 Shim mode	TrueForm
Adjust with body coil	Off
Confirm freq. adjustment	Off
Assume Dominant Fat	Off
Assume Silicone	Off
Adjustment Tolerance	Maximum

System - Adjust Volume

Position	R2.1 A13.5 F21.4 mm
Orientation	Sagittal
Rotation	0.00 deg
A >> P	256 mm
F >> H	256 mm
R >> L	202 mm
Reset	Off

System - pTx Volumes

B1 Shim mode	TrueForm
Excitation	Non-sel.

System - Tx/Rx

Frequency 1H	123.219356 MHz
Correction factor	1
Gain	High
Img. Scale Cor.	5.000
Reset	Off
? Ref. amplitude 1H	0.000 V

Physio - Signal1

1st Signal/Mode	None
Trigger delay	0 ms
TR	5000 ms
Concatenations	1

Physio - Cardiac

Magn. preparation	Non-sel. T2-IR
TI 1	1800 ms
Fat suppr.	Fat sat.
Dark blood	Off
FoV read	256 mm
FoV phase	100.0 %
Phase resolution	100 %

Physio - PACE

Resp. control	Off
Concatenations	1

Inline - Common

Subtract	Off
Measurements	1
StdDev	Off
Save original images	On

Inline - MIP

MIP-Sag	Off
MIP-Cor	Off
MIP-Tra	Off
MIP-Time	Off
Save original images	On

Inline - Composing

Distortion Corr.	Off

Sequence - Part 1

Introduction	On
Dimension	3D
Elliptical scanning	On
Reordering	Linear
Flow comp.	No
Echo spacing	3.42 ms
Adiabatic-mode	Off
Bandwidth	781 Hz/Px

Sequence - Part 2

Echo train duration	879 ms
RF pulse type	Normal
Gradient mode	Fast
Excitation	Non-sel.
Flip angle mode	T2 var
Turbo factor	284

Sequence - Assistant

Allowed delay	30 s

\\USER\OHBA Projects VE11C\2021_112 bhcHC-BIRAX\Protocol v3\TOF_3D_neck

TA: 0:42 PM: REF Voxel size: 0.3×0.3×1.3 mmPAT: 3 Rel. SNR: 1.00 : fl_r

Properties

Prio recon	Off
Load images to viewer	On
Inline movie	Off
Auto store images	On
Load images to stamp segments	On
Load images to graphic segments	Off
Auto open inline display	Off
Auto close inline display	Off
Start measurement without further preparation	Off
Wait for user to start	On
Start measurements	Single measurement

Routine

Slab group	1
Slabs	1
Dist. factor	-50.00 %
Position	R3.0 A14.5 F66.0 mm
Orientation	Transversal
Phase enc. dir.	R >> L
AutoAlign	---
Phase oversampling	0 %
Slice oversampling	20.0 %
Slices per slab	40
FoV read	200 mm
FoV phase	76.9 %
Slice thickness	1.30 mm
TR	21.0 ms
TE	3.43 ms
Averages	1
Concatenations	1
Filter	Normalize
Coil elements	HEA;HEP

Contrast - Common

TR	21.0 ms
TE	3.43 ms
MTC	Off
Flip angle	30 deg
Fat suppr.	None
Water suppr.	None

Contrast - Dynamic

Averages	1
Averaging mode	Short term
Reconstruction	Magnitude
Measurements	1

Resolution - Common

FoV read	200 mm
FoV phase	76.9 %
Slice thickness	1.30 mm
Base resolution	320
Phase resolution	95 %
Slice resolution	50 %
Phase partial Fourier	6/8
Slice partial Fourier	7/8
Interpolation	On

Resolution - iPAT

PAT mode	GRAPPA
Accel. factor PE	3
Ref. lines PE	32
Accel. factor 3D	1
Reference scan mode	Integrated

Resolution - Filter Image

Image Filter	Off
Distortion Corr.	Off
Prescan Normalize	Off
Normalize	On
B1 filter	Off

Resolution - Filter Rawdata

Raw filter	Off
Elliptical filter	Off
POCS	Off

Geometry - Common

Slab group	1
Slabs	1
Dist. factor	-50.00 %
Position	R3.0 A14.5 F66.0 mm
Orientation	Transversal
Phase enc. dir.	R >> L
Slice oversampling	20.0 %
Slices per slab	40
FoV read	200 mm
FoV phase	76.9 %
Slice thickness	1.30 mm
TR	21.0 ms
Multi-slice mode	Sequential
Series	Descending
Concatenations	1

Geometry - AutoAlign

Slab group	1
Position	R3.0 A14.5 F66.0 mm
Orientation	Transversal
Phase enc. dir.	R >> L
AutoAlign	---
Initial Position	R3.0 A14.5 F66.0
R	3.0 mm
A	14.5 mm
F	66.0 mm
Initial Rotation	90.00 deg
Initial Orientation	Transversal

Geometry - Saturation

Fat suppr.	None
Water suppr.	None
Special sat.	Tracking H
Gap	10 mm
Thickness	40 mm

System - Miscellaneous

Positioning mode	REF
Table position	H
Table position	0 mm
MSMA	S - C - T

System - Miscellaneous

Sagittal	R >> L
Coronal	A >> P
Transversal	F >> H
Coil Combine Mode	Sum of Squares
Save uncombined	Off
Matrix Optimization	Off
AutoAlign	---
Coil Select Mode	Off - AutoCoilSelect

System - Adjustments

B0 Shim mode	Tune up
B1 Shim mode	TrueForm
Adjust with body coil	Off
Confirm freq. adjustment	Off
Assume Dominant Fat	Off
Assume Silicone	Off
Adjustment Tolerance	Auto

System - Adjust Volume

Position	Isocenter
Orientation	Transversal
Rotation	0.00 deg
A >> P	263 mm
R >> L	350 mm
F >> H	350 mm
Reset	Off

System - pTx Volumes

B1 Shim mode	TrueForm

System - Tx/Rx

Frequency 1H	123.219356 MHz
Correction factor	1
Gain	Low
Img. Scale Cor.	1.000
Reset	Off
? Ref. amplitude 1H	0.000 V

Physio - Signal1

1st Signal/Mode	None
TR	21.0 ms
Concatenations	1

Physio - Cardiac

Fat suppr.	None
Dark blood	Off
FoV read	200 mm
FoV phase	76.9 %
Phase resolution	95 %

Angio - Common

TONE ramp	70 %
Flow direction	F >> H
Flip angle	30 deg
MTC	Off
Measurements	1
3D centric reordering	On

Angio - Inline

Subtract	Off
Measurements	1
StdDev	Off
Save original images	On

Angio - MIP

MIP-Sag	On
MIP-Cor	On
MIP-Tra	On
MIP-Time	Off
Save original images	On

Angio - Composing

Distortion Corr.	Off

Sequence - Part 1

Introduction	On
Dimension	3D
Elliptical scanning	Off
Asymmetric echo	Allowed
Contrasts	1
Flow comp.	Yes
Multi-slice mode	Sequential
Bandwidth	186 Hz/Px

Sequence - Part 2

Gradient mode	Fast
RF spoiling	On

Sequence - Assistant

Mode	Off

\\USER\OHBA Projects VE11C\2021_112 bhcHC-BIRAX\Protocol v3\diff_PA_MPopt_MB3_3b0_lowflip

TA: 0:36 PM: REF Voxel size: 2.0×2.0×2.0 mmPAT: Off Rel. SNR: 1.00 : epse

Properties

Prio recon	Off
Load images to viewer	On
Inline movie	Off
Auto store images	On
Load images to stamp segments	Off
Load images to graphic segments	Off
Auto open inline display	Off
Auto close inline display	Off
Start measurement without further preparation	Off
Wait for user to start	On
Start measurements	Single measurement

Routine

Slice group	1
Slices	72
Dist. factor	0 %
Position	R1.8 A7.2 H7.5 mm
Orientation	T > C2.0 > S-1.7
Phase enc. dir.	A >> P
AutoAlign	---
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 - Common

TR	3600 ms
TE	92.00 ms
MTC	Off
Magn. preparation	None
Flip angle	78 deg
Refocus flip angle	160 deg
Fat suppr.	Fat sat.
Grad. rev. fat suppr.	Disabled

Contrast - Dynamic

Averaging mode	Long term
Reconstruction	Magnitude
Measurements	1
Delay in TR	0 ms
Multiple series	Off

Resolution - Common

FoV read	210 mm
FoV phase	100.0 %
Slice thickness	2.00 mm
Base resolution	104
Phase resolution	100 %
Phase partial Fourier	6/8
Interpolation	Off

Resolution - iPAT

PAT mode	None

Resolution - Filter Image

Distortion Corr.	Off
Prescan Normalize	Off
Dynamic Field Corr.	Off

Resolution - Filter Rawdata

Raw filter	Off
Elliptical filter	Off

Geometry - Common

Slice group	1
Slices	72
Dist. factor	0 %
Position	R1.8 A7.2 H7.5 mm
Orientation	T > C2.0 > S-1.7
Phase enc. dir.	A >> P
FoV read	210 mm
FoV phase	100.0 %
Slice thickness	2.00 mm
TR	3600 ms
Multi-slice mode	Interleaved
Series	Interleaved
Multi-band accel. factor	3

Geometry - AutoAlign

Slice group	1
Position	R1.8 A7.2 H7.5 mm
Orientation	T > C2.0 > S-1.7
Phase enc. dir.	A >> P
AutoAlign	---
Initial Position	R1.8 A7.2 H7.5
R	1.8 mm
A	7.2 mm
H	7.5 mm
Initial Rotation	0.00 deg
Initial Orientation	T > C
T > C	2.0
> S	-1.7

Geometry - Saturation

Fat suppr.	Fat sat.
Grad. rev. fat suppr.	Disabled
Special sat.	None

Geometry - Navigator

System - Miscellaneous

Positioning mode	REF
Table position	H
Table position	0 mm
MSMA	S - C - T
Sagittal	R >> L
Coronal	A >> P
Transversal	F >> H
Coil Combine Mode	Sum of Squares
Matrix Optimization	Off
AutoAlign	---
Coil Select Mode	Off - All

System - Adjustments

B0 Shim mode	Standard
B1 Shim mode	TrueForm
Adjust with body coil	Off
Confirm freq. adjustment	Off
Assume Dominant Fat	Off
Assume Silicone	Off
Adjustment Tolerance	Maximum

System - Adjust Volume

Position	R1.8 A7.2 H7.5 mm
Orientation	T > C2.0 > S-1.7
Rotation	0.00 deg
A >> P	210 mm
R >> L	210 mm
F >> H	144 mm
Reset	Off

System - pTx Volumes

B1 Shim mode	TrueForm
Excitation	Standard

System - Tx/Rx

Frequency 1H	123.219356 MHz
Correction factor	1
Gain	High
Img. Scale Cor.	1.000
Reset	Off
? Ref. amplitude 1H	0.000 V

Physio - Signal1

1st Signal/Mode	None
TR	3600 ms
Multi-band accel. factor	3

Physio - PACE

Resp. control	Off
Multi-band accel. factor	3

Diff - Neuro

Diffusion mode	Free
Diff. directions	6
Diffusion Scheme	Monopolar
Diff. weightings	1
b-value	2000 s/mm²
b-value	1
Diff. weighted images	On
Trace weighted images	Off
ADC maps	Off
FA maps	Off
Mosaic	Off
Tensor	Off
Noise level	40

Diff - Body

Diffusion mode	Free
Diff. directions	6
Diffusion Scheme	Monopolar
Diff. weightings	1
b-value	2000 s/mm²
b-value	1
Diff. weighted images	On
Trace weighted images	Off
ADC maps	Off

Diff - Body

Exponential ADC Maps	Off
FA maps	Off
Invert Gray Scale	Off
Calculated Image	Off
b-Value >=	0 s/mm²
Noise level	40

Diff - Composing

Distortion Corr.	Off

Sequence - Part 1

Introduction	Off
Multi-slice mode	Interleaved
Free echo spacing	Off
Echo spacing	0.67 ms
Bandwidth	1780 Hz/Px

Sequence - Part 2

EPI factor	104
Gradient mode	Fast
Excitation	Standard
RF spoiling	Off

Sequence - Special

Excite pulse duration	5120 us
Refocus pulse duration	10240 us
Single-band images	On
MB LeakBlock kernel	Off
MB dual kernel	Off
MB RF phase scramble	Off
Time-shifted MB RF	Off
SENSE1 coil combine	On
Invert RO/PE polarity	On
PF omits higher k-space	Off
Disable freq. update	Off
Force equal slice timing	Off
Online multi-band recon.	Online
FFT scale factor	1.00
Physio recording	Off

\\USER\OHBA Projects VE11C\2021_112 bhcHC-BIRAX\Protocol v3\diff_AP_MPopt_MB3_50b1000_50b2000_8b0_lowflip

TA: 6:32 PM: FIX Voxel size: 2.0×2.0×2.0 mmPAT: Off Rel. SNR: 1.00 : epse

Properties

Prio recon	Off
Load images to viewer	On
Inline movie	Off
Auto store images	On
Load images to stamp segments	Off
Load images to graphic segments	Off
Auto open inline display	Off
Auto close inline display	Off
Start measurement without further preparation	Off
Wait for user to start	On
Start measurements	Single measurement

Routine

Slice group	1
Slices	72
Dist. factor	0 %
Position	R1.8 A7.2 H7.5 mm
Orientation	T > C2.0 > S-1.7
Phase enc. dir.	A >> P
AutoAlign	---
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 - Common

TR	3600 ms
TE	92.00 ms
MTC	Off
Magn. preparation	None
Flip angle	78 deg
Refocus flip angle	160 deg
Fat suppr.	Fat sat.
Grad. rev. fat suppr.	Disabled

Contrast - Dynamic

Averaging mode	Long term
Reconstruction	Magnitude
Measurements	1
Delay in TR	0 ms
Multiple series	Off

Resolution - Common

FoV read	210 mm
FoV phase	100.0 %
Slice thickness	2.00 mm
Base resolution	104
Phase resolution	100 %
Phase partial Fourier	6/8
Interpolation	Off

Resolution - iPAT

PAT mode	None

Resolution - Filter Image

Distortion Corr.	Off
Prescan Normalize	Off
Dynamic Field Corr.	Off

Resolution - Filter Rawdata

Raw filter	Off
Elliptical filter	Off

Geometry - Common

Slice group	1
Slices	72
Dist. factor	0 %
Position	R1.8 A7.2 H7.5 mm
Orientation	T > C2.0 > S-1.7
Phase enc. dir.	A >> P
FoV read	210 mm
FoV phase	100.0 %
Slice thickness	2.00 mm
TR	3600 ms
Multi-slice mode	Interleaved
Series	Interleaved
Multi-band accel. factor	3

Geometry - AutoAlign

Slice group	1
Position	R1.8 A7.2 H7.5 mm
Orientation	T > C2.0 > S-1.7
Phase enc. dir.	A >> P
AutoAlign	---
Initial Position	R1.8 A7.2 H7.5
R	1.8 mm
A	7.2 mm
H	7.5 mm
Initial Rotation	0.00 deg
Initial Orientation	T > C
T > C	2.0
> S	-1.7

Geometry - Saturation

Fat suppr.	Fat sat.
Grad. rev. fat suppr.	Disabled
Special sat.	None

Geometry - Navigator

System - Miscellaneous

Positioning mode	FIX
Table position	H
Table position	0 mm
MSMA	S - C - T
Sagittal	R >> L
Coronal	A >> P
Transversal	F >> H
Coil Combine Mode	Sum of Squares
Matrix Optimization	Off
AutoAlign	---
Coil Select Mode	Off - All

System - Adjustments

B0 Shim mode	Standard
B1 Shim mode	TrueForm
Adjust with body coil	Off
Confirm freq. adjustment	Off
Assume Dominant Fat	Off
Assume Silicone	Off
Adjustment Tolerance	Maximum

System - Adjust Volume

Position	R1.8 A7.2 H7.5 mm
Orientation	T > C2.0 > S-1.7
Rotation	0.00 deg
A >> P	210 mm
R >> L	210 mm
F >> H	144 mm
Reset	Off

System - pTx Volumes

B1 Shim mode	TrueForm
Excitation	Standard

System - Tx/Rx

Frequency 1H	123.219356 MHz
Correction factor	1
Gain	High
Img. Scale Cor.	1.000
Reset	Off
? Ref. amplitude 1H	0.000 V

Physio - Signal1

1st Signal/Mode	None
TR	3600 ms
Multi-band accel. factor	3

Physio - PACE

Resp. control	Off
Multi-band accel. factor	3

Diff - Neuro

Diffusion mode	Free
Diff. directions	104
Diffusion Scheme	Monopolar
Diff. weightings	2
b-value 1	0 s/mm²
b-value 2	2000 s/mm²
b-value 1	1
b-value 2	1
Diff. weighted images	On
Trace weighted images	Off
ADC maps	Off
FA maps	Off
Mosaic	On
Tensor	Off
Noise level	40

Diff - Body

Diffusion mode	Free
Diff. directions	104
Diffusion Scheme	Monopolar
Diff. weightings	2
b-value 1	0 s/mm²
b-value 2	2000 s/mm²
b-value 1	1

Diff - Body

b-value 2	1
Diff. weighted images	On
Trace weighted images	Off
ADC maps	Off
Exponential ADC Maps	Off
FA maps	Off
Invert Gray Scale	Off
Calculated Image	Off
b-Value >=	0 s/mm²
Noise level	40

Diff - Composing

Distortion Corr.	Off

Sequence - Part 1

Introduction	Off
Multi-slice mode	Interleaved
Free echo spacing	Off
Echo spacing	0.67 ms
Bandwidth	1780 Hz/Px

Sequence - Part 2

EPI factor	104
Gradient mode	Fast
Excitation	Standard
RF spoiling	Off

Sequence - Special

Excite pulse duration	5120 us
Refocus pulse duration	10240 us
Single-band images	On
MB LeakBlock kernel	Off
MB dual kernel	Off
MB RF phase scramble	Off
Time-shifted MB RF	Off
SENSE1 coil combine	On
Invert RO/PE polarity	Off
PF omits higher k-space	Off
Disable freq. update	Off
Force equal slice timing	Off
Online multi-band recon.	Online
FFT scale factor	1.00
Physio recording	Off

\\USER\OHBA Projects VE11C\2021_112 bhcHC-BIRAX\Protocol v3\to_ep2d_PCASL

TA: 7:17 PM: REF Voxel size: 3.4×3.4×4.5 mmPAT: Off Rel. SNR: 1.00 : epfid

Properties

Prio recon	Off
Load images to viewer	On
Inline movie	Off
Auto store images	On
Load images to stamp segments	Off
Load images to graphic segments	Off
Auto open inline display	Off
Auto close inline display	Off
Start measurement without further preparation	Off
Wait for user to start	On
Start measurements	Single measurement

Routine

Slice group	1
Slices	24
Dist. factor	10 %
Position	R1.8 A6.5 H11.1 mm
Orientation	T > C2.0 > S-1.7
Phase enc. dir.	A >> P
AutoAlign	---
Phase oversampling	0 %
FoV read	220 mm
FoV phase	100.0 %
Slice thickness	4.5 mm
TR	4400 ms
TE	14.0 ms
Averages	1
Concatenations	1
Filter	Prescan Normalize
Coil elements	HEA;HEP

Contrast - Common

TR	4400 ms
TE	14.0 ms
Flip angle	90 deg
Fat suppr.	Fat sat.
Fat sat. mode	Strong

Contrast - Dynamic

Averages	1
Averaging mode	Long term
Reconstruction	Magnitude
Measurements	99
Delay in TR	0 ms
Multiple series	Off

Contrast - ASL

Perfusion mode	PICORE Q2T
Quality check	Off
Bolus Duration	700 ms
Inversion Time	1800.0 ms
Inversion Array Size	1
Flow limit	100.0 cm/s

Resolution - Common

FoV read	220 mm
FoV phase	100.0 %
Slice thickness	4.5 mm
Base resolution	64

Resolution - Common

Phase resolution	100 %
Phase partial Fourier	6/8
Interpolation	Off

Resolution - iPAT

PAT mode	None

Resolution - Filter Image

Distortion Corr.	Off
Prescan Normalize	On
Unfiltered images	On

Resolution - Filter Rawdata

Raw filter	Off
Elliptical filter	Off
Hamming	Off

Geometry - Common

Slice group	1
Slices	24
Dist. factor	10 %
Position	R1.8 A6.5 H11.1 mm
Orientation	T > C2.0 > S-1.7
Phase enc. dir.	A >> P
FoV read	220 mm
FoV phase	100.0 %
Slice thickness	4.5 mm
TR	4400 ms
Multi-slice mode	Interleaved
Series	Ascending
Concatenations	1

Geometry - AutoAlign

Slice group	1
Position	R1.8 A6.5 H11.1 mm
Orientation	T > C2.0 > S-1.7
Phase enc. dir.	A >> P
AutoAlign	---
Initial Position	R1.8 A6.5 H11.1
R	1.8 mm
A	6.5 mm
H	11.1 mm
Initial Rotation	0.00 deg
Initial Orientation	T > C
T > C	2.0
> S	-1.7

Geometry - Saturation

Sat. region	1
Thickness	134 mm
Position	L0.0 A0.3 H11.4 mm
Orientation	T > C1.6
Sat. region	2
Thickness	5 mm
Position	L0.0 P0.0 F79.7 mm
Orientation	Transversal
Fat sat. mode	Strong
Special sat.	None

System - Miscellaneous

Positioning mode	REF
Table position	H
Table position	0 mm
MSMA	S - C - T
Sagittal	R >> L
Coronal	A >> P
Transversal	F >> H
Coil Combine Mode	Sum of Squares
Matrix Optimization	Off
AutoAlign	---
Coil Select Mode	Default

System - Adjustments

B0 Shim mode	Standard
B1 Shim mode	TrueForm
Adjust with body coil	Off
Confirm freq. adjustment	Off
Assume Dominant Fat	Off
Assume Silicone	Off
Adjustment Tolerance	Auto

System - Adjust Volume

Position	R1.8 A6.5 H11.1 mm
Orientation	T > C2.0 > S-1.7
Rotation	0.00 deg
A >> P	220 mm
R >> L	220 mm
F >> H	119 mm
Reset	Off

System - pTx Volumes

B1 Shim mode	TrueForm

System - Tx/Rx

Frequency 1H	123.219356 MHz
Correction factor	1
Gain	High
Img. Scale Cor.	1.000
Reset	Off
? Ref. amplitude 1H	0.000 V

Physio - Signal1

1st Signal/Mode	None
TR	4400 ms
Concatenations	1

Perf

Measurements	99
Motion correction	Off
Spatial filter	Off

Sequence - Part 1

Introduction	On
Multi-slice mode	Interleaved
Free echo spacing	Off
Echo spacing	0.56 ms
Bandwidth	2004 Hz/Px

Sequence - Part 2

EPI factor	64
RF pulse type	Normal
Gradient mode	Fast

Sequence - Special

Perform VEPCASL	On
Use Variable TR?	Off
VEPCASL Tag Mode	Tag/Cntrl All
BGS Mode	Pre-sats + DI
Tag RF Flip Angle	20 degs
Tag RF Duration	600 us
Tag RF Separation	1000 us
Mean Tag Gradient	0.8 mT/m
Tag Gradient Amplitude	6.0 mT/m
Tag Duration	1400 ms
Maximum T1 Opt	500 ms
PLD 0	250 ms
PLD 1	500 ms
PLD 2	750 ms
PLD 3	1000 ms
PLD 4	1250 ms
PLD 5	1500 ms
PLD 6	1750 ms
PLD 7	0 ms
PLD 8	0 ms
PLD 9	0 ms
PLD 10	0 ms
PLD 11	0 ms
PLD 12	0 ms
PLD 13	0 ms
PLD 14	0 ms
PLD 15	0 ms
PLD 16	0 ms
PLD 17	0 ms
PLD 18	0 ms
PLD 19	0 ms
Trans Grad Angle	0.0 degs
Vessel locations 0	-25.0 mm
Vessel locations 1	25.0 mm
Vessel locations 2	25.0 mm
Vessel locations 3	25.0 mm
Vessel locations 4	-25.0 mm
Vessel locations 5	-25.0 mm
Vessel locations 6	25.0 mm
Vessel locations 7	-25.0 mm

\\USER\OHBA Projects VE11C\2021_112 bhcHC-BIRAX\Protocol v3\MB8_FMRI_fov210_2.4mm_resting

TA: 6:10 PM: REF Voxel size: 2.4×2.4×2.4 mmPAT: Off Rel. SNR: 1.00 : epfid

Properties

Prio recon	Off
Load images to viewer	On
Inline movie	Off
Auto store images	On
Load images to stamp segments	Off
Load images to graphic segments	Off
Auto open inline display	Off
Auto close inline display	Off
Start measurement without further preparation	Off
Wait for user to start	On
Start measurements	Single measurement

Routine

Slice group	1
Slices	64
Dist. factor	0 %
Position	R1.8 A7.2 H7.5 mm
Orientation	T > C2.0 > S-1.7
Phase enc. dir.	A >> P
AutoAlign	---
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 - Common

TR	735 ms
TE	39.00 ms
MTC	Off
Magn. preparation	None
Flip angle	52 deg
Fat suppr.	Fat sat.

Contrast - Dynamic

Averaging mode	Long term
Reconstruction	Magnitude
Measurements	490
Delay in TR	0 ms
Multiple series	Off

Resolution - Common

FoV read	210 mm
FoV phase	100.0 %
Slice thickness	2.40 mm
Base resolution	88
Phase resolution	100 %
Phase partial Fourier	Off
Interpolation	Off

Resolution - iPAT

PAT mode	None

Resolution - Filter Image

Distortion Corr.	Off
Prescan Normalize	Off

Resolution - Filter Rawdata

Raw filter	Off
Elliptical filter	Off
Hamming	Off

Geometry - Common

Slice group	1
Slices	64
Dist. factor	0 %
Position	R1.8 A7.2 H7.5 mm
Orientation	T > C2.0 > S-1.7
Phase enc. dir.	A >> P
FoV read	210 mm
FoV phase	100.0 %
Slice thickness	2.40 mm
TR	735 ms
Multi-slice mode	Interleaved
Series	Interleaved
Multi-band accel. factor	8

Geometry - AutoAlign

Slice group	1
Position	R1.8 A7.2 H7.5 mm
Orientation	T > C2.0 > S-1.7
Phase enc. dir.	A >> P
AutoAlign	---
Initial Position	R1.8 A7.2 H7.5
R	1.8 mm
A	7.2 mm
H	7.5 mm
Initial Rotation	0.00 deg
Initial Orientation	T > C
T > C	2.0
> S	-1.7

Geometry - Saturation

Fat suppr.	Fat sat.
Special sat.	None

System - Miscellaneous

Positioning mode	REF
Table position	H
Table position	0 mm
MSMA	S - C - T
Sagittal	R >> L
Coronal	A >> P
Transversal	F >> H
Coil Combine Mode	Sum of Squares
Matrix Optimization	Off
AutoAlign	---
Coil Select Mode	Off - All

System - Adjustments

B0 Shim mode	Standard
B1 Shim mode	TrueForm
Adjust with body coil	Off

System - Adjustments

Confirm freq. adjustment	Off
Assume Dominant Fat	Off
Assume Silicone	Off
Adjustment Tolerance	Maximum

System - Adjust Volume

Position	R1.8 A7.2 H7.5 mm
Orientation	T > C2.0 > S-1.7
Rotation	0.00 deg
A >> P	210 mm
R >> L	210 mm
F >> H	154 mm
Reset	Off

System - pTx Volumes

B1 Shim mode	TrueForm
Excitation	Standard

System - Tx/Rx

Frequency 1H	123.219356 MHz
Correction factor	1
Gain	High
Img. Scale Cor.	2.000
Reset	Off
? Ref. amplitude 1H	0.000 V

Physio - Signal1

1st Signal/Mode	None
TR	735 ms
Multi-band accel. factor	8

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
Meas[1]	Baseline
Meas[2]	Baseline
Meas[3]	Active
Motion correction	Off
Spatial filter	Off
Measurements	490
Delay in TR	0 ms
Multiple series	Off

Sequence - Part 1

Introduction	Off
Contrasts	1
Flow comp.	No
Multi-slice mode	Interleaved
Free echo spacing	Off
Echo spacing	0.64 ms
Bandwidth	2030 Hz/Px

Sequence - Part 2

EPI factor	88
Gradient mode	Fast
Excitation	Standard
RF spoiling	Off

Sequence - Special

Excite pulse duration	7000 us
Single-band images	On
MB LeakBlock kernel	Off
MB dual kernel	Off
MB RF phase scramble	Off
SENSE1 coil combine	On
Invert RO/PE polarity	Off
Disable freq. update	Off
Force equal slice timing	Off
Online multi-band recon.	Online
FFT scale factor	1.00
Physio recording	Off
Triggering scheme	Standard

\\USER\OHBA Projects VE11C\2021_112 bhcHC-BIRAX\Protocol v3\dMRI_MB4_185dirs_d15D45_AP

TA: 11:10 PM: REF Voxel size: 1.6×1.6×1.6 mmPAT: Off Rel. SNR: 1.00 : epse

Properties

Prio recon	Off
Load images to viewer	On
Inline movie	Off
Auto store images	On
Load images to stamp segments	Off
Load images to graphic segments	Off
Auto open inline display	Off
Auto close inline display	Off
Start measurement without further preparation	Off
Wait for user to start	On
Start measurements	Single measurement

Routine

Slice group	1
Slices	88
Dist. factor	0 %
Position	R5.3 A10.8 F0.4 mm
Orientation	T > C-10.5
Phase enc. dir.	A >> P
AutoAlign	Head > Brain
Phase oversampling	0 %
FoV read	205 mm
FoV phase	100.0 %
Slice thickness	1.60 mm
TR	3500 ms
TE	94.00 ms
Multi-band accel. factor	4
Filter	None
Coil elements	HEA;HEP

Contrast - Common

TR	3500 ms
TE	94.00 ms
MTC	Off
Magn. preparation	None
Flip angle	78 deg
Refocus flip angle	160 deg
Fat suppr.	None
Grad. rev. fat suppr.	Enabled

Contrast - Dynamic

Averaging mode	Long term
Reconstruction	Magnitude
Measurements	1
Delay in TR	0 ms
Multiple series	Off

Resolution - Common

FoV read	205 mm
FoV phase	100.0 %
Slice thickness	1.60 mm
Base resolution	128
Phase resolution	100 %
Phase partial Fourier	6/8
Interpolation	Off

Resolution - iPAT

PAT mode	None

Resolution - Filter Image

Distortion Corr.	Off
Prescan Normalize	Off
Dynamic Field Corr.	Off

Resolution - Filter Rawdata

Raw filter	Off
Elliptical filter	Off

Geometry - Common

Slice group	1
Slices	88
Dist. factor	0 %
Position	R5.3 A10.8 F0.4 mm
Orientation	T > C-10.5
Phase enc. dir.	A >> P
FoV read	205 mm
FoV phase	100.0 %
Slice thickness	1.60 mm
TR	3500 ms
Multi-slice mode	Interleaved
Series	Interleaved
Multi-band accel. factor	4

Geometry - AutoAlign

Slice group	1
Position	R5.3 A10.8 F0.4 mm
Orientation	T > C-10.5
Phase enc. dir.	A >> P
AutoAlign	Head > Brain
Initial Position	R5.3 A10.8 F0.4
R	5.3 mm
A	10.8 mm
F	0.4 mm
Initial Rotation	-1.00 deg
Initial Orientation	T > C
T > C	-10.5
> S	0.0

Geometry - Saturation

Fat suppr.	None
Grad. rev. fat suppr.	Enabled
Special sat.	None

Geometry - Navigator

System - Miscellaneous

Positioning mode	REF
Table position	H
Table position	0 mm
MSMA	S - C - T
Sagittal	R >> L
Coronal	A >> P
Transversal	F >> H
Coil Combine Mode	Sum of Squares
Matrix Optimization	Off
AutoAlign	Head > Brain
Coil Select Mode	Off - All

System - Adjustments

B0 Shim mode	Advanced

System - Adjustments

B1 Shim mode	TrueForm
Adjust with body coil	Off
Confirm freq. adjustment	Off
Assume Dominant Fat	Off
Assume Silicone	Off
Adjustment Tolerance	Auto

System - Adjust Volume

Position	R5.3 A10.8 F0.4 mm
Orientation	T > C-10.5
Rotation	-1.00 deg
A >> P	205 mm
R >> L	205 mm
F >> H	141 mm
Reset	Off

System - pTx Volumes

B1 Shim mode	TrueForm
Excitation	Standard

System - Tx/Rx

Frequency 1H	123.219356 MHz
Correction factor	1
Gain	High
Img. Scale Cor.	1.000
Reset	Off
? Ref. amplitude 1H	0.000 V

Physio - Signal1

1st Signal/Mode	None
TR	3500 ms
Multi-band accel. factor	4

Physio - PACE

Resp. control	Off
Multi-band accel. factor	4

Diff - Neuro

Diffusion mode	Free
Diff. directions	185
Diffusion Scheme	Monopolar
Diff. weightings	2
b-value 1	0 s/mm²
b-value 2	4000 s/mm²
b-value 1	1
b-value 2	1
Diff. weighted images	On
Trace weighted images	Off
ADC maps	Off
FA maps	Off
Mosaic	On
Tensor	Off
Noise level	40

Diff - Body

Diffusion mode	Free
Diff. directions	185
Diffusion Scheme	Monopolar
Diff. weightings	2
b-value 1	0 s/mm²
b-value 2	4000 s/mm²
b-value 1	1
b-value 2	1

Diff - Body

Diff. weighted images	On
Trace weighted images	Off
ADC maps	Off
Exponential ADC Maps	Off
FA maps	Off
Invert Gray Scale	Off
Calculated Image	Off
b-Value >=	0 s/mm²
Noise level	40

Diff - Composing

Distortion Corr.	Off

Sequence - Part 1

Introduction	On
Multi-slice mode	Interleaved
Free echo spacing	On
Echo spacing	0.77 ms
Bandwidth	1502 Hz/Px

Sequence - Part 2

EPI factor	128
Gradient mode	Performance
Excitation	Standard
RF spoiling	Off

Sequence - Special

Excite pulse duration	3840 us
Refocus pulse duration	7680 us
Single-band images	On
MB LeakBlock kernel	On
MB dual kernel	Off
MB RF phase scramble	Off
Time-shifted MB RF	Off
SENSE1 coil combine	On
Invert RO/PE polarity	Off
PF omits higher k-space	Off
Disable freq. update	Off
Force equal slice timing	Off
Online multi-band recon.	Online
FFT scale factor	1.00
Physio recording	Off

\\USER\OHBA Projects VE11C\2021_112 bhcHC-BIRAX\Protocol v3\dMRI_MB4_6dirs_d15D45_APrev

TA: 0:44 PM: FIX Voxel size: 1.6×1.6×1.6 mmPAT: Off Rel. SNR: 1.00 : epse

Properties

Prio recon	Off
Load images to viewer	On
Inline movie	Off
Auto store images	On
Load images to stamp segments	Off
Load images to graphic segments	Off
Auto open inline display	Off
Auto close inline display	Off
Start measurement without further preparation	Off
Wait for user to start	Off
Start measurements	Single measurement

Routine

Slice group	1
Slices	88
Dist. factor	0 %
Position	R5.3 A10.8 F0.4 mm
Orientation	T > C-10.5
Phase enc. dir.	A >> P
AutoAlign	Head > Brain
Phase oversampling	0 %
FoV read	205 mm
FoV phase	100.0 %
Slice thickness	1.60 mm
TR	3500 ms
TE	94.00 ms
Multi-band accel. factor	4
Filter	None
Coil elements	HEA;HEP

Contrast - Common

TR	3500 ms
TE	94.00 ms
MTC	Off
Magn. preparation	None
Flip angle	78 deg
Refocus flip angle	160 deg
Fat suppr.	None
Grad. rev. fat suppr.	Enabled

Contrast - Dynamic

Averaging mode	Long term
Reconstruction	Magnitude
Measurements	1
Delay in TR	0 ms
Multiple series	Off

Resolution - Common

FoV read	205 mm
FoV phase	100.0 %
Slice thickness	1.60 mm
Base resolution	128
Phase resolution	100 %
Phase partial Fourier	6/8
Interpolation	Off

Resolution - iPAT

PAT mode	None

Resolution - Filter Image

Distortion Corr.	Off
Prescan Normalize	Off
Dynamic Field Corr.	Off

Resolution - Filter Rawdata

Raw filter	Off
Elliptical filter	Off

Geometry - Common

Slice group	1
Slices	88
Dist. factor	0 %
Position	R5.3 A10.8 F0.4 mm
Orientation	T > C-10.5
Phase enc. dir.	A >> P
FoV read	205 mm
FoV phase	100.0 %
Slice thickness	1.60 mm
TR	3500 ms
Multi-slice mode	Interleaved
Series	Interleaved
Multi-band accel. factor	4

Geometry - AutoAlign

Slice group	1
Position	R5.3 A10.8 F0.4 mm
Orientation	T > C-10.5
Phase enc. dir.	A >> P
AutoAlign	Head > Brain
Initial Position	R5.3 A10.8 F0.4
R	5.3 mm
A	10.8 mm
F	0.4 mm
Initial Rotation	-1.00 deg
Initial Orientation	T > C
T > C	-10.5
> S	0.0

Geometry - Saturation

Fat suppr.	None
Grad. rev. fat suppr.	Enabled
Special sat.	None

Geometry - Navigator

System - Miscellaneous

Positioning mode	FIX
Table position	H
Table position	0 mm
MSMA	S - C - T
Sagittal	R >> L
Coronal	A >> P
Transversal	F >> H
Coil Combine Mode	Sum of Squares
Matrix Optimization	Off
AutoAlign	Head > Brain
Coil Select Mode	Off - All

System - Adjustments

B0 Shim mode	Advanced
B1 Shim mode	TrueForm
Adjust with body coil	Off
Confirm freq. adjustment	Off
Assume Dominant Fat	Off
Assume Silicone	Off
Adjustment Tolerance	Auto

System - Adjust Volume

Position	R5.3 A10.8 F0.4 mm
Orientation	T > C-10.5
Rotation	-1.00 deg
A >> P	205 mm
R >> L	205 mm
F >> H	141 mm
Reset	Off

System - pTx Volumes

B1 Shim mode	TrueForm
Excitation	Standard

System - Tx/Rx

Frequency 1H	123.219356 MHz
Correction factor	1
Gain	High
Img. Scale Cor.	1.000
Reset	Off
? Ref. amplitude 1H	0.000 V

Physio - Signal1

1st Signal/Mode	None
TR	3500 ms
Multi-band accel. factor	4

Physio - PACE

Resp. control	Off
Multi-band accel. factor	4

Diff - Neuro

Diffusion mode	Free
Diff. directions	6
Diffusion Scheme	Monopolar
Diff. weightings	2
b-value 1	0 s/mm²
b-value 2	4000 s/mm²
b-value 1	1
b-value 2	1
Diff. weighted images	On
Trace weighted images	Off
ADC maps	Off
FA maps	Off
Mosaic	On
Tensor	Off
Noise level	40

Diff - Body

Diffusion mode	Free
Diff. directions	6
Diffusion Scheme	Monopolar
Diff. weightings	2
b-value 1	0 s/mm²
b-value 2	4000 s/mm²
b-value 1	1

Diff - Body

b-value 2	1
Diff. weighted images	On
Trace weighted images	Off
ADC maps	Off
Exponential ADC Maps	Off
FA maps	Off
Invert Gray Scale	Off
Calculated Image	Off
b-Value >=	0 s/mm²
Noise level	40

Diff - Composing

Distortion Corr.	Off

Sequence - Part 1

Introduction	On
Multi-slice mode	Interleaved
Free echo spacing	On
Echo spacing	0.77 ms
Bandwidth	1502 Hz/Px

Sequence - Part 2

EPI factor	128
Gradient mode	Performance
Excitation	Standard
RF spoiling	Off

Sequence - Special

Excite pulse duration	3840 us
Refocus pulse duration	7680 us
Single-band images	On
MB LeakBlock kernel	On
MB dual kernel	Off
MB RF phase scramble	Off
Time-shifted MB RF	Off
SENSE1 coil combine	On
Invert RO/PE polarity	On
PF omits higher k-space	Off
Disable freq. update	Off
Force equal slice timing	Off
Online multi-band recon.	Online
FFT scale factor	1.00
Physio recording	Off