

# Philips: ADNI Execution Phase

## 1: Introduction

The purpose of this document is to detail the protocols for the “execution phase” scans for the ADNI study on the Philips 1.5 and 3.0 Tesla scanners. Because the sequences need to be the same at all sites, sequence details in addition to the listed protocols are given in the table of section 2. This table should be used along with the detailed protocol listings in the appendices to verify the sequences are entered correctly on your systems.

## 2: Scan Overview

| Sequence   | TR (ms) | TE (ms) | Flip | Actual WFS | Actual BW/pix. | Scan Time | Measured Voxel Size | Min. TI Time | TFE Pre pulse delay |
|------------|---------|---------|------|------------|----------------|-----------|---------------------|--------------|---------------------|
| 1.5 T      |         |         |      |            |                |           |                     |              |                     |
| MPRAGE     | 8.6     | 4       | 8    | 1.32       | 162            | 7:11      | 1.25 / 1.25 / 1.2   | 864.3        | 1000                |
| Double TSE | 3000    | 20/100  | 90   | 0.884      | 246            | 8:32      | 0.94 / 0.94 / 3.0   |              |                     |
| 3.0 T      |         |         |      |            |                |           |                     |              |                     |
| MPRAGE     | 6.8     | 3.2     | 8    | 1.8        | 241            | 9:22      | 1.0 / 1.0 / 1.2     | 852.9        | shortest            |
| Double TSE | 3000    | 8/100   | 90   | 1.934      | 224            | 7:15      | 0.94 / 0.94 / 3.0   |              |                     |

## 3: Workflow

Once you have verified all protocols are on your system correctly you are ready to begin scanning. The workflow for this study will be relatively simple. The scans you should run include:

- 1) Survey (Description: 3 plane localizer)
- 2) Ref/SHC (Description: SENSE reference scan)
- 3) MPRAGE
- 4) MPRAGE repeat
- 5) Double/TSE

# Appendix A: 1.5T Protocols

## 1.5T: MPRAGE

|                         |  |
|-------------------------|--|
| Coil selection          | = SENSE-head                                     |
| Homogeneity correction  | = none   |
| CLEAR                   | = no (Parameter not shown with SENSE set to YES) |
| FOV (mm)                | = 240.00   |
| RFOV (%)                | = 100.00   |
| Foldover suppression    | = no   |
| Matrix scan             | = 192  |
| reconstruction          | = 256  |
| Scan percentage (%)     | = 100.00   |
| SENSE                   | = yes  |
| P reduction             | = 1.0  |
| S reduction             | = 1.0  |
| Overcontiguous slices   | = no   |
| Stacks                  | = 1  |
| Slices                  | = 170  |
| slice thickness (mm)    | = 1.20   |
| Slice orientation       | = sagittal                                       |
| Foldover direction      | = AP   |
| Fat shift direction     | = F  |
| Chunks                  | = 1  |
| PlanAlign               | = no   |
| REST slabs              | = 0  |
| Catheter tracking       | = no   |
| Interactive positioning | = no   |
| Allow table movement    | = no   |
| Patient position        | = head first                                     |
| orientation             | = supine   |
| Scan mode               | = 3D   |
| technique               | = FFE  |
| Contrast enhancement    | = T1   |
| Acquisition mode        | = cartesian                                      |
| Fast Imaging mode       | = TFE  |
| shot mode               | = multi-shot                                     |
| TFE factor              | = 192  |
| startup echoes          | = default  |
| shot interval           | = user defined                                   |
| (ms)                    | = 2300.00  |
| profile order           | = linear   |
| turbo direction         | = Y  |
| Echoes                  | = 1  |
| partial echo            | = no   |
| shifted echo            | = no   |
| TE                      | = user defined                                   |
| (ms)                    | = 4.00   |
| Flip angle (deg)        | = 8.00   |
| TR                      | = shortest                                       |
| Half Scan               | = no   |
| Water fat shift         | = maximum  |
| Shim                    | = no   |
| SPIR                    | = no   |
| SPAIR                   | = no   |
| TFE prepulse            | = invert   |
| slice selection         | = no   |

|                            |                |
|----------------------------|----------------|
| delay                      | = user defined |
| (ms)                       | = 1000.00      |
| ProSet                     | = no           |
| MTC                        | = no           |
| T2prep                     | = no           |
| Research prepulse          | = no           |
| diffusion mode             | = no           |
| SAR mode                   | = high         |
| B1 mode                    | = default      |
| gradient mode              | = default      |
| SoftTone mode              | = no           |
| Cardiac synchronisation    | = no           |
| Respiratory compensation   | = no           |
| Navigator respiratory comp | = no           |
| Flow compensation          | = no           |
| fMRI echo stabilisation    | = no           |
| NSA                        | = 1            |
| Angio                      | = no           |
| Quantitative flow          | = no           |
| Manual start               | = no           |
| Dynamic study              | = no           |
| Flow labelling             | = none         |
| Preparation phases         | = auto         |
| SENSE ref. scan            | = no           |
| B0 field map               | = no           |
| MIP/MPR                    | = no           |
| Images                     | = M            |
| Autoview image             | = M            |
| Reference tissue           | = White matter |
| Preset window contrast     | = soft         |
| Reconstruction mode        | = immediate    |
| Save raw data              | = no           |
| Push to workstation        | = no           |
| Hardcopy protocol          | = no           |
| Ring filtering             | = yes          |

## **1.5T: Double TSE**

|                            |  |
|----------------------------|--|
| Coil selection             | = SENSE-head                                     |
| Homogeneity correction     | = none   |
| CLEAR                      | = no (Parameter not shown with SENSE set to YES) |
| FOV (mm)                   | = 240.00   |
| RFOV (%)                   | = 88.00  |
| Foldover suppression       | = no   |
| slab thickness             | = half FOV                                       |
| (mm)                       | = 60.00  |
| Matrix scan                | = 256  |
| reconstruction             | = 256  |
| Scan percentage (%)        | = 100.00   |
| SENSE                      | = yes  |
| P reduction                | = 1.0  |
| Stacks                     | = 1  |
| Slices                     | = 50   |
| slice thickness (mm)       | = 3.00   |
| slice gap                  | = user defined                                   |
| gap (mm)                   | = 0.00   |
| Slice orientation          | = transverse                                     |
| Foldover direction         | = RL   |
| Fat shift direction        | = P  |
| Minimum number of packages | = 1  |

|                            |                |
|----------------------------|----------------|
| Slice scan order           | = default      |
| PlanAlign                  | = no           |
| REST slabs                 | = 0            |
| Catheter tracking          | = no           |
| Interactive positioning    | = no           |
| Allow table movement       | = no           |
| Patient position           | = head first   |
| orientation                | = supine       |
| Scan mode                  | = MS           |
| technique                  | = SE           |
| Modified SE                | = no           |
| Acquisition mode           | = cartesian    |
| Fast Imaging mode          | = TSE          |
| TSE factor                 | = 16           |
| startup echoes             | = 0            |
| profile orders             | = default      |
| DRIVE                      | = no           |
| ultrashort                 | = no           |
| Echoes                     | = 2            |
| partial echo               | = no           |
| TE first                   | = user defined |
| (ms)                       | = 20.00        |
| second (ms)                | = 120.00       |
| Flip angle (deg)           | = 90.00        |
| Refocusing control         | = no           |
| TR                         | = user defined |
| (ms)                       | = 3000.00      |
| Half Scan                  | = no           |
| Water fat shift            | = user defined |
| (pixels)                   | = 1.700        |
| Shim                       | = no           |
| SPIR                       | = no           |
| SPAIR                      | = no           |
| BB pulse                   | = no           |
| ProSet                     | = no           |
| MTC                        | = no           |
| Research prepulse          | = no           |
| Zoom imaging               | = no           |
| diffusion mode             | = no           |
| SAR mode                   | = high         |
| B1 mode                    | = default      |
| gradient mode              | = default      |
| SoftTone mode              | = no           |
| Cardiac synchronisation    | = no           |
| Respiratory compensation   | = no           |
| Navigator respiratory comp | = no           |
| Flow compensation          | = no           |
| Temporal slice spacing     | = default      |
| NSA                        | = 2            |
| SMART                      | = no           |
| Manual start               | = no           |
| Dynamic study              | = no           |
| Flow labelling             | = none         |
| Preparation phases         | = auto         |
| SENSE ref. scan            | = no           |
| B0 field map               | = no           |
| MIP/MPR                    | = no           |
| Images                     | = M            |
| Autoview image             | = M            |
| Calculated images          | = no           |
| Reference tissue           | = White matter |
| Preset window contrast     | = soft         |

|                     |             |
|---------------------|-------------|
| Reconstruction mode | = real time |
| Save raw data       | = no        |
| Push to workstation | = no        |
| Hardcopy protocol   | = no        |

## Appendix B: 3.0T Protocols

### 3.0T: MPRAGE

|                         |  |
|-------------------------|--|
| Coil selection          | = SENSE-head                                     |
| Homogeneity correction  | = none   |
| CLEAR                   | = no (Parameter not shown with SENSE set to YES) |
| FOV (mm)                | = 256.00   |
| RFOV (%)                | = 94.00  |
| Foldover suppression    | = no   |
| Matrix scan             | = 256  |
| reconstruction          | = 256  |
| Scan percentage (%)     | = 100.00   |
| SENSE                   | = yes  |
| P reduction             | = 1.0  |
| S reduction             | = 1.0  |
| Body tuned              | = no   |
| Overcontiguous slices   | = no   |
| Stacks                  | = 1  |
| Slices                  | = 170  |
| slice thickness (mm)    | = 1.20   |
| Slice orientation       | = sagittal                                       |
| Foldover direction      | = AP   |
| Fat shift direction     | = F  |
| Chunks                  | = 1  |
| PlanAlign               | = no   |
| REST slabs              | = 0  |
| Catheter tracking       | = no   |
| Interactive positioning | = no   |
| Allow table movement    | = no   |
| Patient position        | = head first                                     |
| orientation             | = supine   |
| Scan mode               | = 3D   |
| technique               | = FFE  |
| Contrast enhancement    | = T1   |
| Acquisition mode        | = cartesian                                      |
| Fast Imaging mode       | = TFE  |
| shot mode               | = multi-shot                                     |
| TFE factor              | = 240  |
| startup echoes          | = default  |
| shot interval           | = user defined                                   |
| (ms)                    | = <b>3000.00</b>                                 |
| profile order           | = linear   |
| turbo direction         | = Y  |
| randomized shots        | = no   |
| Echoes                  | = 1  |
| partial echo            | = no   |
| shifted echo            | = no   |
| TE                      | = shortest                                       |
| Flip angle (deg)        | = 8.00   |
| TR                      | = shortest                                       |
| Half Scan               | = no   |
| Water fat shift         | = user defined                                   |
| (pixels)                | = 1.800  |
| Shim                    | = auto   |
| SPIR                    | = no   |

|                            |                   |
|----------------------------|-------------------|
| SPAIR                      | = no              |
| TFE prepulse               | = invert          |
| slice selection            | = no              |
| delay                      | = <b>shortest</b> |
| ProSet                     | = no              |
| MTC                        | = no              |
| T2prep                     | = no              |
| Research prepulse          | = no              |
| diffusion mode             | = no              |
| SAR mode                   | = high            |
| B1 mode                    | = default         |
| PNS mode                   | = low             |
| gradient mode              | = maximum         |
| SoftTone mode              | = no              |
| Cardiac synchronisation    | = no              |
| Respiratory compensation   | = no              |
| Navigator respiratory comp | = no              |
| Flow compensation          | = no              |
| fMRI echo stabilisation    | = no              |
| NSA                        | = 1               |
| Angio                      | = no              |
| Quantitative flow          | = no              |
| Manual start               | = no              |
| Dynamic study              | = no              |
| Flow labelling             | = none            |
| Preparation phases         | = auto            |
| SENSE ref. scan            | = no              |
| B0 field map               | = no              |
| MIP/MPR                    | = no              |
| Images                     | = M               |
| Autoview image             | = M               |
| Reference tissue           | = Grey matter     |
| Preset window contrast     | = soft            |
| Reconstruction mode        | = real time       |
| Save raw data              | = no              |
| Push to workstation        | = no              |
| Hardcopy protocol          | = no              |
| Ring filtering             | = yes             |

### **3.0T: Double TSE**

|                        |  |
|------------------------|--|
| Coil selection         | = SENSE-head                                     |
| Homogeneity correction | = none   |
| CLEAR                  | = no (Parameter not shown with SENSE set to YES) |
| FOV (mm)               | = 240.00   |
| RFOV (%)               | = 88.00  |
| Foldover suppression   | = no   |
| slab thickness         | = half FOV                                       |
| (mm)                   | = 60.00  |
| Matrix scan            | = 256  |
| reconstruction         | = 256  |
| Scan percentage (%)    | = 100.00   |
| SENSE                  | = yes  |
| P reduction            | = 1.0  |
| Body tuned             | = no   |
| Stacks                 | = 1  |
| Slices                 | = <b>50</b>                                      |
| slice thickness (mm)   | = 3.00   |
| slice gap              | = user defined                                   |

|                            |                |
|----------------------------|----------------|
| gap (mm)                   | = 0.00         |
| Slice orientation          | = transverse   |
| Foldover direction         | = RL           |
| Fat shift direction        | = P            |
| Minimum number of packages | = 1            |
| Slice scan order           | = default      |
| PlanAlign                  | = no           |
| REST slabs                 | = 0            |
| Catheter tracking          | = no           |
| Interactive positioning    | = no           |
| Allow table movement       | = no           |
| Patient position           | = head first   |
| orientation                | = supine       |
| Scan mode                  | = MS           |
| technique                  | = SE           |
| Modified SE                | = no           |
| Acquisition mode           | = cartesian    |
| Fast Imaging mode          | = TSE          |
| TSE factor                 | = 16           |
| startup echoes             | = 0            |
| profile orders             | = default      |
| DRIVE                      | = no           |
| ultrashort                 | = no           |
| randomized shots           | = no           |
| strong FID crushing        | = no           |
| Echoes                     | = 2            |
| partial echo               | = no           |
| TE first                   | = shortest     |
| second (ms)                | = 100.00       |
| Flip angle (deg)           | = 90.00        |
| Refocusing control         | = no           |
| TR                         | = user defined |
| (ms)                       | = 3000.00      |
| Half Scan                  | = no           |
| Water fat shift            | = maximum      |
| Shim                       | = no           |
| SPIR                       | = no           |
| SPAIR                      | = no           |
| BB pulse                   | = no           |
| ProSet                     | = no           |
| MTC                        | = no           |
| Research prepulse          | = no           |
| Zoom imaging               | = no           |
| diffusion mode             | = no           |
| SAR mode                   | = high         |
| B1 mode                    | = default      |
| PNS mode                   | = low          |
| gradient mode              | = default      |
| SoftTone mode              | = no           |
| Cardiac synchronisation    | = no           |
| Respiratory compensation   | = no           |
| Navigator respiratory comp | = no           |
| Flow compensation          | = no           |
| Temporal slice spacing     | = default      |
| NSA                        | = 1            |
| Manual start               | = no           |
| Dynamic study              | = no           |
| Flow labelling             | = none         |
| Preparation phases         | = auto         |
| SENSE ref. scan            | = no           |
| B0 field map               | = no           |
| MIP/MPR                    | = no           |

|                        |               |
|------------------------|---------------|
| Images                 | = M           |
| Autoview image         | = M           |
| Calculated images      | = no          |
| Reference tissue       | = Grey matter |
| Preset window contrast | = soft        |
| Reconstruction mode    | = real time   |
| Save raw data          | = no          |
| Push to workstation    | = no          |
| Hardcopy protocol      | = no          |