Short Manual for the MRI Measurement with multi-parameter mapping protocol for Siemens 3T MRI

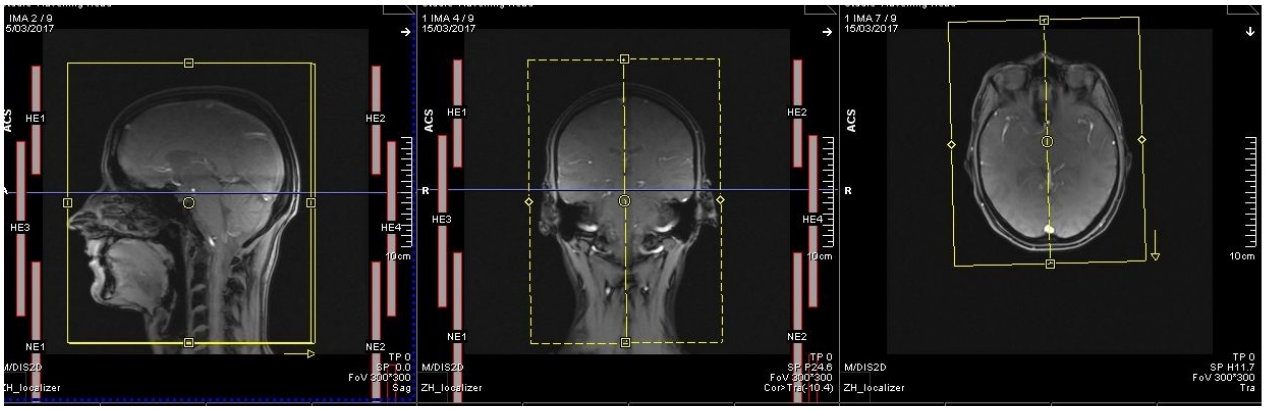
1. Standard Operation Procedure

1.1 Explanation of the Required Sequences and How-to-Measure

The MR protocol is composed of the following sequences (parts A-D).

A. Localizer

Please place the `localizer` in order to cover the whole brain and also the cervical cord until C2/C3 level for the multi-parameter mapping (MPM) protocol (see below).



B. RF-Transmit-Map (B1 Mapping)

The sequence `rf_map` records a map of the RF transmit field. This sequence can be acquired directly after the localizer before running the MPM protocols, applying the same planning, i. e. whole brain coverage.

C. RF-Sensitivity-Maps

For obtaining the RF sensitivity field, we apply two separate sequences right before each multi-parametric mapping sequence (see also next section). One is `RF_sens_head` and the other is `RF_sens_body`, whereas for the latter the Body Coil has to be activated in the System Card as indicated below:

Attention: Although the automatic coil selection should be deactivated, the process of copying the protocol parameters manually or via copy reference ("Center of slice groups & sat. regions") might also copy the coil selection will be copied. Thus you have to **check and change the coil selection** accordingly whenever you manually copy or set a copy reference from `RF_sens_body` to another sequence and vice versa!

D. Multi-parametric mapping (MPM) sequences

This protocol is considered as a research protocol in the frame of the NISCI trial and will be processed to obtain the quantitative MR parameters such as magnetization transfer (MT), and relaxation paramaters R1 and R2*. These parameters are sensitive to the myelination changes and iron level in the tissue.

The protocol comprises of following three multi echo 3D FLASH sequences:

- T1-weighted sequence
- PD-weighted sequence
- MT-weighted sequence

The order is not important within the MPM protocol, but for each scan the `RF_sens_head` and `RF_sens_body` sequences have to be run before each of the three measurements.

Please make use of copy references in order to have the same acquisition volume for the T1-, PD- and MT-weighted sequences, while checking for the correct coil usage (see above).

2. Listing of all Sequences within the Study Protocol

1. Head Localizer
2. RF_map
3. RF_sens_head
4. RF_sens_body

} These two sequences will be repeated before each 3D FLASH sequence of the MPMs.

5. MPM protocol with iPAT3/iPAT2 consisting of three 3D FLASH sequences, i. e. MT-, PD- and T1-weighted sequences covering the whole brain