ANNEX 1

Overview of magnetic resonance imaging (MRI) scanners installed at NIPS

Performance and features of the MRI scanner installed at the NIPS Supportive Center for Brain Research (two 3-T Verio scanners, 2009, Siemens Co.; one 7-T scanner, 2014, Siemens Co., Ltd.)

Verio
1. Superconducting magnet
   1) Magnetic field strength: 3 Tesla, magnet inner diameter 70 cm
   2) Magnetic field uniformity: 0.03 ppm or less (spherical range with a diameter of 20 cm, volume residual mean squared method)
   3) Shimming: Active + passive shimming, automatic shimming for each subject
   4) Liquid helium evaporation: 0.01 L/year or less

2. Imaging functions
   1) Nuclei: $^1$H
   2) Pulse sequence: echo planar imaging, turbo spin echo imaging, etc.
   3) Slice direction: axial, sagittal, coronal, oblique
   4) Min. slice thickness: 1 mm (2-dimensional imaging), 0.3 mm (3-dimensional imaging)
   5) Gradient magnetic field: 45 mTesla/m, rise time 0.225 ms
   6) Probe: 32-channel head coil, circular polarized body coil, etc.
   7) Data processing device: Automatically saves obtained images in DICOM format via Windows network
   8) Other functions: T1, T2, T2*, proton density-weighted images, MR angiography, diffusion-weighted image, image statistical processing software, communication mediation relay system for simultaneously measuring neural activity during interaction between two individuals

7-T MRI
1. Superconducting magnet
   1) Magnetic field strength: 7 Tesla, magnet inner diameter 60 cm
   2) Magnetic field uniformity: 1 ppm or less (spherical range with a diameter of 25 cm, volume residual mean squared method)
   3) Shimming: Active + passive shimming, automatic shimming for each subject
   4) Liquid helium evaporation: 0.01 L/year or less

2. Imaging functions
   1) Nuclei: $^1$H, $^{13}$C, $^{17}$O, $^{19}$F, $^{23}$Na, $^{31}$P
2) Pulse sequence:  echo planar imaging, turbo spin echo imaging etc.
3) Slice dimensions:  axial, sagittal, coronal, oblique
4) Min. slice thickness:  0.5 mm (2-dimensional imaging), 0.05 mm (3-dimensional imaging)
5) Gradient magnetic field:  70 mTesla/m, rise time 0.350 ms
6) Probe:  32-channel receive-only head coil (\textsuperscript{1}H), circular polarized transmit/receive head coil (\textsuperscript{1}H, \textsuperscript{23}Na, \textsuperscript{31}P), transmit/receive surface coil (\textsuperscript{13}C, \textsuperscript{17}O, \textsuperscript{19}F), etc.
7) Data processing device:  Automatically saves obtained images in DICOM format via Windows network
8) Other functions:  T1, T2, T2*, proton density-weighted images, MR angiography, diffusion-weighted image, image statistical processing software
ANNEX 2
Overview of the whole-head type magnetoencephalography (MEG) device installed at NIPS

Overview of the Vectorview whole-head type MEG device installed at NIPS (2002, Neuromag)

1. Sensor
   (1) Number of channels: 306 channels
   (2) Induction coil: flat-bottomed gradiometer, 204 channels
       magnetometer, 102 channels
   (3) System noise: 5 fTesla /\text{Hz} or less
   (4) Sensor arrangement: 102 sensor units evenly distributed over 1220 cm\(^2\)
       Each sensor unit incorporates two orthogonal gradiometers and magnetometers
   (5) Measurement position: sitting position or supine position

2. Shielded room
   (1) Inner dimension: width 3 m x depth 4 m x height 2.4 m
   (2) Outer dimension: width 3.6 m x depth 4.6 m x height 3 m
   (3) Shielding ratio 0.1 Hz, 42 dB or more
       1.0 Hz, 60 dB or more
       10 Hz, 80 dB or more

3. Active shielding system
   An active shielding system is adopted to reduce the influence of the environmental magnetic field at low-frequency bands. The change in the environmental magnetic field at 1 Hz or less is decreased.

4. Analysis control device (UNIX Workstation HPUX J6700)
   (1) Control device
       Connected to sensor system via Ethernet
       Analogue inputs: MEG: 306 channels
       EEG input: 128 channels
       A/D conversion: 24-bit/Save 32-bit
       Sampling (up to 8 kHz)
   (2) Key processing functions
       Signal source estimation: Single/multi-dipole estimation
       (Sphere model/Real shape model)
       MCE
       Signal processing: Digital filter, FFT, etc.
   (3) Data storage device
       5-inch magneto-optical disk 9.1 GB/disk