



Republic of the Philippines
NATIONAL POLICE COMMISSION
NATIONAL HEADQUARTERS PHILIPPINE NATIONAL POLICE
OFFICE OF THE CHIEF, PNP
Camp BGen Rafael T Crame, Quezon City

MEMORANDUM CIRCULAR
NO.: 2021 - 038

MAR 26 2021,

**PRESCRIBING THE MINIMUM TECHNICAL SPECIFICATIONS
FOR MAGNETIC RESONANCE IMAGING (MRI) MACHINE**

1. REFERENCES:

- a. NAPOLCOM Resolution No. 2020-0133 entitled: "Prescribing the Minimum Standard for Magnetic Resonance Imaging (MRI) Machine;
- b. NAPOLCOM Memorandum Circular (MC) No. 2019-002 entitled: "Defining the Duty and Authority of the NAPOLCOM to Prescribe Minimum Standards for Uniforms, Arms, and Equipment to be Procured by the PNP" dated January 29, 2019;
- c. PNP MC No. 2019-016 entitled: "Implementing Guidelines of NAPOLCOM resolution No. 2019-002 Defining the Commission's Function to Prescribe Minimum Standards for Uniforms, Arms and Equipment for the Philippine National Police and Delineation of Authority to the Chief, Philippine National Police and to Set Technical Specifications of PNP Uniforms, Arms and Equipment" dated April 4, 2019; and
- d. PNP UESB Resolution No. 2021-02-014 entitled: "Proposed Minimum Technical Specifications for Magnetic Resonance Imaging (MRI) Machine).

2. RATIONALE:

This MC sets forth the minimum technical specifications for Magnetic Resonance Imaging (MRI) Machine that will serve as reference in the procurement of the said equipment.

3. SITUATION:

MRI Machine, or Nuclear Magnetic Resonance imaging, is a technology being used by doctors of the PNP Health Service to give a visual representation of soft tissue inside the body. Magnetic resonance uses nuclear magnetic resonance to generate said images. It has a bed that enters a strong magnetic field and then radio waves are applied for a short time in a different direction. A sudden shift causes certain atoms in the patient's body to make special signals. The MRI scanner detects those special signals. The MRI Machine sends the signal information to a computer, and the computer creates an image of the inner body by using the signal information.

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Chief, Administrative Section

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4. PURPOSE:

To provide and establish the minimum technical specifications for MRI Machine that will serve as reference in the procurement of the said equipment.

5. DEFINITION OF TERMS:

For purposes of this MC, the following terms shall mean:

- a. **Cardiac Gating** – is typically performed using detection of the R-wave since this is usually the most prominent feature of the EKG. The R-wave coincides with the beginning of ventricular systole. In prospective cardiac gating, MR data acquisition begins after being triggered by the first R-wave. The acquisition is completed before the next R-wave in a period known as the R-R interval.
- b. **Cryogen** – refers to a substance for obtaining low temperatures.
- c. **Digital Imaging and Communications in Medicine (DICOM)** – refers to the standard for the communication and management of medical imaging information and related data. DICOM is most used for storing and transmitting medical images enabling the integration of medical imaging devices such as scanners, servers, workstations, printers, network hardware, and picture archiving and communication systems from multiple manufacturers.
- d. **Electromagnetic Coil** – refers to the electrical conductor such as wire in the shape of a coil, spiral or helix.
- e. **Field Strength** – refers to the magnitude of a vector-valued field (e.g., in volts per meter, V/m, for an electric field E). For example, an electromagnetic field results in both electric field strength and magnetic field strength.
- f. **Field of View** – refers to the extent of the observable world that is seen at any given moment. In the case of optical instruments or sensors, it is a solid angle through which a detector is sensitive to electromagnetic radiation.
- g. **Helium** – exists in a liquid form only at the extremely low temperature of $-269\text{ }^{\circ}\text{C}$ (about 4 K or $-452.2\text{ }^{\circ}\text{F}$).
- h. **Increments** – refers to the process of increasing in number, size, quantity, or extent. Something added or gained. A slight, often barely perceptible augmentation.
- i. **Magnetic Field** – refers to a vector field that describes the magnetic influence of electrical charges in relative motion and magnetize materials. Magnetic fields are observed in a wide range of size scales, from subatomic particles to galaxies.

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- j. **Peripheral Pulse Gating** – used as the last resort for cardiac imaging due to the long and unpredictable delay between myocardial contraction and arrival of the pulse wave to the finger. Peripheral pulse gating is commonly used on peripheral MRA and for cine CSF flow studies, however.
- k. **Pulse Sequence** – refers to a set of radio frequency and magnetic field gradient pulses used in conjunction with the data acquisition timing to produce the desired MR images.
- l. **Synchronization** – refers to one or two distinct but related concepts of movement.
- m. **Slice thickness** – refers to the (often axial) resolution of the scan (2 mm in the illustration).
- n. **Spectroscopy** – refers to the study of the interaction between matter and electromagnetic radiation (via electron spectroscopy, atomic spectroscopy, etc).
- o. **Tesla (T)** – refers to the unit of measurement used to quantify the strength of a magnetic field in an MRI machine.
- p. **Superconducting Magnet** – refers to an electromagnet made from coils of superconducting wire. They must be cooled to cryogenic temperatures during operation.

6. SPECIFICATIONS:

a. Description:

MRI Machine makes computer generated images of anatomic structures by measuring radio frequency interference in a strong electromagnetic field.

b. Technical Specifications:

- 1) Configuration : Compact or short bore
- 2) Power Requirements : Up to 480 volts
- 3) Operating System : Manufactures Standard
- 4) Storage Capacity : 2 GB
- 5) DICOM : 3.0 Compatible
- 6) Field Strength : 1.5 Tesla
- 7) Pulse Sequences : Manufacturer standard
- 8) Field of View : 0.2 cm increments on any direction
- 9) Imaging Modes : Single and Multi-slice
- 10) Synchronization : Cardiac and Peripheral Pulse Gating
- 11) Magnet Type : Superconducting

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- six coils : Brain, head, Breast, Knee, Extremity, Neck
- 13) Spectroscopy : Capable
- 14) Cooling System Type : Refrigeration or Liquid helium
- 15) Cryogen Use : Less than 0.075 L/hr liquid helium max
- 16) Slice Thickness : 0.5 mm (2D) and 0.1 mm (3D)
- 17) Display Matrix : 1024 X1024 pixels
- 18) Measuring Matrix : 64 to 1024 frequency encoding
- 19) Clinical Application : Whole body

7. EFFECTIVITY:

This MC shall take effect immediately after 15 days from filing a copy thereof at the UP-Law Center in consonance with Section 3, Chapter 2, Book VII of Executive Order 292 otherwise known as the "Revised Administrative Code of 1987," as amended.



[Handwritten Signature]
DEBOLD M SINAS
 Police General
 Chief, PNP

CPNP Ltrs 21 S085012

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