



# Department of Defense INSTRUCTION

NUMBER 6055.11

August 19, 2009

Incorporating Change 2, August 31, 2018

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USD(A&S)

SUBJECT: Protecting Personnel from Electromagnetic Fields

References: See Enclosure 1

1. PURPOSE. This Instruction:

a. Reissues DoD Instruction (DoDI) 6055.11 (Reference (a)) in accordance with the authority in DoD Directive (DoDD) 5134.01 (Reference (b)) and the guidance in DoDD 4715.1E (Reference (c)) to update policy, responsibilities, and procedures for protecting personnel from exposure to electromagnetic fields (EMFs) from 0 to 300 gigahertz (GHz).

b. Removes laser content, which is covered in DoDI 6055.15 (Reference (d)).

c. Establishes the DoD Transmitted EMF Radiation Protection (TERP) Working Group to provide technical guidance and recommend policy on EMF safety and health matters within the Department of Defense in accordance with DoDI 6055.01 (Reference (e)).

d. Establishes the DoD EMF Injury Hotline.

e. Expands guidance to include exposure to EMFs from 0 to 3 kilohertz (kHz) in accordance with the American National Standards Institute/Institute of Electrical and Electronics Engineers (IEEE) C95.6-2002 (Reference (f)).

2. APPLICABILITY. This Instruction:

a. Applies to the OSD, the Military Departments, the Office of the Chairman of the Joint Chiefs of Staff and the Joint Staff, the Combatant Commands, the Office of the Inspector General of the Department of Defense, the Defense Agencies, the DoD Field Activities, and all other organizational entities in the Department of Defense (hereafter referred to collectively as the "DoD Components").

b. Applies to DoD operations, activities, and installations worldwide, including Government-owned, contractor-operated facilities and non-DoD activities operating on DoD installations.

c. Does not apply to patients exposed to EMFs as part of a diagnostic or therapeutic medical or dental treatment.

d. Does not apply to potential or suspected adverse health effects in persons with implanted electronic medical devices (such as pacemakers), metal implants (such as orthopedic appliances), or stents, shunts, or wires attributable to EMF levels below the maximum permissible exposure (MPE). Exposures to these devices below the MPE are covered by Food and Drug Administration guidelines for each medical device.

3. DEFINITIONS. See Glossary.

4. POLICY. It is DoD policy, in accordance with Reference (c), to:

a. Protect DoD personnel from accidental death, injury, and occupational illness.

b. Protect the public from risk of death, injury, illness, or property damage because of DoD activities.

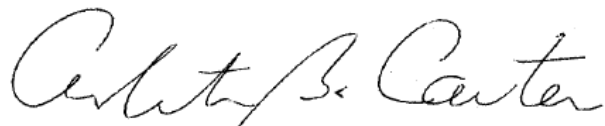
5. RESPONSIBILITIES. See Enclosure 2.

6. PROCEDURES. See Enclosure 3.

7. RELEASABILITY. **Cleared for public release.** This instruction is available on the Directives Division Website at <http://www.esd.whs.mil/DD/>.

8. SUMMARY OF CHANGE 2. This change reassigns the office of primary responsibility for this Instruction to the Under Secretary of Defense for Acquisition and Sustainment in accordance with the July 13, 2018 Deputy Secretary of Defense Memorandum (Reference (g)).

9. EFFECTIVE DATE. This Instruction is effective August 19, 2009.



Ashton B. Carter  
Under Secretary of Defense  
for Acquisition, Technology, and Logistics

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ENCLOSURE 1

REFERENCES

- (a) DoD Instruction 6055.11, "Protection of DoD Personnel from Exposure to Radiofrequency Radiation and Military Exempt Lasers," February 21, 1995 (hereby canceled)
- (b) DoD Directive 5134.01, "Under Secretary of Defense for Acquisition, Technology, and Logistics (USD(AT&L))," December 9, 2005, as amended
- (c) DoD Directive 4715.1E, "Environment, Safety, and Occupational Health (ESOH)," March 19, 2005
- (d) DoD Instruction 6055.15, "DoD Laser Protection Program," May 4, 2007
- (e) DoD Instruction 6055.01, "DoD Safety and Occupational Health (SOH) Program," October 15, 2014
- (f) American National Standards Institute/Institute of Electrical and Electronics Engineers C95.6-2002, "IEEE Standard for Safety Levels with Respect to Human Exposure to Electromagnetic Fields, 0 to 3 kHz," October 23, 2002<sup>1</sup>
- (g) Deputy Secretary of Defense Memorandum, "Establishment of the Office of the Under Secretary of Defense for Research and Engineering and the Office of the Under Secretary of Defense for Acquisition and Sustainment," July 13, 2018
- (h) DoD Instruction 5000.02, "Operation of the Defense Acquisition System," January 7, 2015, as amended
- (i) DoD Instruction 6055.07, "Accident Investigation, Reporting, and Record Keeping," June 6, 2011
- (j) Institute of Electrical and Electronics Engineers C95.1-2005, "IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz," April 19, 2006<sup>1</sup>
- (k) Institute of Electrical and Electronics Engineers C95.7-2005, "IEEE Recommended Practice for Radio Frequency Safety Programs, 3 kHz to 300 GHz," September 2005<sup>1</sup>
- (l) North Atlantic Treaty Organization Standardization Agreement 2345, "Evaluation and Control of Personnel Exposure to Radio Frequency Fields – 3kHz to 300 GHz," (CU:US) Ref: NSA(ARMY)0120-MED/2345, February 13, 2003
- (m) Military Standard MIL-STD-882D, "Standard Practice for System Safety," February 10, 2000
- (n) Institute of Electrical and Electronics Engineers C95.3-2002, "IEEE Recommended Practice for the Measurement and Computations of Radio Frequency Electromagnetic Fields with Respect to Human Exposure to Such Fields, 100 kHz to 300 GHz," January 13, 2003<sup>1</sup>
- (o) DoD Instruction 6055.05, "Occupational and Environmental Health (OEH)," November 11, 2008
- (p) Institute of Electrical and Electronics Engineers C95.2-1999, "IEEE Standard for Radio-Frequency Energy and Current-Flow Symbols," 1999<sup>1</sup>
- (q) DoD Instruction 6490.03, "Deployment Health," August 11, 2006

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<sup>1</sup> Available for purchase at [www.ieee.org/portal/site](http://www.ieee.org/portal/site)

ENCLOSURE 2

RESPONSIBILITIES

1. UNDER SECRETARY OF DEFENSE FOR ACQUISITION, TECHNOLOGY, AND LOGISTICS (USD(AT&L)). The USD(AT&L) shall:

- a. Oversee implementation of this Instruction.
- b. Develop and update EMF policy to continuously improve EMF safety and health matters.
- c. Integrate EMF protection principles into DoD acquisitions and USD(AT&L) strategic planning. For those systems that have the potential to expose personnel to EMF above the action levels, manage the risk pursuant to DoDI 5000.02 (Reference (h)) for all phases of the system life cycle.

2. ASSISTANT SECRETARY OF DEFENSE FOR ENERGY, INSTALLATIONS, AND ENVIRONMENT (ASD(EI&E)). The ASD(EI&E), under the authority, direction, and control of the USD(AT&L), shall:

- a. Establish, as an integral element of the DoD Safety and Occupational Health Committee (Reference (e)), the DoD TERP Working Group to perform the functions described in Enclosure 4 of this Instruction.
- b. Monitor the effectiveness of this Instruction through the annual program reviews (Reference (e)) and special requests for safety information in accordance with DoDI 6055.07 (Reference (i)).

3. HEADS OF THE DoD COMPONENTS. The Heads of the DoD Components shall:

- a. Establish and maintain an EMF protection program that implements the requirements and procedures in this Instruction.
- b. Ensure that necessary health and safety requirements are incorporated into appropriate initial capabilities documents, technical orders, handbooks, manuals, and other publications related to operational EMF systems.
- c. Appoint subject matter experts on EMF protection issues to the DoD TERP Working Group to perform the functions described in Enclosure 4.
- d. Recommend EMF safety and health guidance and direction.

4. SECRETARY OF THE AIR FORCE. The Secretary of the Air Force, in addition to the responsibilities in section 3 of this enclosure, shall:

a. Administer and maintain the DoD EMF Injury Hotline to provide timely expert medical advice in the event of an injury or suspected injury from EMF devices.

b. Administer and maintain the EMF Overexposure Repository for DoD Components to access, analyze, and use in EMF protection programs.

ENCLOSURE 3

PROCEDURES

1. MPE LIMITS

a. To limit exposures to personnel, review and determine DoD mission compatibility with all MPE updates and modifications specified in Reference (f) and IEEE Standard C95.1-2005 (Reference (j)) with implementation guidance provided by IEEE Standard C95.7-2005 (Reference (k)).

b. For high-peak power-pulsed fields, North Atlantic Treaty Organization Standardization Agreement 2345 (Reference (l)) limits all exposures to a maximum peak in terms of E-field to 200 kilovolts per meter (kV/m) in a single pulse. Increasing numbers of research studies on bioeffects from high-peak power-pulsed fields suggest that MPEs of 500 to 1000 kV/m would not be expected to have adverse health effects. Until a more complete research and risk characterization picture is formed, the MPE in this Instruction is 200 kV/m. Additionally, no distinction between types of pulsed EMFs is made; high-peak and electromagnetic pulse are not distinguished.

c. When developing EMF safety programs, do not apply additional safety margins. The MPE limits in this Instruction incorporate adequate safety margins.

d. MPE limits apply to military-unique operations, workplaces, equipment, and systems (Reference (e)). The DoD TERP Working Group provides technical expertise for developing new EMF MPEs and providing risk-based alternative MPEs to meet military-unique operational requirements.

e. Evaluate new EMF transmitting systems and equipment, or modifications of existing EMF transmitting devices, using the policy in Reference (h) and following the methodology in Military Standard 882D (Reference (m)). The DoD TERP Working Group may be consulted for evaluating devices that will be used in a multi-Service environment.

2. EVALUATION

a. Measurement and Evaluation of EMFs. Evaluate EMF hazards using the measurement procedures and techniques recommended in IEEE Standard C95.3-2002 (Reference (n)) as basic guidance. This requirement does not preclude the use of other EMF measuring and evaluation methodologies.

b. Records Maintenance. In accordance with DoDI 6055.05 (Reference (o)), maintain records of surveys, reports, calculations, and control measures imposed for each fielded EMF emitter that is capable of exceeding the MPEs in References (f), (j), and (l).



c. Multiple Emitters. Where multiple EMF emitters may be collocated in fixed arrangements (such as aboard ships or at communication sites), determine the weighted contribution that should be made to ensure personnel are not exposed to effective EMF levels above the MPEs.

d. Inventory. For installations operating applicable EMF emitters, maintain documentation defining locations categorized as “EMF-controlled” and “EMF-action levels” (public/uncontrolled).

### 3. CONTROLS

a. Action Level. Establish and maintain control over areas where potential EMF exposures to personnel above the action level could occur. The lower-tier exposure limit, below the action level, is when exposures are controlled through the implementation of an EMF safety program as described in Reference (k). To prevent exposures of personnel above the MPE and action level, use the MPEs specified in References (f) and (j), except as noted in paragraph 1.b. of this enclosure.

b. EMF Warning Signs. The EMF warning sign formats are specified in IEEE Standard C95.2-1999 (Reference (p)).

(1) Variations to include subdued signs for camouflage or tactical reasons, or to provide improved visibility under certain lighting conditions, are authorized provided the general layout of the signs remains the same. EMF warning signs are required at all access points where levels exceed the controlled environment MPEs listed in References (f) and (l).

(2) Where the EMF levels exceed the uncontrolled environment MPEs or action levels, post warning signs according to Reference (k) as determined by radiation safety, safety, engineering, or occupational health professionals. Insert instructional or warning statements on the signs, as appropriate. Where EMF warning signs create unacceptable operational risks, institute documented alternate procedures for informing personnel of EMF hazards.

(3) In areas where access to EMF levels greater than 10 times the controlled environment MPEs may exist, warning signs alone may not provide adequate protection. Other warning devices, such as flashing lights, audible signals, barriers, or interlocks, are required depending on the potential risk of exposure. Radiation safety professionals should determine the specific warning devices used.

c. Personal Protective Equipment (PPE)

(1) Protective clothing is not authorized for routine use as a means of protecting personnel from EMF overexposure. PPE, such as electrically insulated gloves and shoes for protection against EMF-induced shock and burn or for insulation from the ground plane, is authorized where necessary for compliance with the induced current limits (References (f) and (j)).

(2) Personal EMF monitors are not approved for routine use as a means of personal protection from EMF exposure.

(3) All PPE must be inspected with each use and routinely tested to ensure protective efficacy.

#### 4. TRAINING

a. Provide training to DoD personnel who routinely work directly with equipment that results in electromagnetic environmental levels in excess of the MPEs.

b. Ensure personnel are aware of the potential hazards of EMF, established procedures, and restrictions to control EMF exposures, and their responsibility to limit their exposures.

c. Conduct training before assignment to such work areas.

d. Provide annual refresher training, which may be incorporated into other periodic safety training programs.

e. Develop a risk communication plan for personnel who may be exposed to EMF from DoD sources or from known sources in the vicinity of deployed forces.

(1) Apply current risk communication techniques for describing risk and the process of risk assessment and characterization.

(2) For potential EMF exposures in military deployments, follow operational risk communication requirements of DoDI 6490.03 (Reference (q)).

(3) At a minimum, address opportunities to ensure potential occupationally exposed individuals, including those with implanted medical devices, metal implants, stents, shunts, or wires, understand the known health implications of system operation.

#### 5. MISHAPS

a. Investigate and document incidents involving personnel exposure that may exceed the MPEs in References (f), (j), and (l).

(1) To determine exposure levels, include measurements or analysis, appropriate medical examination, a detailed description of the circumstances surrounding the incident to determine root cause, and recommendations for preventing recurrence of similar incidents. Contact the DoD EMF Injury Hotline for additional medical assistance at DSN 240-6007 (commercial 210-536-6007); alternate numbers DSN 240-5454 (commercial 210-536-5454) or 1-888-232-ESOH (3764).

(2) Submit results of these investigations to the EMF Overexposure Repository. Sample forms for recording data on system operating characteristics and medical outcomes are available from Reference (l). Similar DoD Component-specific forms may be used.

b. For personnel overexposures in excess of five times the adjusted MPEs listed in Reference (j):

(1) Contact the DoD EMF Injury Hotline.

(2) Use a trained EMF professional designated by the DoD Component to measure EMFs and document the exposure.

(3) Contact a medical treatment facility to perform medical examinations, as necessary, and provide recommendations for medical follow-up.

(4) Prepare documentation that includes descriptions of the circumstances surrounding the exposure incident, statements from personnel involved in the incident, and recommendations to prevent similar occurrences. Sample forms are available from Reference (l).

(5) Maintain a repository file of all investigations and submit to the EMF Overexposure Repository.

(6) Maintain personal exposure assessments, medical exams, and evaluations according to the recordkeeping guidelines in Reference (o).

c. For exposure incidents meeting the criteria of a mishap of Reference (i), also implement the requirements of Reference (i).

ENCLOSURE 4

DoD TERP WORKING GROUP FUNCTIONS

1. Coordinate and liaison with the DoD Joint Standards Board for Electromagnetic Environmental Effects to Personnel and the DoD Lead Standardization Activity for Radio Frequency Exposure to Personnel Safety under the Defense Standardization Executive Defense Standardization Program Office.
2. Provide EMF scientific, medical, operational, and standardization advice to the ASD(EI&E) through the Director for Environmental Readiness and Safety (ER&S).
3. Include representatives, who are full-time or permanent part-time Federal employees, from ASD(EI&E) and the DoD Components.
4. Establish guidelines to govern the operation of the working group and procedures for selecting and rotating designation of the Chair.
5. Meet at the call of the Chair to share information, discuss items of mutual interest, and recommend policies to ASD(EI&E) through the Director for ER&S.
6. Act as a technical and scientific liaison body to interact with international, Federal, and State regulatory and advisory agencies and nongovernmental standards development organizations on issues related to EMF protection. This does not authorize the group to officially represent the Department of Defense. Inform the ASD(EI&E) through the Director for ER&S of each such encounter.
7. Submit an annual report to the Director for ER&S with working group accomplishments and a work plan for future actions.

GLOSSARY

PART I. ABBREVIATIONS AND ACRONYMS

ASD(EI&E)	Assistant Secretary of Defense for Energy, Installations, and Environment
DoDD	DoD Directive
DoDI	DoD Instruction
EMF	electromagnetic field
ER&S	Environmental Readiness and Safety
GHz	gigahertz
IEEE	Institute of Electrical and Electronics Engineers
kHz	kilohertz
kV/m	kilovolt per meter
MPE	maximum permissible exposure
PPE	personal protective equipment
TERP	transmitted EMF radiation protection
USD(AT&L)	Under Secretary of Defense for Acquisition, Technology, and Logistics

PART II. DEFINITIONS.

These terms and their definitions are for the purpose of this Instruction.

action level. The values of the electric and magnetic fields' strength; the incident power density, contact, and induced current; and contact voltages above which steps should be initiated to protect against exposures that exceed the upper tier, specifically implementation of an EMF safety program.

EMF. The entire spectrum of static and time-varying electric and magnetic fields for frequencies ranging from 0 to 300 GHz.

EMF overexposure. An exposure to an EMF that exceeds the MPE limits.

MPE. The highest electric or magnetic strengths or power densities, or the induced and contact currents to which a person may be exposed without incurring an established adverse health effect and with an acceptable margin of safety.