Radio Frequency Radiation: High Power Microwave Devices (e.g., Jackal, Calilgo, etc.) - Soldiers

FACT SHEET 24-011-1011

Introduction: The Jackal and Calilgo are high-power microwave (HPM) systems installed on a variety of combat-ready vehicles that use radio frequency (RF) radiation to detect improvised explosive devices (IEDs). These systems use directional antennas to radiate energy in front of and away from the vehicle.

What is Radio Frequency Radiation (RFR)? RFR is energy using radio waves and is called "nonionizing" radiation. RFR does not have enough energy to cause genetic damage or cell mutations. It is not radioactive like x-radiation and there are no lasting effects. Many technologies in ordinary living use RF energy. FM and AM radio broadcasts, TV over the air broadcasts, Wi-Fi, cell phones, and microwave ovens all use RF energy.

Are there Biological Health Effects from Radio Frequency Radiation? Yes. There can be heating effects from high levels of RF radiation, much like a microwave oven. Heating effects are the main health risk from exposure to RFR. At high levels, RFR can cause an increase in body temperature, similar to when you sit in a hot tub or sauna. However, once a person leaves an area of high RFR energy or any high temperature environment, the body returns to normal temperature. The Jackal and Calilgo systems only produce high RFR levels that produce heat "directly" in front of the antennas. There are no known health effects from exposure to RFR levels lower than Department of Defense (DOD) personnel exposure standards. RFR exposure has not been shown to cause cancer.

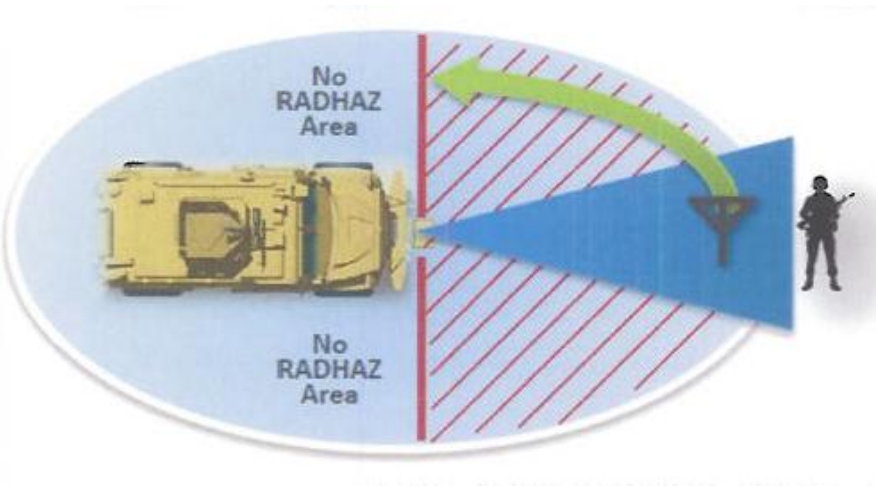
Are there Radio Frequency Radiation Exposure Standards for Personnel? Yes. All DOD RF radiating systems require testing for potential RFR hazards prior to use to ensure personnel are not exposed to RFR levels that exceed the DOD standards. The Jackal, Calilgo and other IED defeat technologies have been evaluated in this manner.

Where are the RF Radiation Areas of Concern for HPM Systems? The area in front of the vehicle where the antenna is mounted is the primary area of concern due to the high RF radiation levels in front of the antenna. RFR levels in the cab, in back and sides of the vehicles have been measured to be tens of times lower than the DOD standards.

How Do I Know If I Have Been Overexposed to RF Radiation? Adverse health effects to users of the Jackal and other HPM systems are not expected unless personnel ignore the safety recommendations. A warming sensation or reddening of the skin after standing in front of a radiating antenna could be associated with RFR exposure. Bottom line, follow the safety procedures associated with the equipment being used and everyone will be safe.

U.S. Army Public Health Command
Radiofrequency and Ultrasound
Aberdeen Proving Ground, MD 21010-5403
Commercial (410) 436-3353/DSN 312-584-3353

What Safety Procedures Should Be Observed for HPM Systems? Soldiers, who have to be in front of the vehicle for some reason, should observe the stand-off distance specified when the antenna is radiating. *Example*: 14 feet from the front of the Jackal system while it is running.



What Should I Do If I Think I've Been Overexposed to RF Radiation? Contact your radiation safety officer or unit safety point of contact as well as your medical treatment facility if you believe you were overexposed to RFR.

What Is the Treatment for Overexposure to RF Radiation? The treatment depends on the exposure level, how long you were exposed, and the part of the body that was exposed to RFR. For exposures to RFR that exceed the DOD standards, you should receive an appropriate medical exam. Eye exams are only required if the exposure is greater than 5 times the DOD standards.

References

IEEE C95.1-2005, *IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz*, 19 April 2006.

DODI 6055.11, *Protecting Personnel from Electromagnetic Fields*, 19 August 2009.