



Millimetre-wave Body Scanner

Health and Safety Information Sheet

Millimetre-waves are part of the radio frequency spectrum. Other parts of the radio frequency spectrum are utilised by many devices in every day public use, such as mobile phones and wireless network devices. There is no evidence to suggest that millimetre-wave body scanners, or other devices in this frequency and at the power density used by scanners, are a health risk for the travelling public or the operators.

How the millimetre-wave body scanner works

The L-3 ProVision millimetre-wave body scanner works in three stages:

1. A weak beam of radio waves is transmitted at the person being scanned from two rotating masts inside the body scanner. The masts contain transmitting and receiving antennas. The exposure of individuals to electromagnetic fields during a scan is very short and does not exceed 2 seconds.
2. The energy reflected by the body or any other object on the body is received by the machine and analysed by the unit's software (automatic threat recognition algorithm) to detect anomalies, such as those produced by items detected on the body or inside clothing.
3. When an anomaly is detected, a small box indicating its location is superimposed on a generic human image or 'stick figure' that is displayed on a monitor for analysis by screening staff.

Exposure Levels

People being scanned by the L-3 millimetre-wave body scanner are exposed to exceptionally low levels of electromagnetic energy. These levels are thousands of times lower than that of a single phone call and comparable to passive exposure to a mobile phone used several metres away. The United States of America Transport Security Administration has stated that the technology emits 10,000 times less radio frequency energy than an average mobile phone call.

The power density that a person could be exposed to within the ProVision body scanner is significantly less than the maximum permissible exposure levels for the public specified in the Australian Radiation Protection and Nuclear Safety Agency's (ARPANSA) Radiation Protection Standard: *Maximum Exposure Levels to Radiofrequency Fields – 3 kHz – 300 GHz*. This standard sets a maximum permissible

exposure level for members of the public, including children, of 10 watts per square metre. In comparison, the power density of the ProVision body scanner has been measured to be between 40 and 640 micro-watts per square metre (or between 0.00004 (4×10^{-5}) and 0.00064 (6.4×10^{-4}) watts per square metre), which is several thousand times less than the maximum exposure levels set in these standards. In addition, these measurements are taken at the closest accessible point, between 2–3 cm, to the antennas. Under standard operating conditions, the individual being scanned would be about 30–60 cm from the antenna, which further reduces the exposure to the person being scanned.

The high frequency used in the millimetre-wave body scanner means the penetration into the human body will be lower than from most other exposures encountered in daily life. Most of the millimetre waves used in the ProVision scanner are reflected within the outer 1 mm of the body and bounce back to the receiving antennas within the scanner. Even if operated continuously, the ProVision millimetre-wave body scanner cannot cause significant heating of skin tissue.

Security Personnel

The waves emitted during a scan are directed towards the interior of the body scanner. Outside the scanner, the exposure of aviation security screeners responsible for operating millimetre-wave body scanners working everyday in close proximity to these machines can be considered to be insignificant.

Implanted Medical Devices

Active implantable medical devices, including pacemakers and defibrillators, are designed to meet the series of standards relating to electrical safety and protection by the International Electrotechnical Commission. One part of that standard requires medical devices to be protected from interference from external energy sources, such as mobile phones and other electronic equipment. The power levels (and peak electric field levels) for the ProVision body scanner are significantly lower than what a person might experience from the use of other everyday electronic equipment, such as mobile phones. Due to the location of the medical devices (under the skin) and the electromagnetic compatibility of these devices, there are no known safety concerns in relation to people with these devices undergoing a body scan.