

INSTALLERS AND ELECTROMAGNETIC FIELDS

WHAT IS ELECTROMAGNETIC RADIATION?

This folder contains information on electromagnetic radiation from antenna systems. It is aimed at people who, through their work on communications equipment, may be exposed to electromagnetic radiation at levels that exceed the action levels for occupational exposure to electromagnetic fields.

Computers, mobile phones, wireless networks and base stations for mobile communications all emit energy that is often referred to as electromagnetic radiation. The action levels for exposure to radiation from this type of communications equipment are based on the heating of body tissue.

At high levels of exposure and protracted exposure, the energy that is absorbed by the body can be converted into heat, causing a rise in body temperature. Beyond this, there are no documented health effects of exposure to electromagnetic radiation from communications equipment.

Adverse health effects rarely occur, however it is still important to be aware when you are very close to antennas.

The Regulations relating to Action Levels and Exposure Limit Values for

the level of exposure employees can be subject to. The action levels are operational values that can be compared with measured values and when exceeding the action levels, measures need to be initiated to reduce exposure to a minimum.

The Norwegian Labour Inspection Authority administers the Regulations relating to Action Levels and Exposure Limit Values and provides guidance.

The Norwegian Communications Authority measures and documents radiation from electronic equipment.

The Norwegian Radiation and Nuclear Safety Authority uses the measurements from the Norwegian Communications Authority and others to assess health risks and provide general health advice and guidance.

Measurements and calculations

In collaboration with the Norwegian Radiation and Nuclear Safety Authority, the mobile operators and the installation industry, the Norwegian Communications Authority has performed calculations and measurements for all the main types of antenna installations.

These results have been used to prepare diagrams and calculate restricted zones in front of antennas. Inside these zones, people risk exposure to electromagnetic radiation that exceeds the action levels.

Occupational exposure

The action levels for occupational exposure depend on the frequency range that the equipment transmits in. The values are defined in terms of power density measured in watts per square metre (W/m²):

FREQUENCY RANGE	ACTION LEVELS [W/m ²]
10 – 400 MHz	10
400 – 2000 MHz	10-50
2 – 300 GHz	50

See also: www.lovddata.no, forskrift om tiltaks- og grenseverdier.

Exposure increases as you move closer to the antennas. In work situations where it is necessary to spend time close to antennas, the action levels may be exceeded.

Even if exposure is higher than the action levels, it is safe to pass through or spend short periods of time in the restricted areas (shaded) shown in the diagrams in this folder.

Exposure from antenna installations

The level of exposure to electromagnetic radiation when you work close to an antenna depends on the transmission power, the frequency bands and how many transmitters are in use at the time. For panel antennas on mobile communication base stations, the radiation levels behind, below, above and to the sides of the antenna are significantly lower than directly in front of it.

Measurements carried out in areas around antenna installations, show that electromagnetic radiation is weak and well below the action levels. Exposure at levels above the action levels only occurs when you spend time closer than approximately four meters, at the same height as and directly in front of an antenna.

If work must be carried out close to and directly in front of antennas, measures to reduce exposure must be considered. These must be described in the installers' own routines.

The exposure values stipulated in the Regulations relating to Action Levels and Exposure Limit Values must not be exceeded.

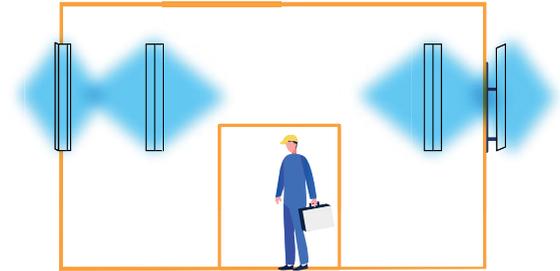
ANTENNAS ON ROOF/ LIFT MACHINE ROOM ROOF *

Four antennas mounted on roof/lift machine room roof *

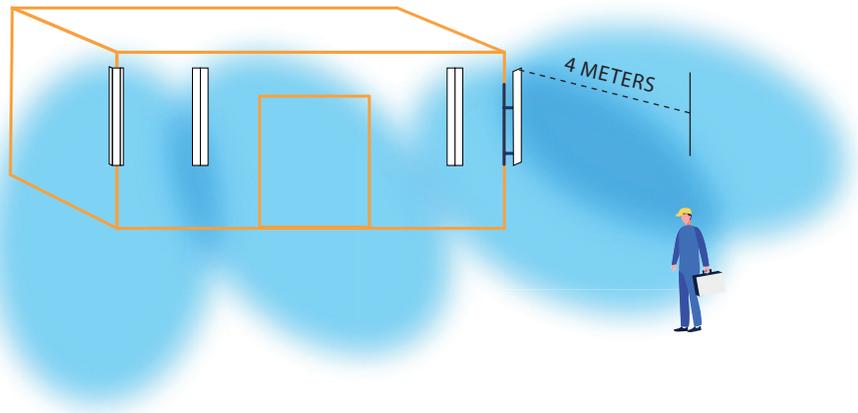
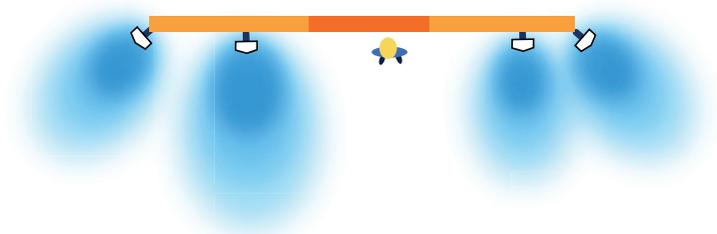


ANTENNAS ON FACADE

Facade-mounted panel antennas seen from the side *



Facade-mounted panel antennas seen from above *

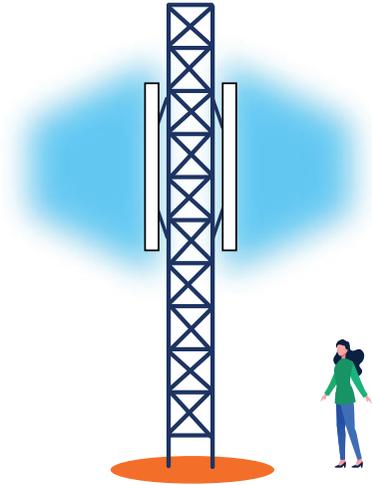


* The areas where the action levels may be exceeded are shaded in blue

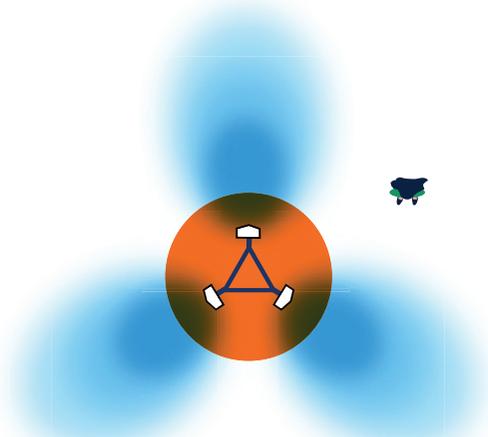
* The areas where the action levels may be exceeded are shaded in blue

ANTENNAS ON MAST

Triangular lattice mast with three panel antennas seen from the side *

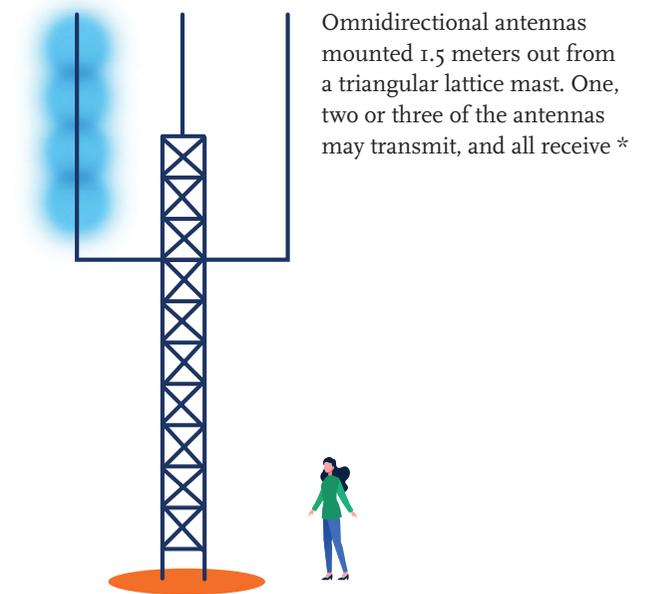


Triangular lattice mast with three panel antennas seen from above *



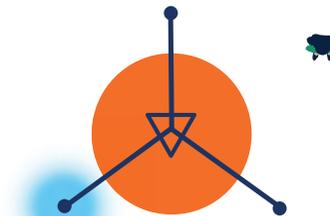
* The areas where the action levels may be exceeded are shaded in blue

OMNIDIRECTIONAL TETRA ANTENNAS ON MAST



Omnidirectional antennas mounted 1.5 meters out from a triangular lattice mast. One, two or three of the antennas may transmit, and all receive *

The same antennas seen from above *



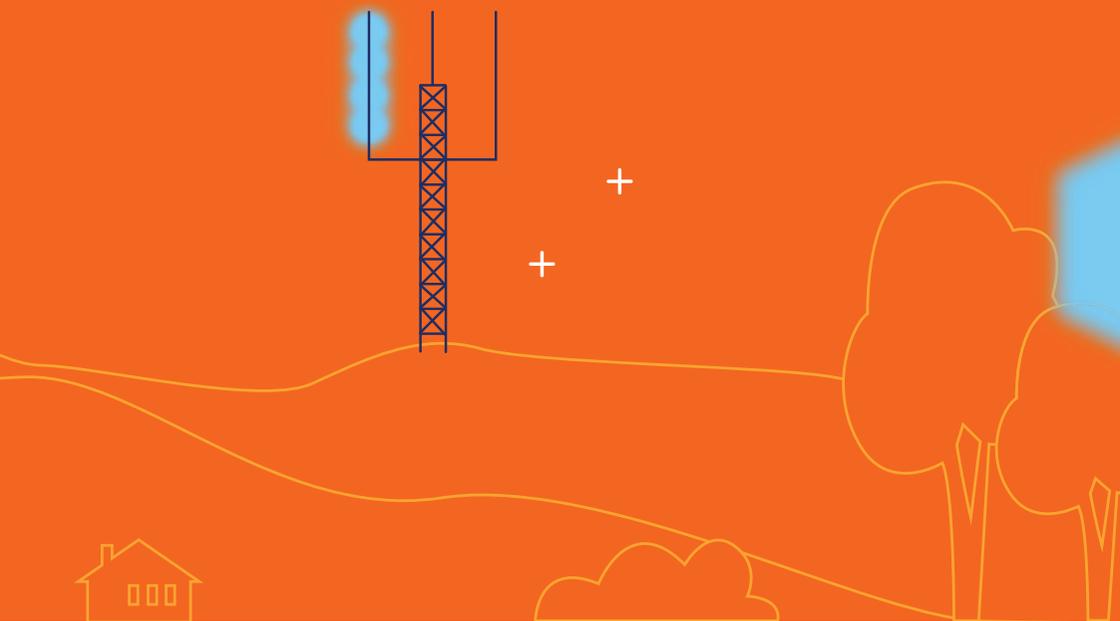
* The areas where the action levels may be exceeded are shaded in blue



Norwegian
Communications
Authority



Norwegian Radiation
and Nuclear Safety Authority



If you have any questions, please contact us:

Norwegian Communications Authority
www.nkom.no

Norwegian Radiation and Nuclear Safety Authority
www.dsa.no

Norwegian Labour Inspection Authority
www.arbeidstilsynet.no