

# Recommendation ITU-T K.145 (12/2020)

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## RF Safety for Telecom Workers

ITU Regional Workshop on EMF Harmony  
Muscat-Sultanate of Oman, 13-16 May 2024

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**ITU-T**

TELECOMMUNICATION  
STANDARDIZATION SECTOR  
OF ITU

**K.145**

(12/2020)

SERIES K: PROTECTION AGAINST INTERFERENCE

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**Assessment and management of compliance  
with radio frequency electromagnetic field  
exposure limits for workers at  
radiocommunication sites and facilities**

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# Introduction

- Standards or guidelines **limiting human exposure to EMF** have been developed by the ICNIRP<sup>(1)</sup>, the IEEE<sup>(2)</sup>, or in national regulations.
- Limits are different for **general public** and **occupational** environments.
- Workers are allowed, **with conditions**, in areas where the exposure levels are higher than the public limits.
- ITU-T K.145 provides guidance on the compliance with RF-EMF exposure limits for **workers at sites and facilities with radiocommunication equipment**.

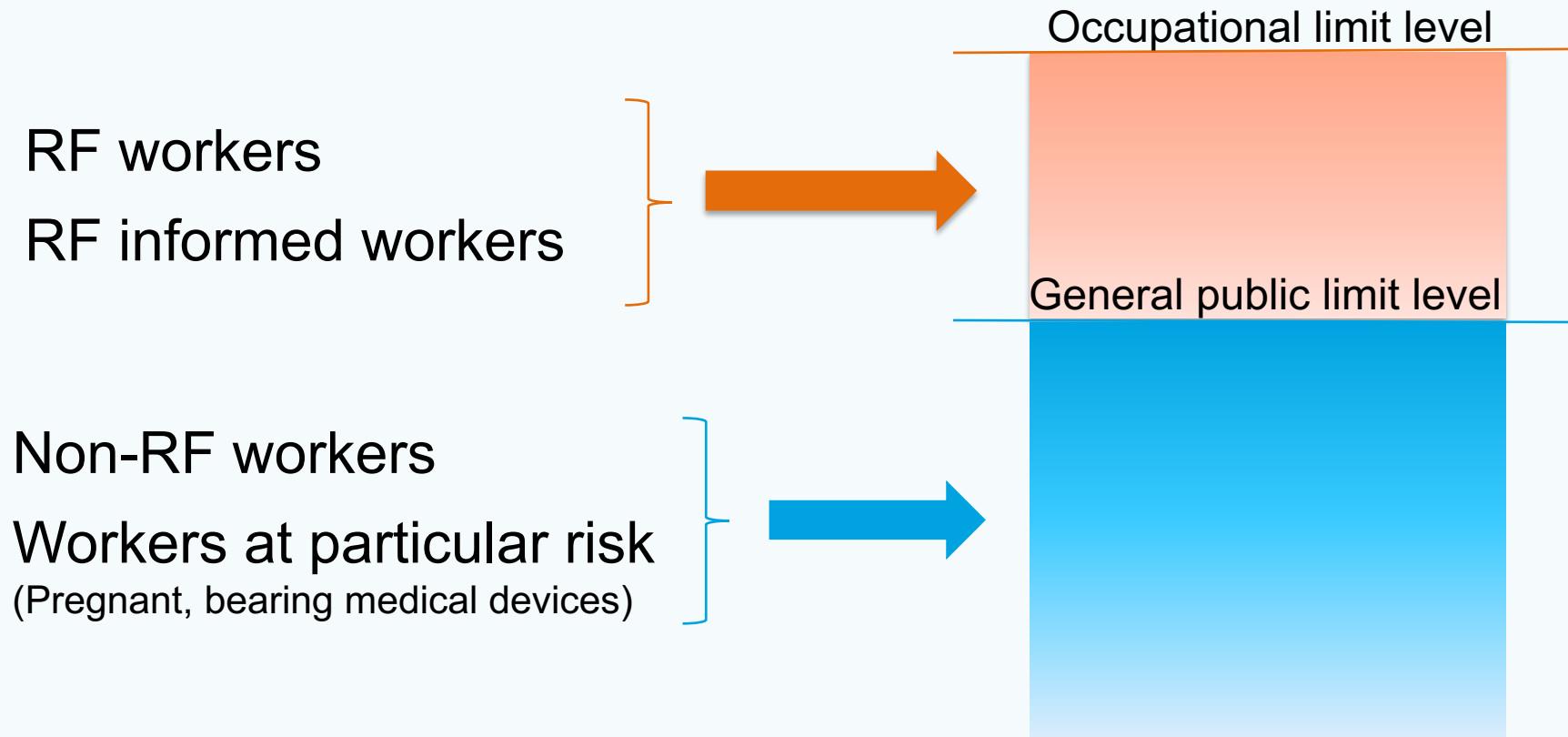
<sup>(1)</sup> ICNIRP: International Commission on Non-Ionizing Radiation

<sup>(2)</sup> IEEE: The Institute of Electrical and Electronics Engineers

# Workers' classification according to ITU-T K.145

- **Non-RF workers:**
  - ✓ Workers that do not find themselves near RF emitters (e.g., those in a standard office with the normal IT equipment, etc.)
- **RF workers:**
  - ✓ All those workers that are likely to be near an RF source as part of their job. Examples are test lab engineers and telecom infrastructure maintenance personnel (tower climbers, installation engineers, etc.)
- **RF informed workers:**
  - ✓ All those who are likely to be near an RF source to carry out their non-RF related work. Examples are air-conditioning installers, painting personnel, etc.
- **Workers at particular risk:**
  - ✓ Pregnant women and Workers bearing personal medical devices

# Workers' classification vs limit levels



The background of the slide features a blue-tinted image of several large satellite dishes. One dish is prominently shown in the foreground on the left, while others are visible in the background and on the right side. The sky is a lighter blue with some white clouds.

# **ITU-T K.145 Protective measures**

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For RF workers and RF informed workers

# RF Safety Program

Should contain the following five steps:

1. Performing risk and exposure assessments.
2. Training RF workers.
3. Providing information on safety practices to RF informed workers.
4. Providing RF workers with the right tools.
5. Applying preventive measures (Action Plan).

RF Safety Program

✓

✓

✓

Action Plan

✓

✓





# 1. Performing risk and exposure assessments

## Risk assessment

- Identification of the RF sources and appropriate exposure limits.
- Determination of the need for an RF exposure assessment.
- Determination of the best method.
- Actions taken to mitigate or avoid overexposure.

## Exposure assessment

- Calculations:
  - ✓ Computational methods
- Measurements:
  - ✓ Broadband equipment
  - ✓ Selective equipment
- Monitoring:
  - ✓ Area monitoring
  - ✓ Personal monitoring





## 2. Training RF workers, on

- the values and concepts of the basic restrictions and reference levels,
- the results of the levels of exposure and the preventive measures taken,
- safe working practices to minimize risks resulting from exposure,
- the associated possible risks: direct and indirect effects,
- how to detect adverse health effects of exposure and how to report them,
- the possibility of transient symptoms and sensations,
- the circumstances in which workers are entitled to health surveillance.



### 3. Providing information on safety practices to RF informed workers

- Safe working practices to minimize risks resulting from exposure.
- Information on the need to follow all signs and comply with all instructions.
- Contact information for requesting switch off if necessary.
- Contact information on location of full information of safe working practices.
- Safe working practices to minimize risk of exceeding exposure limits.





## 4. Providing RF workers with the right tools

### Personal protective equipment (e.g. protective clothing)

- Caution: to be used correctly, may be not compatible with personal monitors.

### Personal RF monitors (exposimeter)

For a good monitoring and avoiding false alarms, check for:

- ✓ Frequency response shaped to the standard
- ✓ Isotropy (on-the-body and off-the-body use)
- ✓ Correct alarm setting
- ✓ Good low frequency immunity
- ✓ E and H-field monitoring
- ✓ Other (datalogging, positioning, etc.)



## 5. Applying preventive measures (Action Plan)



### Worker perspective

- *Other working methods or positions that reduce RF exposure.*
- *Limitations of the duration and intensity of the exposure conditions.*
- *Personal protective and personal monitoring equipment.*



### Equipment perspective

- *Switching off or reducing the RF power.*
- *Choice of equipment emitting less EMF.*
- *Optimization of emitters position, orientation and radiated power.*



### Site perspective

- *Use of area monitoring in places likely to experience high exposures.*
- *Use of interlocks, shielding or similar health protection mechanisms.*
- *Delimitation and access measures (signals, labels, floor markings, barriers) to control access.*

# Thank you for your attention

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