Virtual Forum on Human Exposure to electromagnetic fields (EMFs) due to digital technologies. 10 May 2021.

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

RF Safety for Telecom Workers

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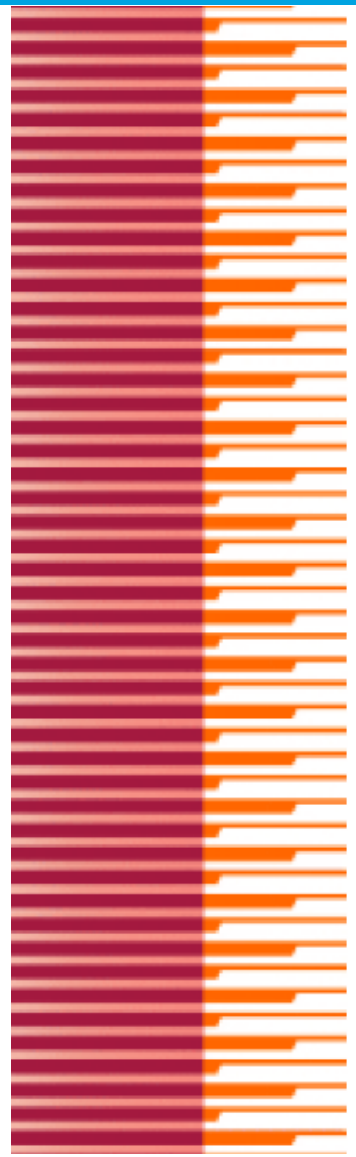


ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

K.145

(12/2020)

SERIES K: PROTECTION AGAINST INTERFERENCE

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

Introduction

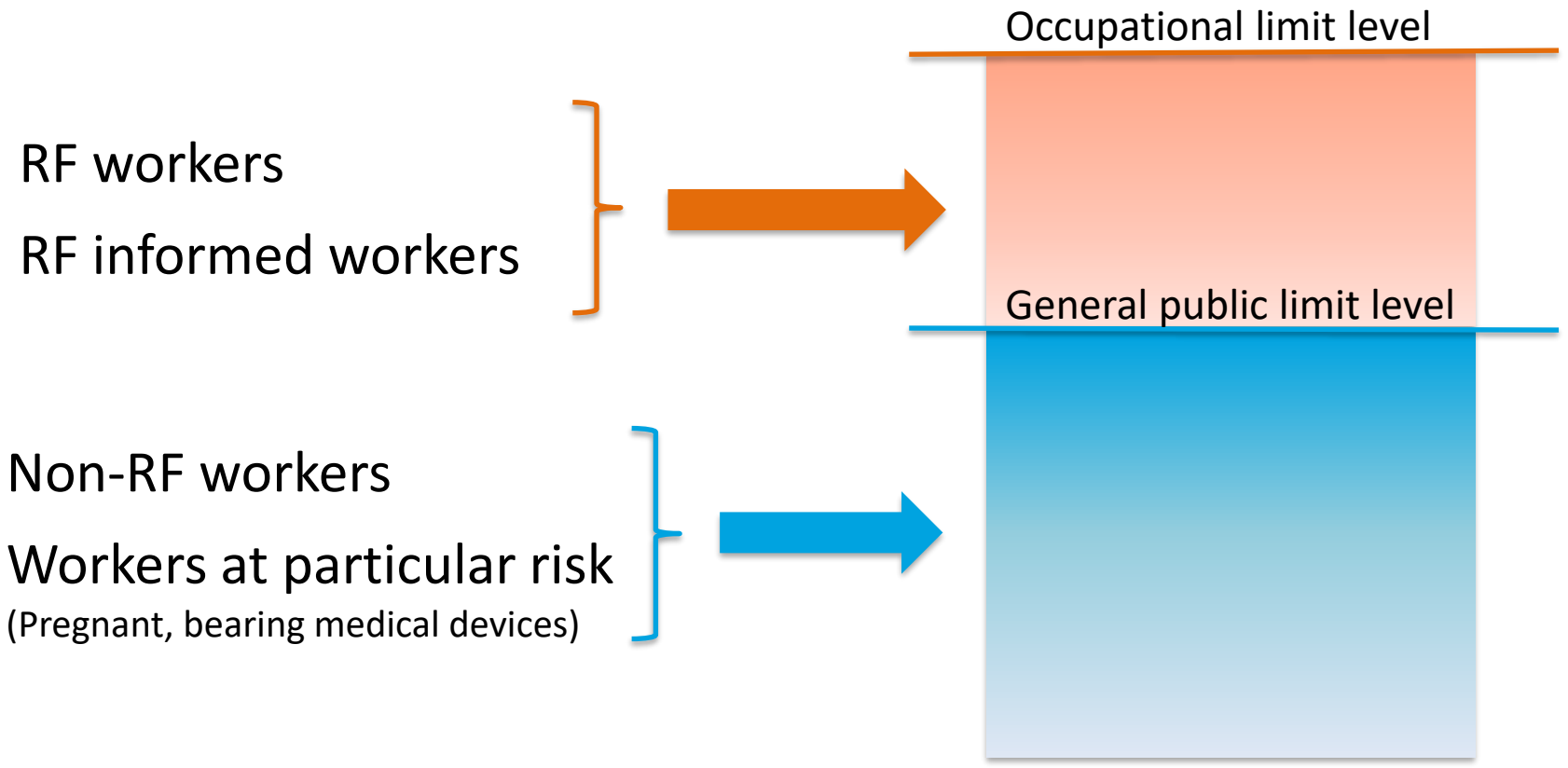
- Standards or guidelines **limiting human exposure to EMF** have been developed by the ICNIRP(1), the IEEE(2), or in national regulations.
- Limits are different for **general public** and **occupational** environments.
- Workers are allowed, **with conditions**, in areas where the exposure levels are 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**.

(1) ICNIRP: International Commission on Non-Ionizing Radiation
(2) 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

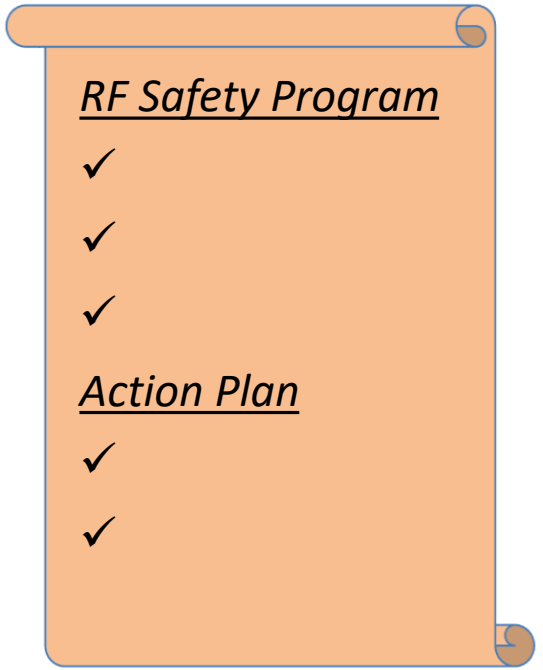
Workers' classification vs limit levels



Protective measures for RF and RF informed workers

This shall be done through an RF safety program in 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)



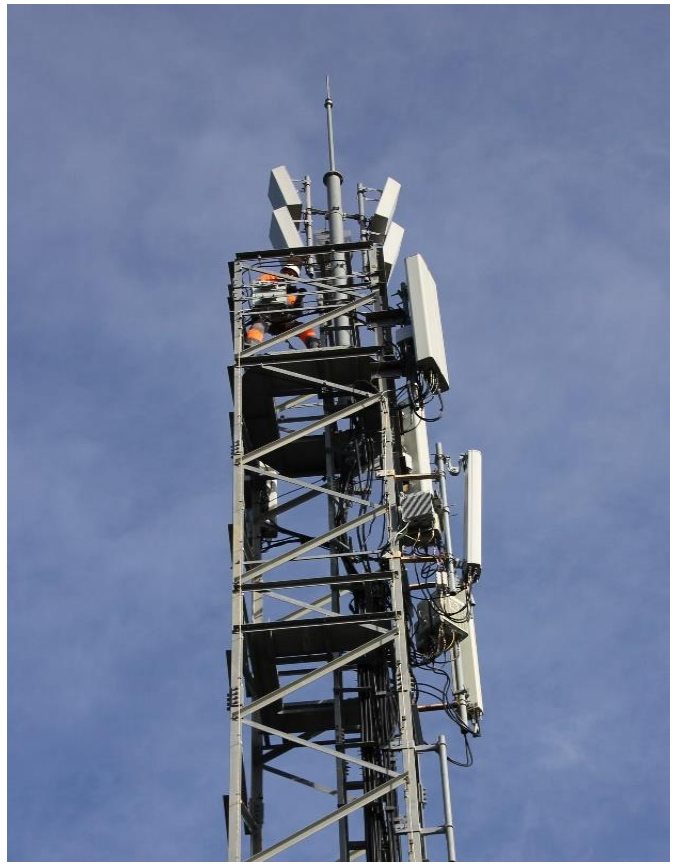
1. Performing risk and exposure assessments

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



Source: recommendation ITU-T K.145

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

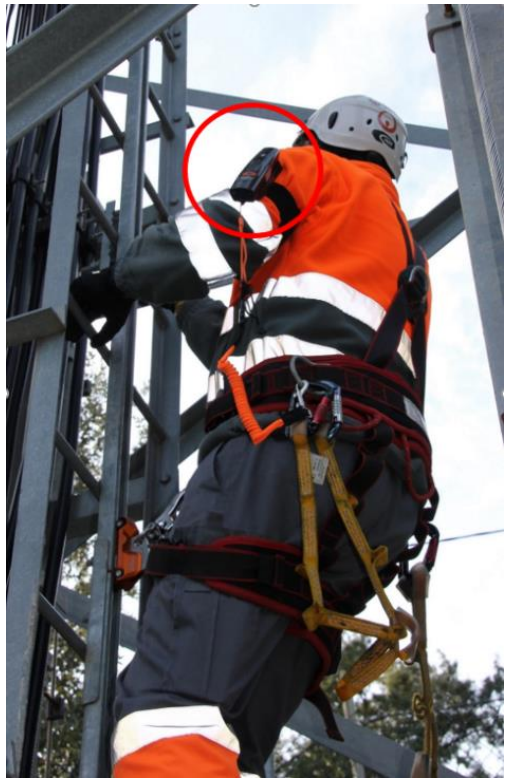
Personal protective equipment (e.g. protective clothing)

CAUTION To be used correctly, may be not compatible with personal monitors.

Personal RF monitors (exposimeter)

CAUTION For better 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.)



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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