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# Guidelines

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## Exposure Limits for Non-Ionizing Radiation (100 kHz to 300 GHz)

Version 1.0

Document Date: 5 December 2022

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**TDRA Guidelines for Exposure Limits for Non-Ionizing Radiation (100 kHz to 300 GHz), Version 1.0**

**Article (1)  
Legal Reference**

- 1.1 These Guidelines are issued in accordance with the provisions of the UAE Federal Law by Decree No 3 of 2003 (Telecom Law) as amended and its Executive Order.
- 1.2 This document comprises guidelines, requirements and measures for Non-Ionizing Radiation Limits for Telecommunication Networks for various applications in the frequency range (100 kHz to 300 GHz). These guidelines shall be read in conjunction with the following regulatory instruments issued by the TDRA and available on TDRA website at [www.tdra.gov.ae](http://www.tdra.gov.ae):
  - 1.2.1 Non-Ionizing Radiation Limits Regulations.
  - 1.2.2 Spectrum Allocation and Assignment Regulations.
  - 1.2.3 Spectrum Monitoring, Interference Management and Enforcement.

**Article (2)**

**Definitions**

- 2.1 The terms, words and phrases used in these Guidelines shall have the same meaning as is ascribed to them in the UAE Federal Law by Decree No 3 of 2003 (Telecom Law) as amended and its Executive Order; unless these Regulations expressly provide otherwise for, or the context in which those terms, words and phrases are used in these Guidelines indicates otherwise. The following terms and words shall be interpreted, as follows:
  - 2.1.1 "**Authority**" or "**TDRA**" means the General Authority for Regulating the Digital Government and Telecommunication Sector known as Telecommunications and Digital Government Regulatory Authority (TDRA) established pursuant to the provisions of Article 6 of Federal Law by Decree No. 3 of 2003 (as amended).
  - 2.1.2 "**Licensee(s)**" means any telecommunications operator who provides Telecommunication Services licensed by the TDRA Board pursuant to the provisions of the UAE Federal Law by Decree No 3 of 2003 (Telecom Law) as amended.
  - 2.1.3 "**Base Transceiver Station**" or "**BTS**" means a piece of equipment that facilitates wireless communication between user equipment (UE) and a network;
  - 2.1.4 "**Compliance Distance**" means the minimum distance from the antenna to the point of investigation where the field level is deemed to be compliant to the limits;

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- 2.1.5 “**EMF**” means the Electro Magnetic Field which is the field of force associated with electric charge in motion. It has both electric and magnetic components and contains a definite amount of electromagnetic energy;
- 2.1.6 “**General-Public Individuals**” means individuals of all ages and of differing health statuses, which includes more vulnerable groups or individuals, and who may have no knowledge of or control over their exposure to EMFs;
- 2.1.7 “**HRP**” means the Horizontal Radiation Pattern;
- 2.1.8 “**ICNIRP Guidelines**” means the guidelines published by the International Commission for Non-Ionizing Radiation Protection (ICNIRP). It includes provisions and tables that illustrate the levels of exposure for the general public to Non-Ionizing radiations which the ICNIRP Guidelines regards as acceptable.
- 2.1.9 “**ICNIRP**” means the International Commission on Non-Ionizing Radiation Protection is a body of independent scientific experts consisting of a main Commission of 14 members, 4 Scientific Standing Committees covering Epidemiology, Biology, Dosimetry and Optical Radiation and a number of consulting experts. This expertise is brought to bear on addressing the important issues of possible adverse effects on human health of exposure to non-ionizing radiation.
- 2.1.10 “**IMT Networks**” means International Mobile Telecommunications is the generic term used by the ITU to designate broadband mobile systems. It encompasses IMT-2000, IMT- Advanced and IMT-2020 collectively. International regulations and global standards are adopted worldwide to enable the global harmonization and implementation of different generations of broadband mobile networks (e.g. 3G, 4G, 5G, etc.).
- 2.1.11 “**ITU**” means the International Telecommunication Union, which is the United Nations specialized agency for information and communication technologies (ICTs).
- 2.1.12 “**Non-Ionizing Radiations**” refer to any type of electromagnetic radiation that does not have enough energy to completely remove an electron from an atom or molecule. Examples of Non-Ionizing radiation sources are; Mobile/phones, AM & FM Radio, and Microwave.
- 2.1.13 “**Occupationally-exposed individuals**” means adults who are exposed under controlled conditions associated with their occupational duties, trained to be aware of potential radiofrequency EMF risks and to employ appropriate harm-mitigation measures, and who have the sensory and behavioural capacity for such awareness and harm-mitigation response. An occupationally-exposed worker must also be subject to an appropriate health and safety program that provides the above information and protection.

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- 2.1.14 **“Plane-wave equivalent incident power density ( $S_{eq}$ )”** means the RF power per unit area, and in the far-field is equal in magnitude to the power flux-density of a plane wave having the same electric (E) or magnetic (H) field strength expressed in units of watts per square metre (W/m<sup>2</sup>).
- 2.1.15 **“Telecommunications Apparatus”** means apparatus made or adapted for use in transmitting, receiving or conveying any of the Telecommunications Services through a Telecommunications Network
- 2.1.16 **“VRP”** means the Vertical Radiation Pattern.
- 2.1.17 **“Wireless Equipment”** means a category of Telecommunication Apparatus used for Radiocommunication Service.

**Article (3)**

**NIRL Requirements**

- 3.1 Each licensee/Wireless Equipment user shall ensure that the general public is not exposed to Non- Ionizing Radiations in excess of these limits as a result of the operation of a telecommunications network or Telecommunications Apparatus by that Licensee.
- 3.2 Licensee shall test each site once on air for radiation exposure and provide report to the Authority. Licensees are also required to keep appropriate records demonstrating their compliance by providing a map on their website for radiation exposure based on area/base transceiver station (BTS) as well as warning sign on the BTS area for safe distance on occupational exposure.
- 3.3 Licensee shall submit a formal declaration to the Authority, within 365 days of this Guidelines coming into force, stating that its telecommunications network and Telecommunications Apparatus comply with the TDRA Regulations and ICNIRP Guidelines including the levels of exposure for the general public and Occupationally-exposed individuals to non-ionizing radiations set out in tables in Article 3 of the TDRA Regulations for Permissible Non-Ionizing Radiation Limits (NIRL). Any changes to existing base stations or the deployment of new base stations should also adhere to the ICNIRP Guidelines.
- 3.4 Licensees should submit information of existing/new site information requested by Authority. That information should be submitted in any format and as per requirements template provided by the Authority and on agreed schedule.
- 3.5 In the event that any updated version of the ICNIRP Guidelines is released, The Authority should send an official correspondence to the Licensees containing the updated standards and guidelines and the time frame to get the updated version of ICNIRP Guidelines in-force.

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- 3.6 Licensees shall provide the Authority with the documents required and acceptable to it, within 3 working days of the Authority's request in writing or through the Authority's official channels, demonstrating that particular Telecommunications Apparatus or particular site on which Telecommunications Apparatus or part of a Telecommunications Network are located that complies with the ICNIRP Guidelines.
- 3.7 Licensees shall comply with the Non-Ionizing Radiation limits set forth in TDRA Regulations for Permissible Non-Ionizing Radiation Limits (NIRL), when fulfilling the requirements for coverage and quality of services.
- 3.8 If an assessment shows non-compliance in publicly accessible areas the relevant Licensee should use mitigation techniques explained in annex D of the latest version of **ITU-T Recommendation K.70** including:
- A decrease in the transmitter power;
  - An increase in the antenna height;
  - A decrease in the VRP down tilt;
  - An increase in the antenna gain;
  - Changes in the VRP;
  - Changes in the HRP; and
  - Multiple methods applied simultaneously

Licensees should use these methods as appropriate to reduce the amount of radiation in the above mentioned areas, The Authority also has the right to request shutting down the operating station in the event of non-compliance with the technical conditions stipulated in TDRA Regulations for Permissible Non-Ionizing Radiation Limits (NIRL) and related guidelines.

- 3.9 General public exposure limits within the ICNIRP Guidelines are more restrictive than the occupational exposure limits set out in the ICNIRP Guidelines. Accordingly, Licensees should ensure that the general public cannot access areas or sites which are subject to Non-Ionizing radiations from their activities, if those areas would fall within the limits for occupational exposure set out in the ICNIRP Guidelines.
- 3.10 Licensees should ensure that the general public, cannot access an area surrounding the antennas of transmission stations which area is determined on a case by case basis in accordance with the formulas set out in the ITU-T Recommendation K.70, Annex C.

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The following table is extracted from ITU-T Recommendation K.70, Annex C:

Radio frequency range	General public exposure	
1 to 10 MHz	$r = 0.10\sqrt{eirp \times f}$	$r = 0.129\sqrt{erp \times f}$
10 to 400 MHz	$r = 0.319\sqrt{eirp}$	$r = 0.409\sqrt{erp}$
400 to 2000 MHz	$r = 6.38\sqrt{eirp / f}$	$r = 8.16\sqrt{erp / f}$
2000 to 300000 MHz	$r = 0.143\sqrt{eirp}$	$r = 0.184\sqrt{erp}$
<p><i>r</i> is the minimum antenna distance, in meters  <i>f</i> is the frequency, in MHz  <i>erp</i> is the effective radiated power in the direction of the largest antenna gain, in Watts  <i>e.i.r.p</i> is the equivalent isotopically radiated power in the direction of the largest antenna gain, in Watts</p>		

*Formulas for the calculation of minimum distances to antennas of transmission stations for compliance with the exposure limits for the population in general.*

*(Note: The expressions below are not appropriate for use in situations where there is no surface reflection in the area of the calculation and will provide inaccurate estimates of compliance zone distances. For example, the minimum distance for compliance zones could be over-estimated for antennas mounted on a tower structure with no surrounding buildings.)*

**Article (4)  
NIRL Measures**

- 4.1 The Authority may evaluate from time to time to ensure that the limits of exposure to EMF set by the ICNIRP Guidelines are not exceeded. If there is any violation of these limits arising from the operation of a base station, the relevant base station will be subject to clause 3.7.
- 4.2 The Authority has the right to take the necessary measures according to its regulations and regulatory frameworks in the event of non-compliance with the issued guidelines.
- 4.3 These Guidelines applies to electromagnetic spectrum specified in TDRA Regulations for Permissible Non-Ionizing Radiation Limits (NIRL).

**Article (5)  
Validation and Publication**

- 5.1 These guidelines should be published in the official gazette and shall be effective as of the date of their publication.