
Notification of the National Telecommunications Commission

Regarding Safety Criteria and Measures for the Use of Radiocommunication Equipment on Human Health

The National Telecommunications Commission has issued the Notification on the Safety Standard for the Use of Radiocommunication Equipment thereby limits and measurement of exposure to electromagnetic waves in the frequency range of 9 kHz – 300 GHz have been set out for use as the guidelines in monitoring and supervising the use of radiocommunication equipment to mitigate the impacts and to safeguard human health against any possible hazards from the exposure to the magnetic waves from such equipment. Therefore, it is deemed appropriate to specify the Safety Criteria and Measures for the Use of Radiocommunication Equipment on Human Health to develop and ensure common practice.

By virtue of Section 51 (5), (10) and (12), and Section 78 paragraph one of the Act on Organization to Assign Radio Frequency and to Regulate the Broadcasting and Telecommunication Services B.E. 2543 (2000), Section 32 paragraph two of the Telecommunications Business Act B.E. 2544 (2001), and Section 11 of the Radiocommunication Act B.E. 2498 (1955) amended by the Radiocommunication Act (No. 3) B.E. 2535 (1992), and Section 29 (5) of the Radiocommunication Act B.E. 2498 (1955), the National Telecommunications Commission hereby specifies the Safety Criteria and Measures for the Use of Radiocommunication Equipment on Human Health in accordance with the Safety Standard for the Use of Radiocommunication Equipment on Human Health as follows:

Section 1. This Notification shall take effect on and from the day following the date of its publication in the Royal Gazette.

Section 2. In this Notification,

“Safety Standard” means Safety Standard for the Use of Radiocommunication Equipment on Human Health - Limits and Measurement of Exposure to Electromagnetic Waves in the Frequency Range of 9 kHz – 300 GHz, NTC TS 5001 – 2550 pursuant to the Notification of the National Telecommunications Commission regarding Safety Standard for the Use of Radiocommunication Equipment on Human Health.

“Entrepreneur” means manufacturer, distributor or importer of radiocommunication equipment into the Kingdom, or person granted permission to use radiocommunication equipment or set up radiocommunication station, or telecommunication business licensee, as the case may be.

“Commission” means the National Telecommunications Commission.

“Secretary General” means the Secretary General of the National Telecommunications Commission.

“Office” means the Office of the National Telecommunications Commission.

Any definitions other than those mentioned herein shall be in accordance with the Notification of the National Telecommunications Commission regarding Safety Standard for the Use of Radiocommunication Equipment on Human Health.

Chapter 1

Scope of Enforcement and Exemption

Section 3. The criteria and measures in this Notification shall be applicable to the following three categories of radiocommunication equipment described in the Safety Standard:

Category 1 Radiocommunication equipment, of which the electromagnetic radiation component is, in normal use, positioned close to the user’s head, or less than 20 centimeters from the body of the user;

Category 2 Radiocommunication equipment, of which the electromagnetic radiation component is, in normal use, positioned at least 20 centimeters from the body of the user; and

Category 3 Radiocommunication equipment in fixed location and with broad area of electromagnetic radiation.

Samples of radiocommunication equipment categorized in line with the Safety Standard are given in **Annex A**.

Section 4. Radiocommunication equipment in the frequency range of 9 kHz-300 GHz shall have the electromagnetic radiation in line with the Safety Standard as from the effective date of the Safety Standard.

Section 5. The radiocommunication equipment with electromagnetic radiation in accordance with the Safety Standard but exempted from the required assessment of electromagnetic radiation comprises:

5.1 The equipment used for the purpose of national security, national defense, maintenance of national order, guarding of His Majesty the King, the royal family as well as VIPs of the country, and the equipment used by public agencies as deemed necessary by the Commission, as the case may be.

5.2 The two-way radios which are portable or hand-held or installed in a vehicle, that have push-to-talk or information transmission function, and the users of which have properly undergone training or received guidance on the use of the equipment and have been well aware or informed of the effects of the electromagnetic wave that may be health hazardous. Samples of the users are ambulance staff, fire fighters, policemen and military officers, etc.

5.3 The equipment for marine vessel or airplane stations.

5.4 The equipment for fixed link stations, point-to-point, in the frequency range of over 2 GHz and with transmitting output power of not over 2 W.

5.5 The equipment with the maximum equivalent isotropically radiated power (e.i.r.p.) of not over 100 MW.

The Commission may specify additional equipment that is exempted from radiation assessment, or it may require the earlier exempted equipment to undergo radiation assessment as deemed appropriate.

Chapter 2

Safety Criteria for Radiocommunication Equipment Category 1

Section 6. Criteria of electromagnetic radiation assessment:

6.1 Radiocommunication equipment classified in Category 1 is subject to assessment of specific absorption rate (SAR) as related to such equipment to ensure compliance with the Safety Standard.

6.2 Entrepreneurs responsible for radiocommunication equipment Category 1 shall submit Declaration of Conformity (DoC) certified by the manufacturers or the entrepreneurs as per the form in **Annex B**, and also submit report on the SAR measurement by the inspection units, either at home or overseas, with accreditation of inspection expertise in accordance with the ISO/IEC 17025 or the equivalent standards, to support the application for the assessment and certification by the Commission pursuant to the regulations regarding the assessment and certification of standard as announced by the Commission.

6.3 Entrepreneurs shall keep copies of the DoC for future inspection to ensure compliance with the regulations after the placement of the equipment for distribution throughout the distribution period and for not less than one year after the cessation of the distribution of such equipment.

Section 7. Compliance declaration:

7.1 Besides having compliance label shown on the equipment in compliance with the regulations regarding the assessment and certification of standard as announced by the Commission, entrepreneurs are duty-bound to make publicly known the conformity with the Safety Standard. The conformity with the Safety Standard shall be stated in the instruction manuals, or presented on the side of the packaging, or provided as additional documents packed together with such equipment. This aims at showing the users that the equipment carries the SAR in accordance with the Safety Standard.

7.2 The statement indicating the conformity with the Safety Standard shall be as follows:

“This radiocommunication equipment has the specific absorption rate (SAR) of W/kg as related to the equipment, which is in compliance with the Safety Standard for the Use of Radiocommunication Equipment on Human Health announced by the National Telecommunications Commission.”

Chapter 3

Safety Criteria for Radiocommunication Equipment Category 2

Section 8. Criteria of electromagnetic radiation assessment:

8.1 Radiocommunication equipment classified in Category 2 is subject to assessment of electromagnetic field strength to ensure compliance with the Safety Standard.

8.2 Entrepreneurs responsible for radiocommunication equipment Category 2 shall submit Declaration of Conformity (DoC) certified by the manufacturers or the entrepreneurs as per the form in **Annex B**, and also submit report on the assessment of electromagnetic field strength, to support the application for the assessment and certification by the Commission pursuant to the regulations regarding the assessment and certification of standard as announced by the Commission.

8.3 Entrepreneurs shall keep copies of the DoC for future inspection to ensure compliance with the regulations after the placement of the equipment for distribution throughout the distribution period and for not less than one year after the cessation of the distribution of such equipment.

Section 9. Compliance declaration:

9.1 Besides having compliance label shown on the equipment in compliance with the regulations regarding the assessment and certification of standard as announced by the Commission, entrepreneurs are duty-bound to make publicly known the conformity with the Safety Standard. The conformity with the Safety Standard shall be stated in the instruction manuals, or presented on the side of the packaging, or provided as additional documents packed together with such equipment. This aims at showing the users that the equipment has the electromagnetic field strength in accordance with the Safety Standard.

9.2 The statement indicating the conformity with the Safety Standard shall be as follows:

“This radiocommunication equipment has the electromagnetic field strength in compliance with the Safety Standard for the Use of Radiocommunication Equipment on Human Health announced by the National Telecommunications Commission.”

Chapter 4

Safety Criteria for Radiocommunication Equipment Category 3

Section 10. Criteria of electromagnetic radiation assessment:

10.1 Radiocommunication equipment classified in Category 3 is subject to assessment of electromagnetic field strength to ensure compliance with the Safety Standard.

10.2 The zoning of the electromagnetic radiation levels of radiocommunication equipment Category 3 may be made according to the radiation strength level as shown in **Figure 1** as follows:

(1) Compliance zone: the zone where the electromagnetic radiation level is lower than the exposure limit for both the occupational exposure group and the general public exposure group, as specified in the Safety Standard.

(2) Occupational zone: the zone where the electromagnetic radiation level is lower than the exposure limits for the occupational exposure group but higher than the exposure limits for the general public exposure group, as specified in the Safety Standard.

(3) Exceedance zone: the zone where the electromagnetic radiation level is higher than the exposure limits for both the occupational exposure group and the general public exposure group, as specified in the Safety Standard.

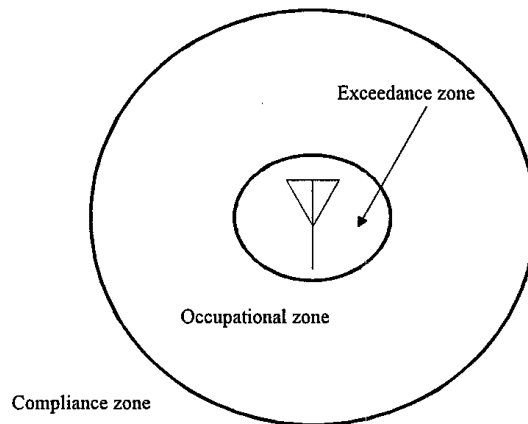


Figure 1 Zoning of electromagnetic radiation levels

10.3 Simple calculation formula of the minimum distance from the antenna of the radiocommunication station to the exposed person within the exposure limits for the occupational exposure group and the general public group can be shown in **Table 1** and **Table 2** respectively.

However, such calculation formula is based on the electromagnetic radiation model of the far-field region. The scope of the far-field region is set by the higher value between 3λ or $2D^2/\lambda$ (D is the maximum size of the antenna and λ is the wave length). Therefore, if the result from the calculation is less than the scope of the far-field region, the entrepreneurs must calculate the electromagnetic radiation level using other models that can reflect more realistically. The radiation level may directly be measured while the radiocommunication equipment is in operation and where the general public or occupational groups have access to the antenna area or the area around the station, with the minimum distance as obtained from the calculation (based on the observation point of 1.5 meters in height which represents human head level as shown in Figure 2).

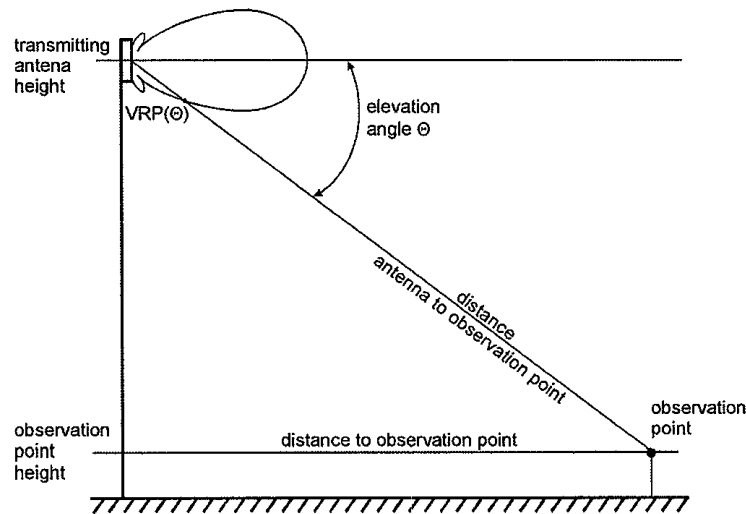


Figure 2 Distance for calculation of electromagnetic radiation at ground level

Table 1 Calculation of the minimum distance from the antenna of the radiocommunication station to the observation point at the radiation levels within the exposure limits for the occupational exposure group:

Frequency range	Minimum distance for occupational exposure group	
	Calculated from e.i.r.p	Calculated from e.r.p
9 kHz – 1 MHz	N/A	N/A
1 MHz to 10 MHz	$r = 0.0144 \times f \times \sqrt{\text{eirp}}$	$r = 0.0184 \times f \times \sqrt{\text{erp}}$
10 MHz to 400 MHz	$r = 0.143 \sqrt{\text{eirp}}$	$r = 0.184 \sqrt{\text{erp}}$
400 MHz to 2 GHz	$r = 2.92 \sqrt{\text{eirp} / f}$	$r = 3.74 \sqrt{\text{erp} / f}$
2 GHz to 300 GHz	$r = 0.0638 \sqrt{\text{eirp}}$	$r = 0.0819 \sqrt{\text{erp}}$

r = minimum distance from the antenna to the observation point, measured in meter

f = frequency, measured in MHz

e.r.p = effective radiated power in the maximum extension direction of the antenna, measured in Watt

e.i.r.p = equivalent isotropically radiated power in the maximum extension direction of the antenna, measured in Watt

Table 2 Calculation of the minimum distance from the antenna of the radiocommunication station to the observation point at the radiation levels within the exposure limits for the general public exposure group:

Frequency range	Minimum distance for general public exposure group	
	Calculated from e.i.r.p	Calculated from e.r.p
9 kHz – 1 MHz	N/A	N/A
1 MHz to 10 MHz	$r = 0.10 \sqrt{\text{eirp} \times f}$	$r = 0.129 \sqrt{\text{erp} \times f}$
10 MHz to 400 MHz	$r = 0.319 \sqrt{\text{eirp}}$	$r = 0.409 \sqrt{\text{erp}}$
400 MHz to 2 GHz	$r = 6.38 \sqrt{\text{eirp} / f}$	$r = 8.16 \sqrt{\text{erp} / f}$
2 GHz to 300 GHz	$r = 0.143 \sqrt{\text{eirp}}$	$r = 0.184 \sqrt{\text{erp}}$

r = minimum distance from the antenna to the observation point, measured in meter

f = frequency, measured in MHz

e.r.p = effective radiated power in the maximum extension direction of the antenna, measured in Watt

e.i.r.p = equivalent isotropically radiated power in the maximum extension direction of the antenna, measured in Watt

Section 11. Assessment of electromagnetic field strength:

11.1 Electromagnetic field strength can be assessed either by theoretical analysis of the radiocommunication station in term of technical characteristics or by directly measuring the electromagnetic field strength when the equipment is in operation and used with the antenna as mentioned in 10.3.

11.2 The assessment of the electromagnetic field strength must be conducted by the entrepreneurs granted permission to set up such station with the signing of certification by the authority in charge. In this regard, the Commission may order the assessment of the electromagnetic field strength through direct measurement thereof in the station area where the effects are expected. The procedure of such assessment shall be conducted by the entrepreneurs in collaboration with the Office and other agencies with expertise in the analysis and measurement of the electromagnetic radiation as approved by the Commission.

11.3 The methodology of the assessment of the electromagnetic field strength shall be based on the standards stated in Section 6 of the Safety Standard or any equivalent standards thereof. However, the Commission may consider granting permission for the use of other assessment methods not specified in the Safety Standard or any equivalent standards thereof as deemed necessary and appropriate.

Section 12. Compliance declaration for radiocommunication stations to be newly established:

12.1 The entrepreneurs shall prepare and submit a report on the assessment of the electromagnetic radiation levels of the station to the Office to support the latter's consideration and approval of the establishment thereof.

12.2 After the preparation of the report stated in 12.1 and submission to the Office, if there are any technical changes of the station that may affect the electromagnetic radiation level, the entrepreneurs shall report the specifications of such station to the Office within one month from the date of such technical changes.

12.3 In case the analytical data or data on the radiation assessment of any station indicate that electromagnetic radiation of radiocommunication stations may trigger radiation exposure risk to the general public or occupational exposure groups, the entrepreneurs shall set up warning board in the electromagnetic radiation exposure areas (exceedance zone or occupational zone) or take practical measures to reduce the

impacts as considered appropriate for each case. This is aimed at preventing easy access to the respective areas or to enable those who are affected to have proper preparation and prevention.

12.4 The entrepreneurs shall keep the documents on the assessment of the electromagnetic field strength as evidence of their compliance with the regulations after the establishment of the station. This includes setting up of a signboard in the station area showing the logo or trade mark of the entrepreneurs as well as telephone number of contact persons.

12.5 To ensure the public safety, the entrepreneurs are duty-bound to enhance understanding of the residents in the station site and nearby areas so as to build up confidence in the safety and prevent any possible public concerns, particularly in case of the areas close to the site with electromagnetic exposure risk, such as healthcare premises, schools, and childcare centers. In this regard, the Commission may demand the evidence of the entrepreneurs' development of understanding with the local community, if necessary.

Section 13. Compliance declaration for the existing radiocommunication stations:

13.1 The entrepreneurs granted permission to establish radiocommunication stations shall prepare and submit a report on the compliance with the standards related to the electromagnetic radiation levels of the stations under responsibility to the Office for use as reference.

13.2 After the preparation of the report stated in 13.1 and submission to the Office, if there are any technical changes of the station that may affect the electromagnetic radiation level, the entrepreneurs shall report the specifications of such station to the Office within one month from the date of such technical changes.

13.3 In case the analytical data or data on the radiation assessment of any station indicate that electromagnetic radiation of radiocommunication stations may trigger radiation exposure risk to the general public or occupational exposure groups, the entrepreneurs shall set up warning board in the electromagnetic radiation exposure areas (exceedance zone or occupational zone) or take practical measures to reduce the impacts as considered appropriate for each case. This is aimed at preventing easy access to the respective areas or to enable those who are affected to have proper preparation and prevention.

13.4 The entrepreneurs shall keep the documents on the assessment of the electromagnetic field strength as evidence of their compliance with the regulations after the establishment of the station. This includes setting up of a signboard in the station area showing the logo or trade mark of the entrepreneurs as well as telephone number of contact persons.

Chapter 5

Monitoring and Supervision

Section 14. The Office shall institute safety monitoring/surveillance scheme for electromagnetic waves of radiocommunication equipment on human health after distribution of the equipment or establishment of the stations. One or several methods may be applicable, the difference among which hinges on the type of radiocommunication equipment, as follows:

14.1 Examination of the entrepreneurs' evidence documents on the conformity with the Safety Standard.

14.2 Inspection of the distribution locations, taking into account the statement indicating the conformity with the Safety Standard.

14.3 Assessment and measurement of electromagnetic radiation levels of radiocommunication equipment or stations at the operation sites.

14.4 Acceptance of complaints of other users or other entrepreneurs on the non-conformity with the Safety Standard.

Section 15. Where it is found that there is a violation to or non-compliance with the criteria provided herein, the Secretary General shall take the following actions as considered appropriate and commensurate with the nature of the violation or offence:

15.1 Send a written warning;

15.2 Order a remedy, improvement or suspension of the distribution or the use of the radiocommunication equipment that fail to meet the Safety Standard;

15.3 Take penal action through demanding a fine from or filing lawsuit against the offender.

Chapter 6
Provisional Clause

Section 16. To enable the entrepreneurs and related parties to adjust themselves and prepare for the compliance with the safety criteria and standards stated herein, the transitional periods are specified as follows:

16.1 A 1-year period after the effective date of the Safety Standard for radiocommunication equipment Category 1 and Category 2;

16.2 A 1-year period after the effective date of the Safety Standard for radiocommunication equipment Category 3 in case of the stations to be newly established; and

16.3 A 2-year period after the effective date of the Safety Standard for radiocommunication equipment Category 3 in case of the existing stations.

Section 17. If necessary, the Commission may require immediate compliance with the criteria stated herein by the owners or the persons in possession of the equipment or stations of certain nature or type.

Section 18. In case of any dispute over the conformity with this Notification, the Secretary General shall propose the issue for the judgment by the Commission. The judgment passed by the Commission shall be deemed final.

Announced on the 29th day of March B.E. 2550 (2007)

General Choochart Promphrasid

Chairman of the National Telecommunications Commission

Annex A

Samples of Radiocommunication Equipment Categories

Category 1: Radiocommunication equipment, of which the electromagnetic radiation component is, in normal use, positioned close to the user's head, or less than 20 centimeters from the body of the user.

Samples:

- GSM900/GSM1800/GSM1900 mobile phones
- CDMA mobile phones

Category 2: Radiocommunication equipment, of which the electromagnetic radiation component is, in normal use, at least 20 centimeters from the human body.

Samples:

- RFID device with over 100 MW transmitting output power
- Car radar device with over 100 MW transmitting output power
- Radiocommunication equipment used in some types of mobile/fixed activities
- On-site paging device

Category 3: Radiocommunication equipment in fixed location and with broad area of electromagnetic radiation.

Samples:

- Base stations of all mobile phone systems
- Base stations or fixed stations for land mobile services
- Hub station of digital trunked radio system
- Hub station of amateur radio

