
Radio Spectrum Guidelines

Fixed Links Radio Stations

June 2021

Document History

| Release | Date |
|--------------|-----------|
| 1.0 (Active) | June 2021 |

1 Scope

This document provides the regulatory guidelines and technical limitations for using Fixed Links Radio Stations.

The term "Fixed links" is the terminology for the radio equipment capable of providing communication service between specified fixed locations. It includes point-to-point and point-to-multipoint radiocommunication systems that are used for the transmission of voice, video and data.

Fixed links are generally used to provide network infrastructure and customer access applications across a wide range of frequency bands, ranging from 4 to 86 GHz. Fixed links mainly use digital radiocommunication technologies, directional antennas and typically operate at very high levels of propagation availability. These links are normally assigned individual frequencies by NTRA and are licensed on a link by link basis.

Fixed radio links are often the preferred solution where there are constraints to implement wired solutions such as cost, local topography (e.g. mountainous terrain or paths across water) and the need for access to remote rural regions are fundamental considerations.

2 Definitions

The terms, words and expressions used in this document have the defined meaning clarified in the Telecommunications Regulatory Law No. (10) of 2003. In addition, this document provides terms and phrases that are defined as follows:

The State: The Arab Republic of Egypt, including its geographical borders, territorial waters and airspace.

NTRA: National authority regulating the telecommunication sector established pursuant to the provisions of the Egyptian telecommunication law no. 10 of 2003.

Radio: A general term applied to the use of radio waves.

Applicant: Any person who can apply for a frequency license in accordance with the Telecom Law No. (10) of 2003.

Station: One or more radiocommunication transmitters or receivers or a combination of transmitters and receivers, including the accessory equipment.

Harmful interference: The effect of unwanted energy due to one or a combination of emissions, radiations, or inductions upon reception in a radiocommunication system, manifested by any performance degradation, misinterpretation, or loss of information by another radio device which could be extracted in the absence of such unwanted energy.

Assignment (of a radio frequency or radio frequency channel): Authorization granted by NTRA to an applicant to use radio station or to use a radio frequency or radio frequency channel under specified conditions.

Secondary Basis: Means that radio station shall not cause harmful interference to stations of Primary stations and cannot claim protection from harmful interference from Primary stations.

Point-to-point (PTP): Communication provided by single connection between two stations located at specified fixed points.

Point-to-multipoint (PMP): Communication between a series of transceivers through a central transceiver.

ETSI: The European Telecommunications Standards Institute that produces European standards for Information and Communications Technologies (ICT).

TPC: Technique in which the transmitter output power is controlled, to reduce the aggregate power from a large number of devices to improve the spectrum sharing conditions by reducing interference to other systems.

DFS: Functionality to detect transmissions from other systems and to avoid co-channel operation with these systems, notably radar systems.

CCDP: Co-channel dual-polarization transmission to provide two parallel communication channels over the same link with orthogonal polarizations.

XPIC: Cross polarization interference cancellation.

3 Legal Considerations

3.1 The guidelines contained in this document are issued by NTRA according to articles of the Telecommunications Regulatory law No. (10) of 2003 and subsequent ministerial decisions.

3.2 NTRA has the right to modify any of the guidelines contained in this document.

4 Scope of Implementation

The guidelines contained in this document:

4.1 indicate the regulatory measures and technical conditions for licensing Fixed Links Radio systems in the Arab Republic of Egypt;

4.2 are meant be implemented in conjunction with other guidelines issued by NTRA for the use of the frequency spectrum, including:

4.2.1 National Frequency Allocations Table,

4.2.2 Other Radio Spectrum guidelines;

5 Eligibility Criteria

5.1 Eligible users who may apply for a Fixed link frequency usage license are:

5.1.1 Telecom operators. (mobile network infrastructure, fixed/mobile network backbone links)

5.1.2 Corporate users. (private data networks, connection of remote premises, etc.)

5.1.3 Private users. (customer access to PSTN or other networks)

5.2 Each application is considered on its merits and requirements such as e.g. security, safety, quality of service and capacity etc.

5.3 The application for Fixed link frequency usage license can be made for the following deployment types:

5.3.1 Point-to-point (PTP) links.

5.3.2 Point-to-multipoint (PMP) links.

6 Spectrum Requirements

6.1 Radio Regulations and relevant ITU-R Recommendations.

6.2 To avoid congestion in the lower bands, applicants shall use, where possible, the higher frequency bands. Only where the required hop length and availability cannot be achieved in the higher frequency bands the lower frequency bands shall be considered.

6.3 Frequency range selection for Fixed links radio stations depends on:

6.3.1 Technical criteria: link length, required bandwidth, capacity, reliability, link budget, minimum modulation, ATPC.

6.3.2 Economic criteria: fees, availability and cost of equipment, antenna size, maintenance.

6.4 The following table lists the designated frequency bands for deploying Fixed links radio systems:

| Frequency Band | Deployment type | Channeling plan Reference | |
|-------------------|----------------------------|---------------------------|--------------|
| 1350 – 1400 MHz | PTP | ITU-R F.1242 | |
| 1427 – 1530 MHz | | | |
| 2290 – 2300 MHz | | | |
| 2300 – 2500 MHz | | | |
| 3400 – 3800 MHz | | | |
| 3800 – 4200 MHz | | | |
| 4400 – 5000 MHz | | | |
| 5725 – 5850 MHz | PTP/PMP on Secondary basis | ETSI EN 302 502 | |
| 5925 – 6425 MHz | PTP | ITU-R F.383 | |
| 6425 – 7110 MHz | | ITU-R F.384 | |
| 7110 – 7725 MHz | | ITU-R F.385 | |
| 7725 – 8500 MHz | | ITU-R F.386 | |
| 10 – 10.68 GHz | | ITU-R F.747 | |
| 10.7 – 11.7 GHz | | ITU-R F.387 | |
| 11.7 – 12.75 GHz | | ITU-R F.746 | |
| 12.75 – 13.25 GHz | | ITU-R F.497 | |
| 14.4 – 15.35 GHz | | ITU-R F.636 | |
| 17.7 – 19.7 GHz | | ITU-R F.595 | |
| 21.2 – 23.6 GHz | ITU-R F.637 | | |
| 24.45 – 25.25 GHz | PTP/PMP | ITU-R F.748 | |
| 25.25 – 27.5 GHz | | | |
| 27.5 – 29.5 GHz | PTP | ITU-R F.746 | |
| 31 – 31.3 GHz | | | |
| 31.8 – 33.4 GHz | | | ITU-R F.1520 |
| 36 – 40.5 GHz | | | ITU-R F.749 |
| 40.5 – 43.5 GHz | | | ITU-R F.2005 |
| 71 – 76 GHz | | | ITU-R F.2006 |
| 81 – 86 GHz | | | |

7 Technical Conditions

7.1 Only directive antennas shall be allowed for point-to-point links.

7.2 For Fixed systems operating in the frequency band 5725 – 5850 MHz:

- 7.2.1 The radiated power E.I.R.P. shall be determined on the basis of the minimum power required with respect to the link budget calculations not exceeding 36 dBm (including the antenna gain).
- 7.2.2 The TPC and DFS are mandatory and shall be activated on the radio equipment.
- 7.2.3 The allowed channel bandwidth is 10 or 20 MHz.

8 Additional Considerations

- 8.1 NTRA encourages applicants to deploy of systems that make efficient use of the radio The operational EIRP will be determined on the basis of the minimum power required to meet the propagation availability validated by NTRA and will be specified as an authorization condition.
- 8.2 Space diversity (including the use of advanced antenna systems such as MIMO) will be considered as same link. Frequency diversity is considered as multiple links.
- 8.3 NTRA encourages applicants to install high profile radio devices supporting new radiocommunication technologies e.g. higher order modulation schemes, adaptive modulation and the use of system features like CCDP with XPIC or use of advanced antenna systems (MIMO etc.) to improve spectral efficiency.
- 8.4 For point-to-point links, NTRA encourages applicants to use radio systems, including antennas, that comply with the appropriate specifications set out in ETSI EN 302 217 Series “Fixed Radio Systems - Characteristics and requirements for point-to-point equipment and antennas”. The equipment compliant with ETSI spectral efficiency class 4 or above are also recommended.
- 8.5 For point-to-multipoint systems, NTRA encourages the use of systems, including antennas, that comply with the appropriate specifications set out in ETSI EN 302 306 series “Fixed Radio Systems - Multipoint Equipment and Antennas”.

9 Frequency Assignment Application process

- 9.1 For licensing Fixed links radio devices, the applicant has to submit a complete request through NTRA [E-services](#) portal providing all the required technical information (e.g. site coordinates, antenna data and height, equipment data like modulation, transmit output power, datasheet for the hardware...etc).

9.2 For Fixed systems applications in the frequency band 5725 – 5850 MHz, Link budget calculation for the requested link shall be submitted to NTRA for verification.

To ensure the efficient usage of frequency, frequency diversity is generally not preferred, applicant shall provide technical justification with the application for allowing the use of frequency diversity.