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# Radio Spectrum Guidelines

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## Aeronautical Radio Systems

June 2021

## Document History

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

## 1 Scope

This document provides the regulatory guidelines and technical limitations for using Aeronautical Radio Systems.

Aeronautical radio communication involves the communication between aeronautical stations and aircraft stations, or between aircraft stations relating to safety and regularity of flight, primarily along national or international civil air routes. Due to the safety critical nature of this type of communication the frequency bands are internationally agreed and set out in the Radio Regulations, which are agreed at the World Radio Conferences of the International Telecommunication Union (ITU).

## 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.

**Egyptian Civil Aviation Authority (ECAA):** The Civil Aviation Authority of Egypt.

**ITU:** The International Telecommunication Union, a leading United Nations agency for information and communication technologies.

**Radio Regulations (RR):** A publication issued by the ITU, adopted by the World Radiocommunication Conference and ratified by Egypt.

**International Civil Aviation Organization (ICAO):** The United Nations specialized agency for civil aviation.

**Annex 10 to the Convention on International Civil Aviation:** ICAO publication consisting of five volumes containing the Standards and Recommended Practices (SARPs), Procedures for Air Navigation Services (PANS) and guidance material on aeronautical communication, navigation and surveillance systems.

**Mobile Satellite Service:** A radiocommunication service between mobile earth stations and one or more space stations, or between space stations used by this service; or between mobile earth stations by means of one or more space stations.

**Aeronautical Mobile Service:** A mobile service between aeronautical stations and aircraft stations, or between aircraft stations, in which survival craft stations may participate: emergency, position-indicating radio beacon stations may also participate in this service on designated distress and emergency frequencies.

**Aeronautical Mobile Satellite Service:** A mobile satellite service in which mobile earth stations are located on board aircraft.

**Aeronautical Mobile (R) Service:** An aeronautical mobile service reserved for communications relating to safety and regularity of flight primarily along national or international civil air routes.

**Meteorological Aids Service:** A radiocommunication service used for meteorological, including hydrological, observations and exploration

**Radiolocation Service:** A radiodetermination service (like Radar) that uses radio signals to detect and locate distant objects like aircraft.

**Aeronautical Radionavigation Service:** A radio navigation service intended for the benefit and for the safe operation of aircraft.

**Aeronautical Radionavigation Satellite Service:** A radio navigation service intended for the benefit and for the safe operation of aircraft using satellites

**Station:** One or more transmitters or receivers or a combination of transmitters and receivers, including the accessory equipment, necessary at one location for carrying on a radiocommunication service.

**Earth Station:** A station located either on the Earth's surface or within the major portion of the Earth's atmosphere and is intended for communication with one or more space stations, or with one or more stations of the same kind by means of one or more reflecting satellites or other objects in space.

**Aeronautical Radio Systems:** All radio equipment on an aircraft necessary for communication, navigation and surveillance purposes.

**Airborne Collision Avoidance System (ACAS):** Airborne Collision Avoidance System as specified in Vol 5, ICAO Annex 10.

**Aircraft Radio License (License):** A license given by NTRA to permit the operation of all radio equipment on the aircraft necessary for communication, navigation and surveillance purposes.

**Airport Surface Detection Equipment (ASDE):** Equipment used to detect aircraft and vehicles on the surface of an airport. It is used by air traffic controllers to supplement visual observations.

**ATC:** Air Traffic Control.

**Automatic Dependent Surveillance – Broadcast (ADS-B):** A surveillance technology in which an aircraft determines its position via satellite navigation and periodically broadcasts it, enabling it to be tracked.

**CNS:** Communication, Navigation and Surveillance.

**Distance Measuring Equipment (DME):** A transponder-based radio navigation technology that measures slant range distance by timing the propagation delay of VHF or UHF radio signals, as specified in Vol 1 ICAO Annex 10.

**Emergency Locator Transmitter (ELT):** A radio device fitted on aircraft to send alert signal to search and rescue centers via satellite.

**Emergency Position- Indicating Radio Beacon (EPIRB):** Station in the maritime mobile service, the emission of which is intended to facilitate search and rescue operations.

**Global Navigation Satellite System (GNSS):** Satellite navigation system that provides autonomous geo-spatial positioning with global coverage (i.e. Global Positioning System (GPS, GLONASS, Compass, Galileo).

**Ground Based Augmentation System (GBAS):** An all-weather aircraft landing system based on real-time differential correction of the GPS signal, as specified in Vol 1, ICAO Annex 10.

**High Frequency Data Link (HFDL):** A communication system in HF band used to exchange data such as Aeronautical Operational Control (AOC) messages, Controller Pilot Data Link Communications (CPDLC) messages and Automatic Dependent Surveillance (ADS) messages between aircraft end-systems and corresponding ground-based HFDL ground stations.

**Instrument Landing System (ILS):** A radio navigation system which provides aircraft with horizontal and vertical guidance just before and during landing and, at certain fixed points indicates the distance to the reference point of landing.

**ILS-Glide Path:** A system for vertical guidance embodied in the instrument landing system which indicates the vertical deviation of the aircraft from its optimum path of descent.

**ILS-Localizer:** A system for horizontal guidance embodied in the instrument landing system which indicates the horizontal deviation of the aircraft from its optimum path of descent along the axis of the runway.

**Marker Beacon:** A transmitter in the aeronautical radio navigation service which radiate vertically a distinctive pattern for providing position information to aircraft.

**MID FASID:** The ICAO Middle East office (MID) Facilities And Services Implementation Document (FASID).

**Mobile Communication on-board aircraft:** Radio systems installed on aircraft delivering end-user wireless connections to public mobile networks.

**Non-Directional Beacon (NDB):** A transmitter in the aeronautical radio navigation service which radiates a distinctive pattern for providing position information to aircraft.

**Primary Radar:** A radio determination system based on the comparison of reference signal with radio signal reflected from the position to be detected.

**Radar:** Radio Detection and Ranging.

**Search and Rescue (SAR):** The activities of the search for and provision of aid to people who are in distress or imminent danger.

**Secondary Radar:** A radio determination system based on the comparison of reference signal with radio signal retransmitted from the position to be determined.

**Secondary Surveillance Radar (SSR):** A radar system used in Air Traffic Control (ATC), that not only detects and measures the position of aircraft i.e. range and bearing, but also requests additional information from the aircraft itself such as its identity and altitude. This is specified in Vol 4, ICAO Annex 10.

**Selective Calling (SELCAL):** A signaling method which can alert an individual aircraft that a ground station wishes to communicate with it, specified in Vol 3 Part 2, ICAO Annex 10.

**Universal Access Transceiver (UAT):** Equipment broadcasts positioning and performance data from an aircraft while receiving air traffic, weather, and other critical information from ground stations. Specified in Vol 3 Part 1, ICAO Annex 10.

**VHF Data Link (VDL):** A communication system in Very High Frequency (VHF) band for transmitting information between aircraft and ground stations or other aircraft, as specified Vol 3, ICAO Annex 10.

**VHF Omni directional Ranging (VOR):** Short-range radio navigation system for aircraft, enabling aircraft with a receiving unit to determine their position and stay on course by receiving radio signals transmitted by a network of fixed ground radio beacons as specified in Vol 1 ICAO Annex 10.

## 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 operating Aeronautical 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 Usage of Aeronautical radio systems

Aeronautical Radio Systems (not limited to the following):

- 5.1 Aeronautical Mobile Service (Ground-to-Air / Air-to-Ground)
- 5.2 Aeronautical Mobile Service (Air-to-Air)
- 5.3 Aeronautical Radionavigation Service (Navigational Aids)
- 5.4 Aeronautical Radionavigation Satellite Service (e.g. GNSS)
- 5.5 Radiolocation Service (e.g. Primary Radar, Secondary Radar, Surface Movement Radar).
- 5.6 Radionavigation Service (e.g. Radio Altimeter).
- 5.7 Meteorological Aids Service (e.g. Wind Profiler Radar).
- 5.8 For Land Mobile (Ground-to-Ground) applications on the airport or airfield, NTRA guidelines for Private Mobile Radio shall apply.

## 6 Spectrum usage and regulatory requirements

The following table summarizes the designated frequency bands for Aeronautical radio systems, their use and usage conditions:

| Frequency Range    | Usage   | Regulatory requirement  |
|--------------------|---|---|
| 325 – 405 kHz      | Aeronautical NDBs                                   | Chapter 3.4, Vol 1, ICAO Annex 10   |
| 3023 kHz, 5680 kHz | Search and Rescue ( <b>SAR</b> )                    | Chapter 2.2 Vol 5, ICAO Annex 10  |
| 3400 – 3500 kHz    | Aeronautical Mobile (R) Voice and Data applications | RR Appendix 27<br><b>Voice:</b> Chapter 2.4, Vol 3 Part 2, ICAO Annex 10<br><b>HFDL:</b> Chapter 3, Vol 3 Part 1, ICAO Annex 10 |
| 4650 – 4700 kHz    | Aeronautical Mobile (R) Voice and Data applications | RR Appendix 27<br><b>Voice:</b> Chapter 2.4, Vol 3 Part 2, ICAO Annex 10<br><b>HFDL:</b> Chapter 3, Vol 3 Part 1, ICAO Annex 10 |



| Frequency Range   | Usage   | Regulatory requirement  |
|-------------------|---|---|
| 5480 – 5680 kHz   | Aeronautical Mobile (R) Voice and Data applications | RR Appendix 27<br><b>Voice:</b> Chapter 2.4, Vol 3 Part 2, ICAO Annex 10<br><b>HFDL:</b> Chapter 3, Vol 3 Part 1, ICAO Annex 10 |
| 6525 – 6685 kHz   | Aeronautical Mobile (R) Voice and Data applications | RR Appendix 27<br><b>Voice:</b> Chapter 2.4, Vol 3 Part 2, ICAO Annex 10<br><b>HFDL:</b> Chapter 3, Vol 3 Part 1, ICAO Annex 10 |
| 8815 – 8965 kHz   | Aeronautical Mobile (R) Voice and Data applications | RR Appendix 27<br><b>Voice:</b> Chapter 2.4, Vol 3 Part 2, ICAO Annex 10<br><b>HFDL:</b> Chapter 3, Vol 3 Part 1, ICAO Annex 10 |
| 10005 – 10100 kHz | Aeronautical Mobile (R) Voice and Data applications | RR Appendix 27<br><b>Voice:</b> Chapter 2.4, Vol 3 Part 2, ICAO Annex 10<br><b>HFDL:</b> Chapter 3, Vol 3 Part 1, ICAO Annex 10 |
| 11275 – 11400 kHz | Aeronautical Mobile (R) Voice and Data applications | RR Appendix 27<br><b>Voice:</b> Chapter 2.4, Vol 3 Part 2, ICAO Annex 10<br><b>HFDL:</b> Chapter 3, Vol 3 Part 1, ICAO Annex 10 |
| 13260 – 13360 kHz | Aeronautical Mobile (R) Voice and Data applications | RR Appendix 27<br><b>Voice:</b> Chapter 2.4, Vol 3 Part 2, ICAO Annex 10<br><b>HFDL:</b> Chapter 3, Vol 3 Part 1, ICAO Annex 10 |
| 17900 – 17970 kHz | Aeronautical Mobile (R) Voice and Data applications | RR Appendix 27<br><b>Voice:</b> Chapter 2.4, Vol 3 Part 2, ICAO Annex 10<br><b>HFDL:</b> Chapter 3, Vol 3 Part 1, ICAO Annex 10 |
| 74.8 – 75.2 MHz   | ILS/Marker beacons                                  | 75 MHz center frequency<br>Chapter 3.1.7 and 3.6, Vol 1, ICAO Annex 10  |

| Frequency Range   | Usage   | Regulatory requirement  |
|-------------------|---|---|
| 108 – 117.975 MHz | VOR<br>GBAS<br>ILS-Localizer<br>VDL mode 4  | <b>VOR:</b> 108 - 117.975 MHz, Chapter 3.3, Vol 1, ICAO Annex 10<br><b>GBAS:</b> 108-117.975 MHz, Chapter 3.7, Vol 1, ICAO Annex 10<br><b>ILS-Localizer:</b> 108 - 112 MHz, Chapter 3.3, Vol 1, ICAO Annex 10<br><b>VDL:</b> 112–117.975 MHz, Chapter 6, Vol 3, ICAO Annex 10 |
| 117.975 – 137 MHz | Aeronautical Mobile (R)   | Table 2, MID FASID App B (CNS)<br>Chapter 4, Vol 5, ICAO Annex 10<br><b>Voice:</b> Chapter 2.1–2.3 Vol 3, Part 2, ICAO Annex 10<br><b>VDL:</b> Chapter 6, Vol 3 Part 1, ICAO Annex 10   |
|                   | <b>121.5 MHz</b> Emergency use  | Chapter 5, Vol 3 Part 2, ICAO Annex 10  |
|                   | <b>123.1 MHz</b> Coordination of SAR Activities                                     | Chapter 5, Vol 3 Part 2, ICAO Annex 10  |
| 243 MHz           | Emergency use   | Chapter 2.1 Vol 5, ICAO Annex 10  |
| 328.6 – 335.4 MHz | ILS glide path  | Chapter 3.1, Vol 1 ICAO Annex 10  |
| 406 – 406.1 MHz   | ELT (Search and Rescue)   | Chapter 5, and Appendix 1 to Chapter 5, Vol 3 Part 2 ICAO Annex 10  |
| 960 – 1215 MHz    | DME<br>UAT<br>SSR<br>ACAS<br>GNSS<br>ADS-B  | <b>DME:</b> Chapter 3.5, Vol 1 ICAO Annex 10<br><b>UAT:</b> Chapter 12, Vol 3 Part 1, ICAO Annex 10<br><b>SSR:</b> Chapter 3 and 4, Vol 4, ICAO Annex 10  |
|                   | <b>1087.7 - 1092.3 MHz</b> ADS-B  | <b>ACAS:</b> Chapter 4, Vol 5, ICAO Annex 10  |
|                   | <b>1030 MHz</b> SSR ground to air Interrogation                                     | <b>GNSS:</b><br>Chapter 4.2 Vol 1, ICAO Annex 10  |
|                   | <b>1090 MHz</b> SSR air to ground reply   | <b>ADS-B:</b> Chapter 5 Vol 4 ICAO Annex10  |
| 2700 – 2900 MHz   | Primary Surveillance Radar (PSR)  | Chapter 3.2.4 Vol1, ICAO Annex 10<br>ITU-R SM.329, ITU-R SM.1541  |
| 9000 – 9500 MHz   | Precision Approach Radar (ASDE)<br>Surface Movement Radar<br>Airborne Weather Radar | ITU-R SM.329, ITU-R SM.1541   |

## 7 Priority of communications

7.1 The order of priority for communications (RR Article 44) shall be:

- (1) Distress calls, distress messages and distress traffic.
- (2) Communications preceded by the urgency signal.

7.2 The next priority of communications shall be in the following order:

- (3) Communications relating to radio direction finding.
- (4) Flight safety messages.
- (5) Meteorological messages.
- (6) Flight regularity messages.
- (7) Messages relating to the application of the United Nations Charter.
- (8) Government messages for which priority has been requested.
- (9) Service communications.
- (10) Other aeronautical communications.

## 8 Application process for licensing of aeronautical radio devices

For aeronautical radio devices operating on the frequency band 117.975 – 137 MHz, specific channels could be assigned in accordance section 6 of this document. For licensing aeronautical radio devices, the applicant has to submit a complete request through NTRA [E-services](#) portal.