ADVISORY

CIRCULAR

NIGERIA CIVIL AVIATION AUTHORITY

AC: NCAA-AC-ANS(AET)003
JANUARY 2026

ADVISORY CIRCULAR ON AERONAUTICAL RADIO FREQUENCY UTILIZATION

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Approved by:

Capt. Chris O. Najomo
Director General of Civil Aviation

NIGERIA CIVIL AVIATION AUTHORITY
(NCAA)

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1.0 PURPOSE

This Advisory Circular (AC) is to provide guidance to Air Navigation Service Providers to be aware of the requirements for utilization of aeronautical frequency. This is to ensure proper coordination and reduction of radio frequency interference of aeronautical telecommunication facilities in Nigeria. It is also to provide information on Codes, Address Assignments including:

- AFTN Addressing
- Identification Codes

CHAPTER ONE

REFERENCED REGULATORY PROVISIONS

1.1 REFERENCE

The following is a list of references to which the information in this advisory circular is
anchored.
1.2 Paragraph 40:2(h) of Nigerian Civil Aviation Act 2022
1.3 Nig. CARs 14.7.5.
1.4 CL:AC-ANS (AET)
1.5 FORM: AC-ANS (AET) 003

1.6 Regulatory requirement

1.6.1 Paragraph 30:3(k) states as a requirement that the Nigerian civil Aviation Authority shall certify/grant licences in respect of Aerodromes certify airways, navigation s and landing aids in Nigeria to ensure safety of Air navigation.

1.6.2 Paragraph 30(2)g provides that the Authority may by regulation make such provisions as expedient for minimizing or preventing interference with the use or effectiveness of apparatus used in connection with air navigation, and for prohibiting and regulating the use of such apparatus and the display of signs and lights liable to endanger aircraft

CHAPTER TWO

GENERAL INFORMATION

2.0 GENERAL

2.1 Nigeria Civil Aviation Authority Advisory Circulars contain information about standards, Practices and procedures that the Authority has found to be an Acceptable Means of Compliance (AMC) with the associated regulations and corresponding ICAO annexes
An AMC is not intended to be the only means of compliance with regulations. Considerations will be given to other methods of compliance that may be related to circulars; equipment certification procedure and MEL. When new standards, practices or procedures are found to be acceptable they will be added to the appropriate Advisory Circular.

2.2 An Advisory Circular may also include **guidance material (GM)** to facilitate compliance with regulatory requirements. Guidance material must not be regarded as an acceptable means of compliance.

2.3 The advisory Circular provides:

- Methods acceptable to Nigeria Civil Aviation Authority for showing compliance with the certification requirements of Part 14 on Nigerian CAR to provide and operate aeronautical telecommunication services and facilities to support air traffic services and air navigation:
- Methods acceptable to Nigeria Civil Aviation Authority for the provision and operation of aeronautical telecommunication services and facilities under Regulation 14.7.1
- Methods acceptable to Nigeria Civil Aviation Authority for assignment of 14.7.1

I. ICAO three-Letter and Radio telephony designator
II. AFTN Addressing
III. Identification Codes under Regulation 14.7.1

This document is thus aimed at providing procedure, utilization and criteria for Aeronautical Telecommunication Radio frequency assignment to equipment intended for installation, operation and deployment in the Nigerian Airspace and Aerodromes and assignments of ICAO three-Letter and Radio telephony designator, AFTN Address and Identification Codes

CHAPTER THREE

AERONAUTICAL RADIO FREQUENCY MANAGEMENT

3.0 SPECTRUM CLASSIFICATION

- ULF-Ultra Low Frequency: 30HZ to 300HZ
- VLF-Very Low Frequency: 3KHZ to 30KHZ
- LF-Low frequency: 30KHZ to 300KHZ
- MF-Medium Frequency: 300KHZ to 3MHZ
- HF-High Frequency: 3.0 MHZ to 30MHZ
- VHF-Very High Frequency: 30MHZ to 300MHZ
- UHF-Ultra High Frequency: 300MHZ to 3.0GHZ
- MICROWAVE: 3.0GHZ to 30.0GHZ
  EHF-Extra High Frequency: 30GHZ to 300GHZ

3.1 AERONAUTICAL SPECTRUM:
The following are specific aeronautical frequency band and associated services

- The LF/MF **190-1750KHZ** - Radio Navigation Aids- NDB)
- HF (AM(R)S Voice Communication 2.80 MHz to 22.00MHz
- VHF (AM(R)S) Air-to-Ground Communication 117.975 -137.00MHz
- Radio Navigation Aids 108 – 117.975 MHz
- UHF DME 960.00 – 1215MHZ
- 1.0 to 2.0 GHz SSR (L-Band)
- 2-4 GHz PSR.

3.2 NEED TO PROTECT AND GUIDE AERONAUTICAL FREQUENCY SPECTRUM

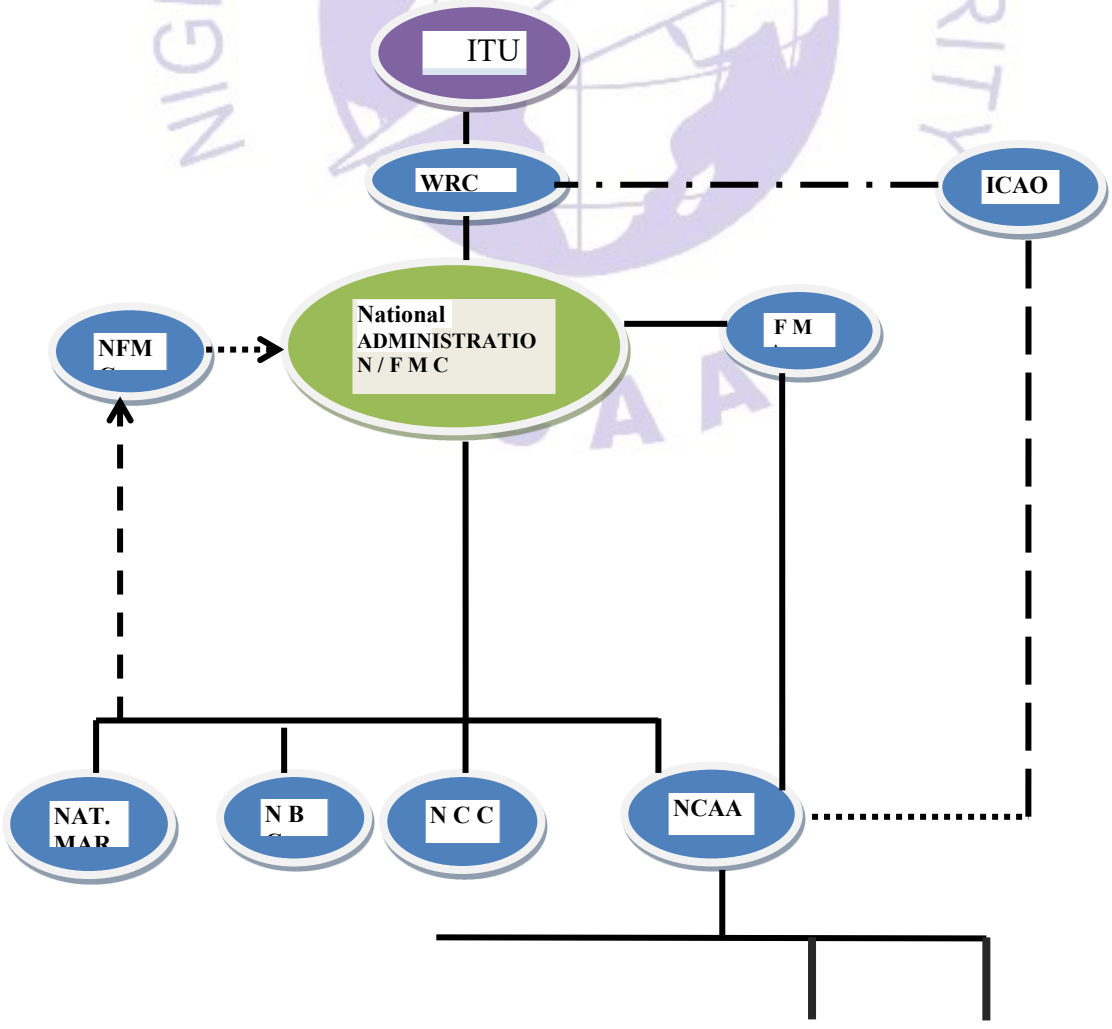
- Radio spectrum is a scarce natural resources with finite capacity for which demand is constantly increasing rapidity.
- Without adequate planning and management radio signals from different users and services would interfere with each other.
- Above a certain level of interference, radio would become useless as a suitable means of communication.
- Effective spectrum management requires regulation at national, regional and global level.

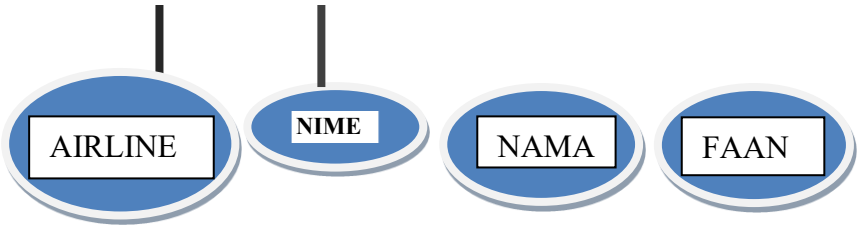
3.3 SPECTRUM MANAGEMENT

- Effective spectrum management requires regulation at national, regional and global level.
- Spectrum management deals with the regulatory measures necessary to ensure the interference-free and efficient co-existence of different radio services.
- International harmonization through ITU (UN agency)
- ITU-Radio Regulations
- World radio conference (WRC)
- Competing natural and commercial interest

- Frequency management deals with the coordination and assignment of frequencies to individual transmitters within a given radio service

3.4 OVERVIEW OF FREQUENCY MANAGEMENT STRUCTURE





ORGANOGRAM AERNAUTICAL SPECTRUM MANAGEMENT

3.4.1. The ITU is a member of United Nations Organisation being recognized as a specialized agency for Telecommunication. ITU is the apex body for spectrum management. Each member state is represented at ITU meetings by State Frequency Administrations**.** In Nigeria, Federal Ministry of Information and Communications stands as spokesman for all other frequency users (Civil Aviation, Military, NCC and National Maritime Agency), in the country

3.4.2 ICAO is recognized as a specialized body and an observer during ITU meeting but provides professional advice for the interest of Civil Aviation safety during ITU Resolutions and WRC.

3.4.3 National Frequency Management Council (NFMC) was established under section 28 0f Nigerian Communication Act No. 19 2003 to assist and advice the Honourable Minister of Information and Communications on national Frequency Management matters and other issues relation to ITU and Radio Spectrum allocations . NFMC manages the allotted frequency bands by the ITU. Federal Ministry of Aviation is a member of the NFMC while NCAA advices the Federal Ministry of Aviation on Aeronautical Frequency utilization and the custodian of Aeronautical frequency spectrum allotment.

3.4.4 The Aeronautical frequency allotment is managed by Nigeria Civil Aviation Authority. Applications for the assignment of a radio frequency shall be made directly to the Director General of Nigerian Civil Aviation Authority. The Federal Ministry of Aviation is a representative of Aeronautical division of the NFMC while Nigeria Civil Aviation Authority NAMA, FAAN, NIME and NAF are members of Aviation Standing Committee of NFMC for which NCAA is an authoritative member The diagram above illustrates the management structure of radio spectrum.

3.4.5 Frequency assignments in the aeronautical radio frequency bands are in accordance with the requirements contained in ICAO Annex 10 vol. V to the Convention on International Civil Aviation, the ITU Radio Regulations.

3.5**.0 TERMINOLOGIES IN SPECTRUM MANAGGEMENT**

3.5.1 Service provider's needs to have knowledge of certain terminologies in Spectrum Management

• In spectrum/frequency management the terms *assignment*, *allotment* and *allocations* are used interchangeably and frequently. These include:

3.5.2. **Allocation** -the entire radio spectrum is divided into blocks or bands of frequencies established for a particular type of service by the process of frequency allocation, under the provisions of ITU-R

3.5.3 **Allotment**
• The subdivisions of allocations into bands designated for a particular service.
• Again, when the Aeronautical telecommunication allotments are subdivided into typical aeronautical services e.g Radio Navigation Aids (VOR, ILS, DME Radar and voice/digital communication.

3.5.4 **Assignment** – Refers to the final subdivision of the spectrum in which a service provider gets an approval or license by an authorized RF administration to operate a radio transmitter on a specific channel or group of channels at a particular location under specific condition or criteria

CHAPTER FOUR

GENERAL REQUIREMENTS

4.0. Minimum Equipment List.

It is always required to enable the authority ascertain the acceptable level and applicability of facilities in ANSPs aerodrome of deployment.

4.1. 0. Equipment requirement

Each Air Navigation Service Provider is required to satisfy a Minimum Air Navigation Facility Equipment List (MAFEL) appropriate to his own aerodrome and procedures within the limitations defined in the Airspace classification before frequency can be assigned after the processing of application forms submitted to NCAA. This is because MANFEL will specify the proposed type of facilities. MANFEL is in advisory circular NCAA- AC-ANS (AET)-002

4.1.2 Requirement for Frequency Assignment

4.1.2.1 Under Nigeria Civil Aviation Regulations Part 14 .7, an aeronautical telecommunication service certificate is a prerequisite to providing an aeronautical

telecommunication service or to operating any facility that supports an air traffic Service or IFR flight.

4.1.2.2 A certificate may be granted to cover one or more facilities that support the Nigerian air
Navigation system. The rule also sets out the conditions for the operation of a facility without an aeronautical telecommunication service certificate. This is intended to cover private facilities operating on an Aeronautical radio frequency that do not support an air transport.

4.2.0 Notification of Facility Information

4.2.1 For radio communication and navigation facilities the specific information required includes:
* the geographic name of the facility.(Aerodrome site Name)
* the type of facility and, where applicable, the type of service supported by the facility.
* the call sign or identification code of the facility see section 9.1.
* the type of emission for each frequency.
* the frequency for ground-to-air and air-to-ground transmissions proposed.
* the hours of operation.
* the latitude and longitude of the transmitting antenna (Geographical Coordinates in WGS-84) for each radio navigation facility to the nearest second decimal point
* the average radius of rated coverage for each facility (Service Volume)
* Details of any known abnormalities or limitations associated with the coverage or navigation
Information of a radio navigation facility.

4.3.0 FURTHER REQUIREMENTS

4.3.1. The application for frequency assignment shall be prepared and submitted with the following:

a. Type of equipment (Communication, Navigation, Surveillance) est.
b. Co-and Adjacent Channel Separation from Aeronautical Telecommunication Radio station in closest Aerodrome
c. Name and address of the manufacturer
d. Purpose e.g. en-route, approach, landing e.t.c
e. Year of manufacture
f. Proposed location (geo coordinates)
g. Proposed transmission power (PEP) of the facility.
h. Information concerning similar facilities in the vicinity including distances from/to the proposed location and also respective frequencies and transmission power
i. Justification for the need
j. Name and address of the manufacturer including telephone numbers.
k. Any additional information that could facilitate the certification process
l. For requests that include ATS applicants is expected to complete (Form: AC-ANS (AET) 003)

4.4.0 Aeronautical Facility Specification For frequency assignment

4.4.1 The procedures required under this information are to ensure that each facility listed as equipment to be deployed meets the applicable operational specifications. The facility performance must conform to the applicable system characteristics and standards prescribed in Nigeria Civil Aviation Regulations Part 14. 7.4

4.4.2 It is expected that procedures will be established to ensure that:
* the engineering design of facilities meets the operational requirements and all applicable Standards :
* facilities are installed in accordance with applicable standards

4.4.4. Documentation

The organization must hold relevant copies of manufacturers' equipment manuals, Nig.CARs 14.7
and any other documentation that may be necessary to ensure that its facilities are installed, maintained and operated so that they will be safe for operational use.

CHAPTER FIVE

FREQUENCY ASSGINMENT TO RADIO STATIONS

5.0 CHANNEL ASSIGNMENT OF AERONAUTICAL RADIO FREQUENCIES

5.1 Nigeria Civil Aviation Authority assigns frequencies in accordance with planning criteria AFI Facility Services and Implementation Development plan from the available communication lists (Com List). This is to ensure fair distribution and minimization of adjacent and co-channel inferences. Procedures, obligations and rules related to harmful interference are in ITU-Radio Regulations chapter four (4) of Radio Regulations

5.2. Frequency plan, Channelization and Planning, criteria for VOR

5.2.1 Planning criteria for VOR, to be applied in the AFI/IO Region are contained in the Air Navigation Plan, Volume II, Part IV, Attachment H (Doc. 7474). These criteria were confirmed at the 7th Africa-Indian Ocean Region Regional Air Navigation Meeting (1997).

These criteria stipulate:

(i) VOR in operation for flight up to FL 500 (using 100 kHz channel spacing in odd tenths of a megahertz in the band 112 – 117.975 MHz) the following geographical separation should be used:

Co-channel: 550 NM
Adj-channel: 220 NM

(ii) VOR on congested areas and operating in a mixed 50 kHz / 100 kHz channel separation environment the adjacent channel separation should be at least 500 NM

Note: the planning criteria in (i) and (ii) do not take into account the actual designated operational coverage (DOC) of the VOR

(iii) For VOR operating in terminal areas (DOC: 25/250) the following geographical separation should be used:

Co-channel: 200 NM
Adj-channel: 60 NM

(iv) For VOR operating for use in final approach and landing (DOC: 25/100) the following geographical separation should be used:

Co-channel: 130 NM
Adj-channel: 30 NM

Note: the planning criteria in (iii) and (iv) recognize two DOC areas. On a case-by-case basis, different DOC areas can be used.

5.2.2. **Frequency Plan Channelization and Planning criteria for**
Aeronautical Mobile (R). 117.975 -137 MHz
Air-to Air, Ground -to-Ground, and Air –to-Ground communication. The Radio spectrum between 118.00 to 135.975 MHz is used for Air/Ground communication in aeronautical Mobile service. With required channelization o 25KHz, the available assignable channels are 720 while retaining 100KHz for 121.5 emergency channel reduces the available channel to 714. In selecting radio system for Air to-ground – air, it is advisable to select systems that enable communications between airport terminal and ramp area personnel and the flight crew in the cockpit.

The global COM list 3 (Assignments in the VHF band 117.975 -137.00MHz
Contains only reference to the service(s) that is (are) provided. These services are:

SERVICE	PURPOSE	DESIGNATED OPERATIONAL COVERAGE
TWR	Aerodrome control service	(25NM/4000ft)
AS	Aerodrome surface movement control	(limits of aerodrome
APP-U	Approach – Upper flight level	(up to FL 450) (150NM/45000ft)
APP-I	Approach – Intermediate	(up to FL 250) (75NM/25000ft)

APP-L	Approach – Low	(up to FL 120) (50NM/12000ft)
ACC-U	Area Control service – Upper	(up to FL 450) (area + 50NM/45000ft)
ACC-L	Area Control service – Low	(up to FL 250) (area + 50 NM/25000ft)
FIS-U	Flight Information Service – Upper	(up to FL 450) (area + 50 NM/45000ft)
FIS-L	Flight Information Service – Low	(up to FL 250) (area + 50 NM/25000ft)
VOLMET	VOLMET broadcasts	(omni-directional/45000ft)
ATIS	Automated Terminal Information Service	(omnidirectional/45000ft)
AFIS*)*	Aerodrome Flight Information Service	(*25NM/4000ft*
AOC	Airline Operational Control	(not protected)

T**able 1**

Note 1: The values between brackets contain the fixed Designated Operational Coverage (DOC) of these services as per COM table 3 used in ICAO the Regional Offices.
Note 2: Currently the program for calculating compatibility between frequency assignments does not include a buffer of 50 NM for ACC frequency assignments. (See Appendix A). Should it be considered necessary, this can be included.
Note 3: Because of the expected introduction of supersonic aircraft in aviation in the early seventy protection for ACC/FIS/VOLMET up to 65000 ft was incorporated in the protection requirement to support SST (supersonic transport) operations. Since the introduction of supersonic aircraft has not materialized, this could be deleted.
Note 4: DOC for AFIS currently not specified.
Note 5: VOLMET and ATIS are broadcast only services; aircraft do not respond on these frequencies;
Note 6: A combination of service identification with different services (e.g TWR/APP or ACC/L/U is being considered to be introduced in the program.

5.3 **SERVICE VOLUME**

With regard to the service volume, the Regional COM lists currently use a system with predetermined service volumes (see DOC figures within brackets in Table 1). The DOC is part of the service indication. This provides for flexibility in making frequency assignments as the DOC can be tailored to the operational requirements (e.g TWR 30/40 provides a TWR service within a range of 30 NM up to 4000 ft).

5.3.1 In summary, the following is a proposal for rationalizing the service indication and the use of the DOC in frequency assignment planning:
(i) Review the need for a 50 NM buffer around the DOC for ACC frequency assignments
(ii) Review the need to keep reference to an upper flight level of 65000 ft for FIS and
(iii) VOLMET considers the benefits of a flexible structure in identifying the DOC for a frequency assignment;
(iv) consider the possibility for moving additional information regarding the operational use of frequency assignments from the service identification to the “Remarks” column in the table.

5 .4 Key number.
For easy reference of frequency assignments in the COM list 3 and those used in the global list 3, it is proposed to add the (unique) key or registration number that has been given to each frequency assignment in the global list to the Regional COM list 3. This is done automatically by the software as soon as the newly assigned frequency is entered or saved in the data base.

CHAPTER SIX

6.0 FREQUENCY PLANNING CRITERIA

6.1 Frequency assignment planning criteria.

6.1.1 Frequency assignment planning criteria for co-channel VHF assignments for use in the AFI Region have been developed at the Regional Air Navigation Meeting. These planning criteria include a (predetermined) set of Designated Operational Coverage areas (DOC) and provide for co-channel separation distances. The separation distances used are the distance between the transmitter sites for circular services like TWR or APP. For area services (ACC and FIS) separation distance are given relative to the distance between limits of service area (or DOC). The separation distances are based upon a desired to undesired (D/U) signal ratio of 20 dB, which requires that the interfering (or undesired) station is located beyond the radio horizon of the interfered (or desired) station.

6.1.2 The minimum co-channel separation distance between transmitter/receiver locations can be calculated by adding the relevant distances (DOC-range) to the radio horizon (DOC-altitude) of the two frequency assignments (see Figure 1). These criteria are incorporated in the computer programme for VHF COM frequency assignment planning.

6.1.3. With regard to frequency assignment planning for area services, ICAO is working on introducing the concept of area service planning. This is work in progress and will hopefully be introduced soon. This method is consistent with the current protection requirements and may result in more efficient frequency assignment planning.

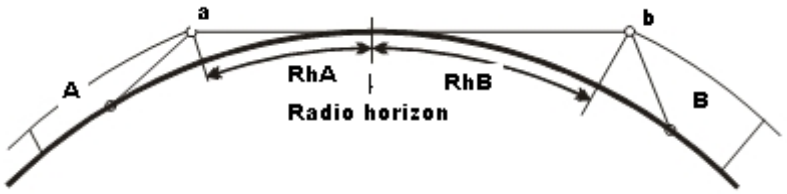


Figure 1

6.1.4. Applying the methodology as described in fig.1, separation distances between the edges of the DOC have been calculated and, using the distance to the radio horizon as in Table 1, been summarized in Table 2.

Symbol	Service range (NM)	Service height	Radio horizon
TWR	25 NM / 46km	4000 ft /1200 m	78 NM
AFIS	25 NM / 46km	4000 ft /1200 m	78 NM
AS	Limits of aerodrome	Surface	N/A
APP-U	150 NM / 280 km	45000 ft/ 13700 m	260 NM
APP-I	75 NM / 140 km	25000 ft / 7600 m	195 NM
APP-L	50 NM / 93 km	12000 ft /3650 m	134 NM
ACC-U	Specified area	45000 ft /13700 m	260 NM
ACC-L	Specified area	25000 ft / 7600 m	195 NM
FIS-U	Specified area	45000 ft /13700 m	260 NM
FIS-L	Specified area	25000 ft / 7600 m	195 NM

VOLMET	260 NM / 480 km	45000 ft / 13700m	260 NM
ATIS	150 NM / 280 km	45000 ft /13700 m	260 NM

Table 2 – distance to radio horizon with aircraft at maximum altitude

Note:Radio horizon of the aircraft from the edge of DOC.

6.1.5 Automatic Terminal Information Service, or ATIS, is a continuous broadcast of recorded information in busier terminal (i.e airport) areas. ATIS broadcasts contain essential information, such as weather information, which runways are active, available approaches, and any other information required by the pilots, such as important NOTAMs.

As a terminal service, ATIS may not require a DOC greater than APP/U.

Service	TWR	AFIS	SMC	APP-U	APP-I	APP-L	ACC-U	ACC-L	FIS-U	FIS-L	VOLMET	ATIS
TWR	156 (206)	156 (206)	103 (128)	338 (513)	273 (373)	212 (287)	338 *	273 *	338 *	273 *	338 (623)	338 (623)
AFIS	156 (206)	156 (206)	103 (128)	338 (513)	273 (373)	212 (287)	338 *	273 *	338 *	273 *	338 (623)	338 (623)
AS	103 (128)	103 (128)	50	285 (435)	220 (295)	159 (209)	285 *	220 *	285 *	220 *	285 (310)	285 (310)
APP-U	338 (513)	338 (513)	285 (435)	520 (820)	455 (680)	394 (594)	520 *	455 *	520 *	455 *	520 (930)	520 (820)
APP-I	273 (373)	273 (373)	220 (295)	455 (680)	390 (540)	329 (454)	455 *	390 *	455 *	390 *	455 (790)	455 (680)
APP-L	212 (287)	212 (287)	159 (209)	394 (594)	329 (454)	268 (368)	394 *	329 *	394 *	329 *	394 (704)	394 (594)
ACC-U*	338	338	285	520	455	394	520	455	520	455	520	520
ACC-L*	273	273	220	455	390	329	455	390	455	390	455	455
FIS-U*	338	338	285	520	455	394	520	455	520	455	520	520
FIS-L*	273	273	220	455	390	329	455	390	455	390	455	455
VOLMET	338 (623)	338 (623)	285 (545)	520 (930)	455 (790)	394 (704)	520 *	455 *	520 *	455 *	13 (533)	10 (413)
ATIS	338 (513)	338 (513)	285 (435)	520 (820)	455 (680)	394 (594)	520 *	455 *	520 *	455 *	10 (413)	13 (313)

Table 3 – Minimum geographical co-channel separation distances **between limits of DOC**
Note: All distances are in NM; values in brackets are separation distances between facilities for (circular) services
* Area services; only distances between limits of DOC are given.

6.1.6 VOLMET and ATIS are one-way transmissions from a ground transmitter to the aircraft. Since the VOLMET DOC has been calculated upon the maximum coverage that can be obtained at 45000 ft (260 NM), protection between VOLMET stations can be secured if the separation distance between these service volumes is 13 NM, assuming a VOLMET transmitter height of 100ft. This distance would also be sufficient for the protection of ATIS from VOLMET transmissions.

6.1.7 **AS** (aerodrome surface movement control) separation distances are calculated with an antenna height of 30 m (100ft). At 100 ft the radio horizon is 12.3 NM to which a buffer (12.7 NM) has been added (total 25 NM). Co-channel operation between **AS** assignments is 50 NM. Should the difference in height between the two aerodromes be significantly different, additional margins need to be added. Separation distances (between facilities) with airborne services have been calculated as the sum of 25 NM (AS) plus radio horizon plus DOC-range (or the airborne service). In case the airborne service is an area service (ACC or FIS), only the distance of the radio horizon to the nearest limit of the airborne service has been provided (25 NM plus range airborne service). Sharing with airborne services however is unlikely to occur since an (exclusive) sub-band has been allotted by ICAO for AS communication (121.600-121.975 MHz).

6.2.0 ADJACENT CHANNEL UTILIZATION.

6.2.1The geographical separation between two aircraft operating on the first adjacent 25 kHz channel is 10 NM throughout the service area. This implies that the first adjacent 25 kHz channel cannot be deployed in the same DOC plus 10 NM.

6.2.2 In cases where DSB-AM equipment is being in use with 50 kHz channel spacing, the first adjacent channel geographical separation between a 50 kHz frequency assignment and a 25 kHz assignment is 100 NM throughout the coverage areas. The first adjacent channel separation between two 50 kHz assignments is 10 NM. Should such protection be required (currently frequency assignment planning throughout the AFI Region is based on 25 kHz channel spacing for all frequency assignments) relevant information needs to be included in the COM list and the program be amended accordingly.

CHAPTER SEVEN

7.0 PROCESS OF ASSIGNMENT

7.1.0 FREQUENCY ASSIGNMENT PROCEDURE

After the equipment lists have been received from the proposed service provider (SP) prior to the shipment and with proven capability of provision of service, the frequency assignment procedure commences. The following are certain issues considered to be critical.

1. Application:
   The proposed service provider applies for frequency assignment; providing the following information/document: (*Original Frequency application form can be downloaded from NCAA website. www.ncaa.gov.ng).*

PROOF OF GROUND TEST INSPECTION

1. Ground Test Inspection.

A test carried out at the proposed site for suitability of Radio Navigation Aids using portable ground installation must be carried out. This is to be witnessed and by the Authority

.

2. Flight testing**.**

3. Before a facility especially radio navigation can be commissioned such a ground station would have been calibrated.

iii. An MOU may be required if Aerodrome operator requires an ANSP for the maintenance and operation of facility

iv. Personnel availability in sufficient number and quality

v. Runway designation of facility

VI. NOTAM

7.2 NCAA SITE VALIDATION INSPECTION

This is a visit to the proposed site for installation of the facility to physically validate documented information and confirm its suitability. The Service Provider shall apply for Site Validation Inspection by completing and forwarding NCAA the form (DAAS-ANS-AEROTELS—06).

The following information is essential.

I. Site Proving:

A flight test certificate or evidence of conducted flight test on the proposed site to

Determine the effect of environmental impact on the performance and of planned Facility.

II. Evidence of WGS -84 Survey with documentation of geographical Coordinates of the proposed sites and runway designation.

III. Runway Designation

IV. Site layout drawing/map

V. Terrain topography (up slope, down slope or Flat, Level and on highest ground)

VI. Obstacle clearance not less than 300m (avoid high rise structure, Trees or any physical obstacle that could affect signal radiation)

VII. Presence of Wires or fences not less than 600m far way Avoid metallic fence nearby

VIII. Site contour in the case of VOR should be circular

IX. Avoid stagnant water within vicinity of antenna reflecting surface

The Site for installation of facilities must be prepared to suite the appropriate facilitate including the required clearances, location in the appropriate runway(s)

Allowing appropriate gentle slopes and required civil works for antenna locations (see advisory circular on installation of radio navigation Aids) The antennae system lay

out must properly earthed and civil work must ensure surface water is not retained within the vicinity of the antenna system.
The topography of the runway plays a vital role in the selection and planning of the site of aeronautical telecommunication facility (See advisory circular on installation of radio navigation Aids)

7.3 FREQUENCY ASSIGNMENT

The assignment of aeronautical frequencies is done by employing the ICAO frequency assignment planning software for CNS systems. The method includes

- a coordinated process with the ICAO Regional Headquarters.
- Clarifications of the suitability of the frequencies proposed
- Inclusion of the frequency on AFI frequency utilization plan
- Letter of assignment to the applicant.
- NOTAM process

CHAPTER EIGHT

8.0 VHF FREQUENCY UTILIZATION PLAN

It should be noted that the allocation to Aeronautical Mobile service has been increased from 136.00 band t0 136.975 MH**.** By this extension it is recommended that new radios systems that operate in the band 1800.00 through to 136.975 MHz range with channel spacing of 25 KHz be deployed to provide full Airport and Pilot communication services. Unrestricted Instrument Flight Rules operation requires 25 KHz communication capability

8.1 Further recommendations

a) Air line operators should be aware that 25 KHz channel deployment excludes adjacent channel interference protection for equipment only. Operable on50khz channels (360 channel radios). Interference caused by proximity to aircraft and ground stations operating on adjacent 25khz channels should be anticipated
b) It is strongly recommended that aircraft owners upgrade their VHF radio communication systems and install 760 channel equipment that are operable in the 118.00 to 136.975 MHz band with 25 KHz channel spacing, if they want to be ensured of receiving full air traffic control (ATC) services. It is anticipated that there will be heavy congestion in future and the requirement to provide additional ATC services, is imperative hence NCAA is using 25 KHz spacing for air-ground communications.
c) NCAA fully implements 25 KHz channelling in the 118.00 to 136.975 MHz band.
d) If still available in Aircraft, upgrading airborne equipment to the current or future 760 channel radios are necessary for full access. All Air traffic

control that require assignment will be assigned in this band with 25KHz channel spacing only.

AIR-GROUND/ GROUND-AIR COMMUNICATION TABLE

SERVICE	CHANNEL 1	CHANNEL 2	CHANNEL 3	CHANNEL 4
FIS-U, GP	124,800	124,825	124,850	124,875
	125,800	125,825	125,850	125,875
	126,300	126,325	126,350	126,375
	-	126,925	126,950	126,975
	127,400	127,425	127,450	127,475
	131,300	131,325	131,350	131,375
	132,300	132,325	132,350	132,375
OPC	131,400 - 131,900			
VOLMET, ATIS	126,200	126,225	126,250	126,275
	126,400	126,425	126,450	126,475
	126,600	126,625	126,650	126,675
	126,800	126,825	126,850	126,875
	127,000	127,025	127,050	127,075
	127,600	126,625	127,650	127,675
DATA LINK	136,900 - 136,975			
EMERGENCY	121,500			
AUXILIARY SAR	123,100			
AIR-TO-AIR	123,450			
FUNCTION/FONCTION	FREQUENCIES/BANDS (MHZ) - FREQUENCES/BANDES(MHZ)			
	A	C	B	D
TWR	118,000	118,025	118,050	118,075
	118,100	118,125	118,150	118,175
	118,200	118,225	118,250	118,275
	118,300	118,325	118,350	118,375
	118,400	118,425	118,450	118,475
	118,600	118,625	118,650	118,675
	118,700	118,725	118,750	118,775
	118,800	118,825	118,850	118,875
	118,900	118,925	118,950	118,975
	120,800	120,825	120,850	120,875
SMC	121.600	121.625	121.650	121.675
	121.700	121.725	121.750	121.775
	121.800	121.825	121.850	121.875
	121.900	121.925	121.950	121.975
APP-PAR	119.500	119.525	119.550	119.575
	119.900	119.925	119.950	119.975
	120.100	120.125	120.150	120.175

APP-L	119.000	119.025	119.050	119.075
	119.100	119.125	119.150	119.175
	119.200	119.225	119250	119.275
	119.400	119.425	119.450	119.475
	119.600	119.625	119.650	119.675
	119.700	119.725	119.750	119.775
	119.800	119.825	119.850	119.875
	126.000	126.025	126.050	126.075
APPL-I, APP/SR/1	120.000	120.025	120.050	120.075
	120.300	120.325	120.350	120.375
	120.400	120.425	120.450	120.475
	120.700	120.725	120.550	120.575
	121.100	121.125	121.150	121.175
	121.200	121.225	121.250	121.275
	121.300	121.325	121.350	121.375
	123.700	123.725	123.750	123.775
	124.000	124.025	124.050	124.075
	124.300	124.325	124.350	124.375
	125.300	125.325	125.350	125.375
APP-H	125.700	125.725	125.750	125.775
	127.200	127.225	127.250	127.275
	128.200	128.225	128.250	128.275
	128.600	128.625	128.650	128.675
APP-U	123.900	123.925	123.950	123.975
	124.400	124.425	124.450	124.475
	124.500	124.525	124.450	124.575
	124.900	124.925	124.450	124.975
	127.800	127.825	127.450	127.875
	128.000	128.025	128.050	128.075
ACC-L	123.800	123.825	123.850	123.875
	125.400	125.425	125.450	125.475
	128.400	128.425	128.450	128.475
	129.000	129.025	129.050	129.075
	129.600	129.625	129.650	129.675
	131.200	131.225	131.250	131.275
ACC-U	118.500	118.525	118.550	118.575
	119.300	119.325	119.350	119.375
	120.500	120.525	120.550	120.575
	120.600	120.625	120.650	120.675
	120.900	120.925	120.950	120.975
	124.600	124.625	124.650	124.675
	124.700	124.725	124.750	124.775
	125.100	125.125	125.150	125.175
	125.500	125.525	125.550	125.575
	125.600	125.625	125.650	125.675
	125.900	125.925	125.950	125.975
	126.100	126.125	126.150	126.175
	126.500	126.525	126.550	126.575

	126.700	126.725	126.750	126.775
	127.100	127.125	127.150	127.175
	127.300	127.325	127.350	127.375
	127.700	127.725	127.750	127.775
	128.100	128.125	128.150	128.175
	128.300	128.325	128.350	128.375
	128.500	128.525	128.550	128.575
	128.700	128.725	128.750	128.775
	128.800	128.825	128.850	128.875
	128.900	128.925	128.950	128.975
ACC-U (…..,…)	129.100	129.125	129.150	129.175
	129.200	129.225	129.250	129.275
	129.300	129.325	129.350	129.375
	129.400	129.425	129.450	129.475
	129.500	129.525	129.550	129.575
	130.900	130.925	130.950	130.975
	132.100	132.125	132.150	132.175
FIS-L	124.200	124.225	124.250	124.275
	125.200	125.225	125.250	125.275
	127.500	127.525	127.550	127.575

Area Control or Flight information (upper)	ACC-U OR FIS-U	Specified area plus 50NM	13700/45000 or 19800/65000	520(2) 630(2)
Area Control or Flight information (low)	ACC-L or FIS-L	Specified area plus 50NM	7600/25000	500(2)
Area Control or Flight information (extended range)	ACCL-ER or FIS-ER	To be specified	13700/45000 or 9800/65000(3)	1000(1)(4) 1200(1)
VOLMET	VOLMET	Omni-directional	13700/45000 or 19800/65000(3)	520(2) 660(2)

Table 4

(1) Distance between stations
(2) Distance between, limits of service areas
(3) If required for SST Operations
(4) Applicable o the AFI Region only

8.2 NAVIGATION AIDS FREQUENCY ASSIGNMENTS

8.2.1 ILS Channels

ILS- Channel Frequency List

ICAO	LOCALIZER MODE	GLIDESLOPE MODE
DME CHANNEL	FREQUENCY (MHZ)	FREQUENCY (MHZ)

18X	108.10	334.70
18Y	108.15	334.50
20X	108.30	334.10
20Y	108.35	333.95
22X	108.50	329.90
22Y	108.55	329.75
24X	108.70	330.50
24Y	108.75	330.35
26X	108.90	329.30
26Y	108.95	329.15
28X	109.10	331.40
28Y	109.15	331.25
30X	109.30	332.00
30Y	109.35	331.85
32X	109.50	332.60
32Y	109.55	332.45
34X	109.70	333.20
34Y	109.75	333.05
36X	109.90	333.80
36Y	109.95	333.65
38X	110.10	334.40
38Y	110.15	334.25
40X	110.30	335.00
40Y	110.35	334.85
42X	110.50	329.60
42Y	110.55	329.45
44X	110.70	330.20
44Y	110.75	330.05
46X	110.90	330.80
46Y	110.95	330.65
48X	111.10	331.70
48Y	111.15	331.55
50X	111.30	332.30
50Y	111.35	332.15
52X	111.50	332.90
52Y	111.55	332.75
54X	111.70	333.50
54Y	111.75	333.35
56X	111.90	331.10
56Y	111.95	330.95

Table 5

Channel (ICAO)	Frequency (MHZ)	Channel (ICAO)	Frequency (MHZ)	Channel (ICAO)	Frequency (MHZ)
17x	108.00	74y	112.75	102x	115.50

17y	108.05	75x	112.80	102y	115.55
19x	108.20	75y	112.85	103x	115.60
19y	108.25	76x	112.90	103y	115.65
21x	108.40	76y	112.95	104x	115.70
21y	108.45	77x	113.00	104y	115.75
23x	108.60	77y	113.05	105x	115.80
23y	108.65	78x	113.10	105y	115.85
25x	108.80	78y	113.15	106x	115.90
25y	108.85	79x	113.20	106y	115.95
27x	109.00	79y	113.25	107x	116.00
27y	109.05	80x	113.30	107y	116.05
29x	109.20	80y	113.35	108x	116.10
29y	109.25	81x	113.40	108y	116.15
31x	109.40	81y	113.45	109x	116.20
31y	109.45	82x	113.50	109y	116.25
33x	109.60	82y	113.55	110x	116.30
33y	109.65	83x	113.60	110y	116.35
35x	109.80	83y	113.65	111x	116.40
35y	109.85	84x	113.70	111y	116.45
37x	110.00	84y	113.75	112x	116.50
37y	110.05	85x	113.80	112y	116.55
39x	110.20	85y	113.85	113x	116.60
39y	110.25	86x	113.90	113y	116.65
41x	110.40	86y	113.95	114x	116.70
41	110.45		114.00		116.75

y		87x		114y	
43x	110.60	87y	114.05	115x	116.80
43y	110.65	88x	114.10	115y	116.85
45x	110.80	88y	114.15	116x	116.90
45y	110.85	89x	114.20	116y	116.95
47x	111.00	89y	114.25	117x	117.00
47y	111.05	90x	114.30	117y	117.05
49x	111.20	90y	114.35	118x	117.10
49y	111.25	91x	114.40	118y	117.15
51x	111.40	91y	114.45	119x	117.20
51y	111.45	92x	114.50	119y	117.25
53x	111.60	92y	114.55	120x	117.30
53y	111.65	93x	114.60	120y	117.35
55x	111.80	93y	114.65	121x	117.40
55y	111.85	94x	114.70	121y	117.45
57x	112.00	94y	114.75	122x	117.50
57y	112.05	95x	114.80	122y	117.55
58x	112.10	95y	114.85	123x	117.60
58y	112.15	96x	114.90	123y	117.65
59x	112.20	96y	114.95	124x	117.70
59y	112.25	97x	115.00	124y	117.75
70x	112.30	97y	115.05	125x	117.80
70y	112.35	98x	115.10	125y	117.85
71x	112.40	98y	115.15	126x	117.90
71y	112.45	99x	115.20	126y	117.95

72x	112.50	99y	115.25		
72y	112.55	100x	115.30		
73x	112.60	100y	115.35		
73y	112.65	101x	115.40		
74x	112.70	101y	115.45		

Table 6 ILS /VOR/DME Channels

8.3 ILS Localizer 108 –111.975 MHz
8.3.1 Glide Path 328.6 – 335.4 MHz

1. As there are only a few ILS installations in Nigeria localizer frequencies and the paired glide path frequencies are to be selected sequentially for each aerodrome from the list given.
2. Where separate ILS installations serve the opposite ends of a single runway or different runways at the same aerodrome, separate frequency pairs are to be assigned to each installation.

8.3.2 VHF Marker Beacon 75 MHz

8.3.3 VOR 111.975 – 117.975 MHz
1. Frequencies for VOR are to be selected in accordance with table above. Note areas where VOR installations are implemented and are assigned frequency spacing at 50KHz from existing VORs in the same areas, priority shall be given to ensuring that the frequency tolerance of the radio frequency carrier of the existing VORs is reduced to plus or minus 0.002 percent.
2. Criteria for the geographical separation of VOR on the same and adjacent frequencies is given in advisory circular NCAA-AC. Aerotel-ANSP-004. (Advisory Circular on Testing of radio Navigation)

8.3.4 NDB 190 – 415 kHz
1 606.5 – 1 632 kHz
Vol I, 3.4.4.1
Although Annex 10 allocates the band 190 to 1 750 kHz to NDB, ITU Radio Regulations (RR8) and agreement between
the NCAA and the Ministry of information and communications restrict the use of the band to 190 – 415 kHz, except that when a frequency in this band cannot fulfill an operational requirement, a frequency between 1 606.5 – 1 632 kHz may be assigned.

8.3.5 DME 960 – 1 215 MHz Vol I, 3.5.3.2
1. Interrogate and reply frequencies for DME operating Channels are to be selected from the "X" channels listed in appendix to this circular table.
2. The pairing of DME Channels for operation with ILS, VOR, or ILS/MLS is to be in accordance with Nig.CARs 14.7
3. The frequency 978MHz is allocated to the Universal Access Transceiver (UAT) system for the transmission of ADS-B
reports and the broadcast of ground-based aeronautical information.

8.3.6 Secondary Surveillance Radar (SSR)

Interrogation frequency
1 030 MHz
Reply frequency
1 090 MHz
8.3.7 Primary Surveillance Radar (PSR)
S-Band 2.7-3.4GHz

8.3.8 MLS for Angle and data
Channel pairing with DME

5 031.0 - 5 090.7 MHz Vol I, 3.11.4.1.1
8.3.9 VHF Air-ground 117.975 – 136 MHz
136 – 137 MHz

1. Frequencies for the Aeronautical Mobile (R) Service are to be selected from those listed in Group A, Annex 10, Vol. V, paragraph 4.1.8.1.2.
When the number of frequencies exceeds those listed in Group A, assignments will be made from
Group B. (Reference Annex 10, Vol V, paragraph 4.1.8.1.1). Where possible, frequencies should be selected to follow
the general allotments in the VHF Frequency Utilization Plan given in ICAO AFI FASID Regional Air Navigation Plan. (see appendix table A)
2. Frequencies for other air-ground services are to be selected from those listed in Group C or Group D, Annex 10, Vol V, paragraph 4.1.8.1.2.

3. Frequencies from 136.9 to 136.975 MHz are reserved for air-ground data link communications (Annex 10, Vol V,
4.1.1.1).

8.4 HF SSB Aero Mobile 2.8 MHz – 22 MHz
Frequency assignments will be in accordance with the requirements and allotments of the ITU Radio Regulations and Nig.CARs14.7.5.

8.4.1 Survival Radio equipment 121.5 and 406 MHz
Aircraft ELT 121.5 and 406 MHz
8.4. 2 The carrier frequencies, 3182 kHz. 3023 KHz, 8364 KHz, and 5 680 kHz and
8.4.3. 121.5 MHz, 156.525MHz, 156.814MHz are used for procedures for aeronautical radio SAR operations and may be used for manned space vehicles, however, emission must be confirmed in a band of plus or minus 3KHz about the frequency. 121.5MHz aeronautical emergency frequency. Survival Radio Equipment 243 **MHz Military**

8.4.4. Where required auxiliary frequency is 123.1MHz.
8.4.5 Aircraft ELT 243 MHz **Military. Note: the frequency 121.5 MHz is no longer monitored by the international Satellite System for SAR (COSPAS/SARSAT).** This use was phased out in February 2009 and the new COSPAS/SARSA tracking is concentrated on 406.1MHz.

CHAPTER NINE

9.0 CODES ASSIGNMENTS

9.1. IDENTIFICATION CODES AND CALL SIGNS

The following is approved format regarding the selection of identification codes,

Call signs, AFTN, and Airport Address
9.2 **Airport Code**. The Airport is represented by four-letter identifier code, where the first two is used to denote the location Nigeria is assigned **And the remaining two letter word is used to denote the name of the Airport (DN XX)** The service provider shall propose three Airport codes

9.3 **AFTN Address:** This is an eight - letter -group composed of four –letter ICAO location Indicator plus a three-letter – group identifying an organization or service address and an additional letter. The service provider shall propose three AFTN Addresses

YFYX.ZZZ X (DN YX ZZZ X)

9.4 **Localizer Ident:** The Morse Code Identification of a localizer consists of a three-letter identifier preceded by the letter I. **(I X X)** The service provider shall propose three identification codes

9.5. **VOR Ident:** The only positive way of identifying a VOR station is by its Morse code appropriately representing the three letters in the name of the Airport (OGONI AIRPORT (OGN**, GNI, ONI)** The service provider shall propose three identification codes

DEFINITIONS AND ACRONYMS.

- **Radio spectrum.**
  Radio spectrum refers to the full frequency range from 3KHz to 300 GHz which may be used for wireless communication.
  - **Nig.CARs:** Nigeria Civil Aviation Regulations
  - **DOC** Designated operational coverage
  - **ITU:** International Telecommunication Union
  - **NFMC:** National Frequency Management Council
  - **NCC:** Nigerian Communication Commission
  - **ANS:** Air Navigation Standards
  - **ANSP:** Air navigation service Provider
  - **AFI:** Africa and Indian ocean region
  - **AFI FASID:** facilities And Services Implementation document
  - **SST:** Supersonic Transport
  - **NFR:** National Frequency Radius

NIGERIA CIVIL AVIATION AUTHORITY
NCAA