NIGERIAN COMMUNICATIONS COMMISSION

DRAFT GUIDELINES FOR THE USE OF 60 GHz LICENSE-EXEMPT BAND FOR MULTI GIGABIT WIRELESS SYSTEMS

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1. Introduction

The use of licence-exempt Spectrum for wireless broadband and last mile access allows home-based users to have access to varieties of IP-based services thereby enhancing universal service objectives. The Nigerian Communications Commission (Commission) hereby provides guidelines for the use of the 60 GHz spectrum band for Wi-Fi access, Wireless Gigabit (WiGig), 5G offload and related technologies to ensure rapid expansion of services and accelerated increase in Internet penetration in Nigeria at affordable prices to all categories of users.

The Commission, therefore, sets out rules on unlicensed basis in the 60 GHz spectrum (57 – 66) GHz band to achieve the following:

(a) To allow wider coverage distances for unlicensed 60 GHz to deliver Multi-gigabit Wireless System (MGWS) services such as Wireless Personal Area Network (WPAN), Wireless Access Service (WAS), Radio Local Area Network (RLAN) and Fixed Wireless Services (FWS) etc. to support broadband service provision in Nigeria.

(b) To complement other licensed-exempt bands from congestion due to higher bandwidth.

(c) To enable wireless broadband technology that can meet backhaul requirements of modern communication systems.

(d) To ensure equipment comply with the technical specifications in section 5 of these Guidelines;

2. Objectives of Guidelines

The main objective of these Guidelines is to ensure interference-free operation of the 60GHz band and to ensure that a guaranteed Quality of Service is available to the users.

3. Operational Conditions

To assist with the planning of links/hotspots, a "self-coordination" approach similar to the "light licensing", will be applied where a simplified set of conventional mechanisms and attributes will be defined. This planning will be delegated to the operators.

This process requires each operator to record the following set of simple criteria for each authorised link or hotspot and make the data available publicly to assist in the identification of operational parameters and to conduct interference analyses:

i. Date of deployment (In order to assign priority);

ii. Transmit and receive centre frequencies and occupied bandwidth;

iii. Equipment type, specifying relevant transmitter/receiver parameters;

iv. Link/Hot spot location (geographic coordinates, height/direction of antenna, etc…);

v. The antenna gains and radiation pattern.

Subject to the above conditions set by the Commission, it is left to the operators to conduct any compatibility studies or coordinate as necessary to ensure that harmful interference is not caused to existing links registered in the database.

For such protection to be established, the Commission defines a set of conditions as follows:

(a) Access to the spectrum will be on shared basis. There will be no exclusive assignment to any individual or organizations, whether for private, public or commercial use.

(b) All private and commercial service providers will be guided by the same technical specifications and operational restrictions, with respect to WAS/RLAN systems.

(c) All equipment to be deployed must be type approved by the Commission prior to importation and deployment in compliance with Section 132 of NCA 2003.

(d) All sites in which commercial deployments are to be provided on the 60 GHz band shall be registered with the Commission.

(e) The use of the 60 GHz band shall be permitted for both indoor and outdoor use.

Wide area deployment shall not be allowed. Coverage or transmission distance from a single hotspot shall be within the distance stipulated in the technical specification. Transmit power, antenna height and gain shall be selected in order to keep emission within stipulated distances. Users of the 60 GHz band are required to notify the Commission upon deployment of services on this band using the template on the Commission's website via the link with the heading "License Exempt Spectrum Registration Form."

4. Licensing Conditions

(a) All Wi-Fi Hotspots/PP links shall be registered and authorised by the Commission.

(b) All authorized Wi-Fi Hotspot/PP links shall be reported annually.

(c) All commercial Wi-Fi Hotspot/PP link operators shall possess an operational Licence from the Commission.

(d) All equipment to be deployed must be type approved by the Commission.

(e) Users of the 60 GHz band are required to notify the Commission upon deployment of services on this band using the template on the Commission's website via the link with the heading "License Exempt Spectrum Registration Form. Existing users are equally required to submit data on utilization of the frequency on a biannual basis or upon request by the Commission.

(f) All customer premises equipment deployed by the operator shall conform to the items listed in the **"TECHNICAL SPECIFICATIONS"** section.

5. Technical Specifications

S/N	Parameter	Specifications
1.	Operating Frequency:	60 GHz
2.	Operating Frequency Range:	57 – 66 GHz
3.	Authorization:	Licence-exempt
4.	Data Rate:	100 Mbps ~ 10 Gbps Ethernet Systems
5.	Multiple Access Method:	Spread Spectrum/ OFDM/(CSMA/CS)
6.	Digital Modulation Scheme:	CCK, BPSK, QAM, etc.
7.	Media Access Protocol:	Collision Avoidance Technique

Table 1: Basic Specifications: (Industry open standard)

(a) Operational Features:

An additional limit on the transmit output power density (-10dBm/MHz) in the 57 – 66 GHz can be implemented to support the deployment of wideband systems (i.e. bandwidth higher than 100 MHz) by consequently limiting the maximum transmitter output power for narrow band systems (i.e. bandwidth lower than 100 MHz) below that of the maximum (+10dBm) allowed in the 57 - 66 GHz band. This limit will not apply if the Commission wishes to implement narrowband systems in the band.

Frequency Band	Application	Maximum radiated Power of Field Strength Limits	Technical Conditions	Additional Information	Relevant Standards/ Additional Requirements
(57 – 66) GHz	SRD WAS RLAN	• 40 dBm (10 W) mean e.i.r.p. (indoor only) • 23 dBm/MHz e.i.r.p density	Adequate Spectrum Sharing mechanism shall be implemented	Fixed outdoor installations are excluded	• WiGig 802.11ad standard • ETSI standard: EN 302 567 • ERC Recommendation 70-03
	SRD WAS	• 40 dBm (10 W) mean e.i.r.p. (indoor only) • 23 dBm/MHz e.i.r.p density maximum transmit power of 27 dBm at the antenna ports or ports	Adequate Spectrum Sharing mechanism shall be implemented		• ETSI standard: EN 303 722 • ETSI standard: EN 303 753 • ERC Recommendation 70-03
	SRD WAS	55 dBm (316 W) mean e.i.r.p. 38 dBm/MHz e.i.r.p density transmit antenna gain >- 30dBi	Mean e.i.r.p. fir indoor band emissions - 38dBm/MHz and transmit antenna >- 30 dBi Adequate Spectrum Sharing mechanism shall be implemented	Applies only to fixed outdoor installations	• ETSI Standard: draft EN 303 722 • ERC Recommendation 70-03

Table 2: Wi-Fi deployments shall be compatible with IEEE 802.11 standards.

(b) Automatic Transmit Power Control (ATPC):

ATPC feature shall be declared with the ranges and the related tolerances.

(c) Dynamic Frequency Selection/Adaptive Frequency Hopping Technique:

The equipment shall have the capability for dynamic frequency selection from the range of hopping frequencies.

(d) Modulation:

The Modulation type shall be wideband digital modulation system, using spread spectrum techniques to transmit and receive.

(e) Spectrum Mask:

The Spectral mask is set to establish clear boundaries between adjacent licensees. The spectral mask shall apply to 60 GHz band according to the Recommendations in the ITU-R M.2003-2 and ITU Radio Regulations.

6. Channel Bandwidth

(a) Each channel shall have a bandwidth of 2160 MHz for single channels.

(b) Concatenation of single channels shall be allowed in line with ITU channelization standards in order to promote better coexistence.

(c) Centre frequencies for single channels are recommended to be at 58.32, 60.48, 62.64 and 64.80 GHz.

(d) For concatenated channels, center frequencies depend on how many single channels are aggregated but shall be uniformly spaced with respect to the single channel center frequencies.

7. Quality of Service

(a) Interference:

No interference shall be caused to any systems operating in any of the primary allocations in the band (e.g. FSS and Radiolocation).

(b) Availability of Connection:

The Service provider is to guarantee 99% availability of its service to its subscribers.

(c) Security:

The provider shall take adequate measures to protect the data traffic to ensure the subscriber's right to privacy, as entrenched in the constitution of the Federal Republic of Nigeria.

(d) After-sale Support and Maintenance:

There shall be adequate support system to the subscriber in terms of repairs of equipment, upgrade facilities and other service failure reports on mutually acceptable terms and conditions.

(e) Service Agreement:

The Service Agreement between the Provider and Subscriber shall be subject to approval by the Commission.

(f) Bit Error Rate (BER):

BER objective: 10^{-6} Max

(g) Hotpots:

The number of permissible hotspots in any given area will take cognizance of acceptable quality of service, and the interference factor.

8. Type Approval

All equipment to be deployed must be Type-Approved by the Commission prior to importation and deployment in compliance with Section 132 of NCA 2003, Type Approval Regulations 2024 and its Business Rules published by the Commission before it can be sold or utilized in Nigeria.

An application for Type Approval shall be made using the standard Type Approval application form which may be obtained from the Commission on request or downloaded from its website – www.ncc.gov.ng.

All equipment subject to these Guidelines shall only be supplied or sold to any user if such devices or systems have satisfied the technical provisions stated in these Guidelines on use of 60 GHz band.

Users of WAS which have been Type-Approved by the Commission shall not Operate outside of the 60 GHz frequency range.

In the event of any alteration by a User, such Operator shall be sanctioned as appropriate pursuant to Part XI of the Type Approval Regulations 2024, published by the Commission.

9. Backhaul Frequencies

For the purpose of connecting Wi-Fi hotspots to the nearest switch/router for onward connection to the internet or other global/national networks, the under- listed point-to-point (PP) backhaul methods will be permitted.

(a) Exclusive (FWA) Backhaul Frequency:

FWA licensees or other operators with frequency licenses consisting of multiple channels/slots are free to reserve one of the slots for PP backhaul links. This can be used to backhaul their Wi-Fi hotspot traffic or to service ISPs and cyber-cafés.

(b) Microwave Backhaul Frequencies:

Operators requiring secured high capacity backhaul links are free to apply for additional microwave link frequency license from the Commission.

(c) Satellite Backhaul:

Operators can use satellite backhaul to concentrate Wi-Fi hotspot traffic.

(d) Leased Backhaul Links:

Operators, private individuals or organizations can lease bandwidth from National_Long-Distance Operators or from domestic satellite providers for the purpose of linking their hotspot to internet access points or for concentrating hotspot traffic.

10. Applicable Industry Standards

The above specifications are broadly based on ITU recommendations, ETSI, IEEE standards and Wireless Ethernet Compatibility Alliance (WECA) guidelines.

11. Definitions

In these Guidelines terms defined in the Act shall have the same meanings as in the Act and in addition to the following:

(A) "Band": A defined range of frequencies that may be allocated for a particular radio service or shared between radio services.

(B) "Coordination": This term refers to the process under which a new user seeks the agreement of existing users to share access to a particular range of frequencies while avoiding harmful interference.

(C) "dBm" – decibels of power referenced to one milliwatt

(D) "ETSI" – European Technical Standards Institute

(E) "GHz": Gigahertz: a unit of frequency equal to 1000 million Hz or cycles per second.

(F) "Interference": The effect of unwanted signals upon the reception of a wanted signal in a radio system, resulting in degradation of performance, misinterpretation or loss of information compared with that which would have been received in the absence of the unwanted signal.

(G) "WiGig" – Wireless Gigabit or 802.11ad is a high-speed wireless technology operating in the 60 GHz frequency band, designed for multi-gigabit data transfer rates. Is a technology that enables ultra-fast wireless communication for various applications, including VR/AR, wireless docking, and high-definition multimedia streaming.

(H) MHz: Megahertz: a unit of frequency, equal to 1,000,000 ($1X10^6$) Hz or cycles per second.

These guidelines may be cited as the Guidelines for the use of 60 GHz License-Exempt Band Multi Gigabit Wireless System, 2025.

DATED THIS _____ DAY OF _____ 2025.

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