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**REGULATION N° 014/R/SM-ICT/RURA/2021 OF 04/05/2021
GOVERNING THE USE OF THE UNLICENSED AND LIGHT
LICENSED FREQUENCY BANDS**

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REGULATION N° 014/R/SM-ICT/RURA/2021 OF 04/05/2021 GOVERNING THE USE OF THE UNLICENSED AND LICENSED FREQUENCY BANDS

The Regulatory Board;

Pursuant to Law N° 09/2013 of 01/03/2013 establishing the Rwanda Utilities Regulatory Authority;

Pursuant to Law N° 24/2016 of 18/06/2016 governing Information and Communication Technologies;

Having reviewed the regulations on the use of unlicensed frequency spectrum for the delivery of telecommunication services;

Pursuant to the stakeholder's consultative meeting conducted on 14th October 2020;

After consideration and deliberation in its session of 4th May, 2021;

HEREBY issues the following Regulation;

CHAPTER ONE: GENERAL PROVISIONS

Article One: Purpose

The purpose of this regulation is to determine the terms and conditions that governs the use of the unlicensed and light licensing in the frequency Spectrum bands 2.4 GHz, 5GHz and 60GHz for the deployment of broadband services.

Article 2: Definitions of terms and acronyms

In this regulation, unless specified otherwise, the terms and acronyms below have the following meanings;

1° Channel Indexing: the frequency difference between adjacent channel center frequencies;

2° dB (Decibel): a relative unit of measurement corresponding to one tenth of bel. It is used to express the ratio of one value of a power or field quantity to another, on a logarithmic scale;

3° DAA (Detect and Avoid): is the interference mitigation technique that equipment uses to detect if the channel is free and send signal or if occupied, avoid sending the signal;

4° DFS (Dynamic Frequency Selection): is a channel allocation schemes specified for wireless LAN, commonly Wi-Fi. It is designed to prevent electromagnetic interference with other usages of the same frequencies;

5° EIRP (Effective Isotropic Radiated Power): the measured radiated power of an antenna in a specific direction;

6° ETSI (European Telecommunications Standards Institute): an independent, not-for-profit, standardization organization in the telecommunications industry (equipment makers and network operators) in Europe;

7° Frequency Band: a range of frequencies allocated to a certain service;

8° IEEE (Institute of Electrical and Electronics Engineers): a non-profit professional organization founded for the purpose of consolidating ideas dealing with electro technology;

9° ITU (International Telecommunication Union): a globally managed agency of the United Nations that is responsible for the management, development and standardization of information and communication technology;

10° Light licensing: a procedure which allows easier and less time-consuming spectrum management in which the responsibility of frequency planning and interference analysis is given to the license applicant;

11° LBT (Listen before talk): a technique used in radiocommunications where radio transmitters first sense its radio environment before they start a transmission;

12° OFDM (Orthogonal Frequency Division Multiplexing): a type of digital modulation and a method of encoding digital data on multiple carrier frequencies;

13° Radiocommunication: telecommunication by radio waves;

14° Transmit Power Control (TPC): a mechanism used in radiocommunications to reduce the power of a radio transmitter to the minimum necessary to maintain the link with a certain quality. TPC is used to avoid interference into other devices.

Article 3: Scope

This regulation applies to the use of the frequency spectrum bands 2.4 GHz, 5 GHz and 60 GHz for the deployment of mobile and fixed broadband services.

Article 4: Objectives

The objectives of this regulation are the following:

- a) To ensure that the use of the frequency spectrum bands 2.4 GHz, 5 GHz and 60GHz comply with technical parameters set by appendix 1 and appendix 2 of this regulation;
- b) To ensure that broadband services in the frequency bands 2.4 GHz, 5 GHz and 60GHz operate in an interference free environment; and
- c) To cater for fixed outdoor broadband services in 5 GHz and 60GHz frequency spectrum bands.

CHAPTER II: REQUIREMENTS FOR DEPLOYMENT OF BROADBAND SERVICES IN THE 2.4 GHz, 5 GHz AND 60GHz FREQUENCY SPECTRUM BANDS

Article 5: Operating conditions

License exempt and lightly licensing approaches applies for the deployment of broadband services to ensure efficient use of spectrum.

Article 6: The bands under considerations

The bands under this regulation are:

- a) 2400 – 2483MHz;
- b) 5150 – 5350MHz;
- c) 5470-5725MHz;
- d) 5725-5850MHz; and
- e) 57-66 GHz.

Article 7: Licensing Regime

The bands **2.4-2.483, 5.15-5.35** and **57-62GHz** is license exempt and follows technical parameters specified in appendix 1.

The bands **5.47-5.725 MHz, 5.725-5.850 GHz** and **62-66GHz** is light licensed according to the technical parameters specified in appendix 2.

Article 8: Regulatory Compliance

An entity wishing to deploy network to the general public using unlicensed bands listed in article 7 must make a declaration to the Regulatory Authority on the deployment to be done and specifications of the equipment in accordance with appendix 1 of this regulation.

Any person or entity wishing to use broadband equipment operating in the unlicensed bands for their own consumption do not need to declare their equipment to the Regulatory Authority as long as they comply with technical parameters specified in the appendix 1. However, the importation of those equipment is subject to type approval procedures.

Operation in these frequency bands: **2.4-2.483GHz, 5.15-5.35GHz, 5.47-5.595GHz, 5.595-5.725GHz, 5.725-5.850GHz** and **57-66 GHz** is on the basis that the frequencies are shared and frequency sharing mitigation techniques must be used in accordance with Appendix 1 and 2.

All equipment to be deployed in these bands must be type approved by the Regulatory Authority prior to the importation in compliance with the regulation governing importation, supply and type approval for electronic communications equipment.

Article 9: Frequency bands under consideration for unlicensed bands

The following bands are considered as unlicensed bands; **2.4-2.483GHz, 5.15-5.35GHz** and **57-62GHz**.

Article 10: Frequency bands under consideration for light licensing

The following spectrum frequency bands are considered as light licensed bands, **5.47-5.5725 GHz, 5.725-5.850 GHz** and **62-66GHz** and are subject to the base station/link fees.

CHAPTER III: CONDITIONS FOR THE USAGE OF LIGHT LICENSED FREQUENCY BANDS

Article11: License Application requirements

Any entity wishing to operate in the light licensed frequency spectrum bands must submit to the Regulatory Authority the following:

- a) An application letter to Director General explaining the need for the network deployment;
- b) Detailed specifications of the equipment;
- c) Certificate of company registration;
- d) Location of the site/sites; and
- e) Copy of license showing that he/she is allowed to install network.

Article12: Operating power

The transmitters operating in the light licensed frequency spectrum bands must not exceed the maximum power (EIRP) limit of 37 dBm.

Article13: Base Station/Link fees

The deployment of site and microwave link using light licensed frequency spectrum bands is subject to the light license fee. The annual base station fee is fifty (50,000) thousand Rwanda Francs and Microwave link fee is ten thousand (10,000) Rwandan Francs.

Article 14: Backhaul frequencies

Any operator wishing to deploy a backhaul link using 5.47-5.850GHz and 62-66GHz frequency bands must comply with the Power level and the Standard set in the Appendix 2 of this regulation.

CHAPTER IV: TRANSITIONAL AND FINAL PROVISIONS

Article 15: Transitional period

Any person already conducting activity related to the frequency spectrum bands provided in this regulation have a period of six (6) months from the commencement of this regulation to align activities with the provisions of this regulation.

Any other person who intends to start operation using the bands provided in this regulation after the commencement of this regulation must comply with this regulation.

Article 16: Interpretations of this regulation

Upon request, the Regulatory Authority provides an interpretation of this regulation to assist the user of the set frequency spectrum bands in ensuring its compliance with this regulation.

Article 17: Repealing provision

Regulations on the use of unlicensed frequency spectrum for the delivery of telecommunication services and all other prior provisions contrary to this regulation are hereby repealed.

Article 18: Commencement

This Regulation comes into force on the date of signature by the Chairperson of the Regulatory Board.

Kigali, on 4th /05/2021

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Dr. Ignace GATARE

CHAIRPERSON OF THE REGULATORY BOARD

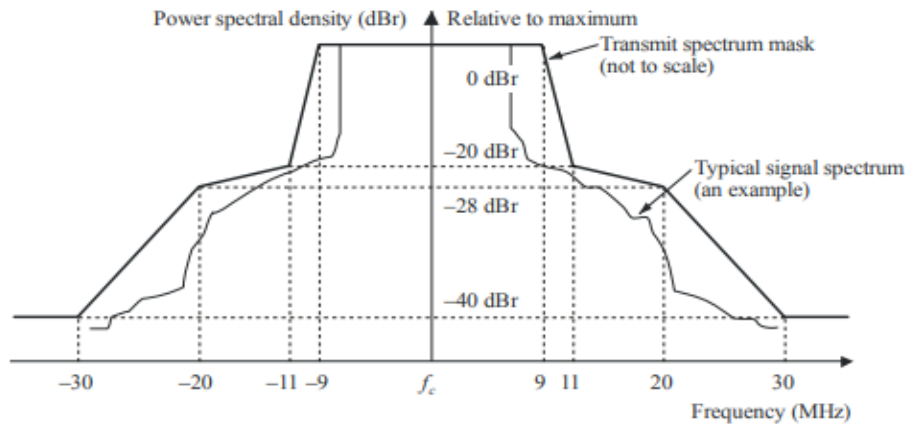
APPENDIX1: TECHNICAL REQUIREMENTS FOR UNLICENSED BANDS

General band designation	Specific frequency band (MHz)	Transmitter output power (mW)	Standard	Mitigation techniques	Spectrum mask (Bandwidth)	Channel indexing
2.4 GHz Band	2400-2483.5	100 mW (e.i.r.p.)	- IEEE Std 802.11-2012 (Clause 17, commonly known as 802.11b)	LBT	802.11b mask (Fig. 3)	5MHz
			- IEEE Std 802.11-2012 (Clause 19, commonly known as 802.11g)	LBT	OFDM mask (Fig. 1)	5 MHz
			- IEEE Std 802.11n-2012 (Clause 20, commonly known as 802.11n)	LBT/DFS/TPC	OFDM mask (Fig. 2A and 2B)	5 MHz
			- ETSI EN 300 328	DAA/LBT, DAA/non-LBT, MU	Not specified	Not specified
5GHz band	5150-5250	200 mW (e.i.r.p.)	- IEEE Std 802.11-2012 (Clause 18, commonly known as 802.11a) - IEEE Std 802.11-2012 (Clause 18, Annex D and Annex E, commonly known as 802.11j)	LBT/DFS/TPC		5 or 20MHz
	5250-5350	1000 mW (e.i.r.p.)	- IEEE Std 802.11n-2012 (Clause 20, commonly known as 802.11n) - IEEE P802.11ac - ETSI EN 301 893			5 or 20MHz

60GHz	57-62GHz	1000 mW (e.i.r.p.)	-	LBT/DFS/ TPC
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FIGURE 1

OFDM transmit spectrum mask for 802.11a, 11g, 11j, HIPERLAN2 and HiSWANa systems



Note 1 – The outer heavy line is the spectrum mask for 802.11a, 11g, 11j, HIPERLAN2 and HiSWANa and the inner thin line is the envelope spectrum of OFDM signals with 52 subcarriers.

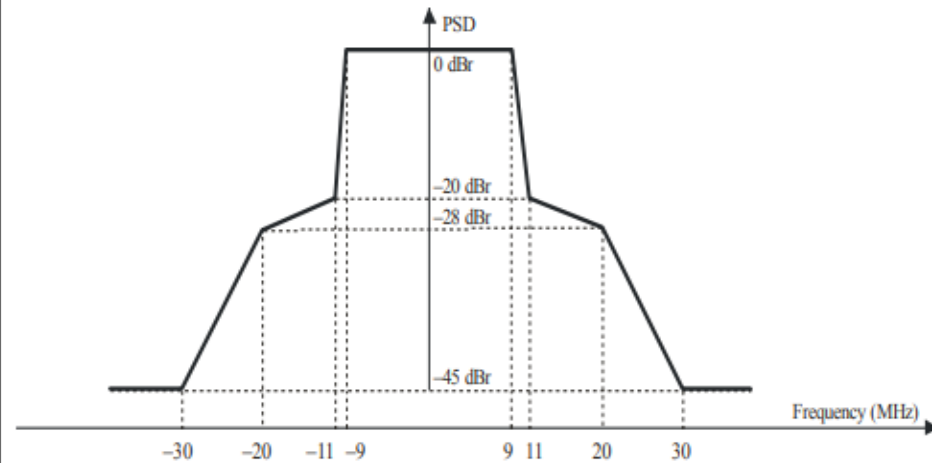
Note 2 – The measurements shall be made using a 100 kHz resolution bandwidth and a 30 kHz video bandwidth.

Note 3 – In the case of the 10 MHz channel spacing in 802.11j, the frequency scale shall be half.

M.1450-01

FIGURE 2a

Transmit spectral mask for 20 MHz 802.11n transmission in 2.4 GHz band

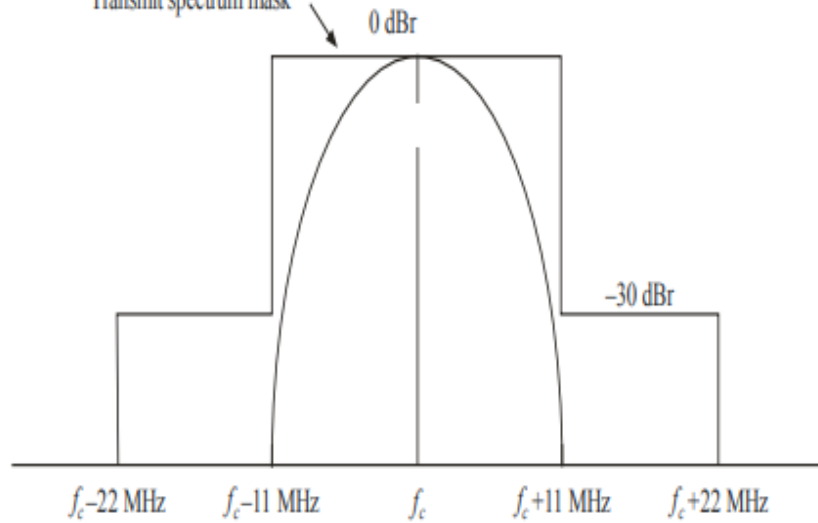


Note 1 – Maximum of -45 dBr and -53 dBm/MHz at 30 MHz frequency offset and above.

M.1450-02

Figure 3: Transmit spectrum mask for 802.11b

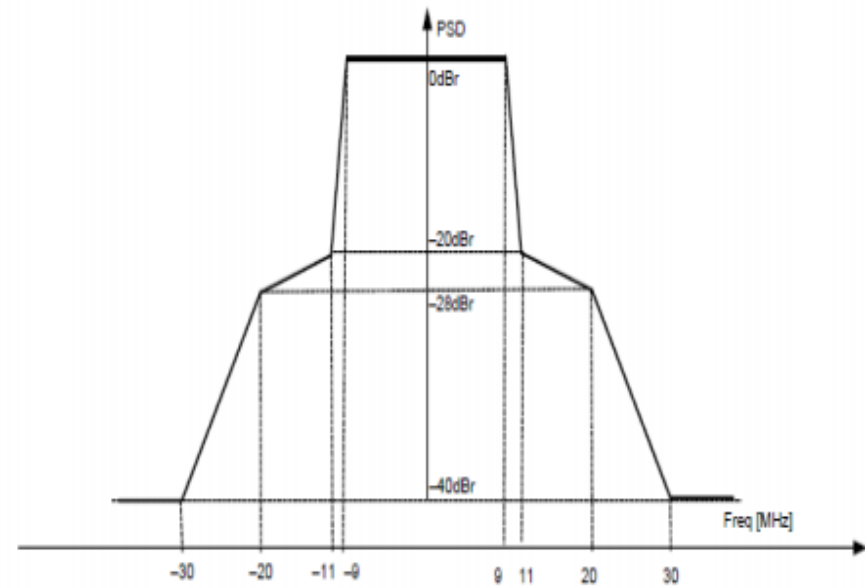
Transmit spectrum mask



1450-04

FIGURE 2b

Transmit spectral mask for a 20 MHz 802.11n transmission in 5 GHz band and transmit spectral mask for 802.11ac



APPENDIX 2: TECHNICAL REQUIREMENTS FOR LIGHT LICENSED FREQUENCY BANDS

Minimum requirements for the use of Fixed and Mobile Broadband Services operating in the frequency bands 5470-5725MHz, 5725-5850MHz and 61-66GHz		
1	Radiocommunication service	Fixed and Mobile
2	Application	Fixed and Mobile Wireless Access
3	Modulation/Occupied Bandwidth for 2.4 and 5 GHz	TDD (5, 20 and 40MHz)
4	Modulation/Occupied Bandwidth for 60GHz	TDD/FDD, HDFS according to ITU-R Rec F.1497-1.
5	Maximum transmitter power (EIRP)	37 dBm
6	Channels access and occupation rules	n/a
7	Authorization	Light license is required
8	Mitigation techniques	LBT/DFS/TPC

Seen to be attached to the Regulation N° 014/R/SM-ICT/RURA/2021 of 04/05/2021 governing the use of the unlicensed and licensed frequency bands.

Done at Kigali on 04/05/2021

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Dr Ignace GATARE

Chairperson of the Regulatory Board