ZICTA

ZAMBIA INFORMATION AND COMMUNICATIONS TECHNOLOGY AUTHORITY

TECHNOLOGY & ENGINEERING

REGULATORY GUIDELINES ON THE USE OF ISM BANDS FOR RADIOCOMMUNICATIONS SERVICES IN ZAMBIA

JULY, 2013

Table of Content

1. Introduction

The Zambia Information and Communications Technology Authority under mandate by the ICT Act No. 15 of 2009 regulates the use of Spectrum in Zambia including the Industrial, Scientific and Medical (ISM) bands.

Industrial, scientific and medical (ISM) bands are portions of the radio spectrum that are internationally reserved for use in industrial, scientific and medical applications. ISM bands are also known as license-exempt bands or unlicensed bands because operation in these bands does not require a radio license.

ISM bands are used either for **radiocommunication services** or **non-radiocommunication services**. For example, radiocommunication services include: short-range, low power communications systems, cordless phones, Bluetooth devices, near field communication (NFC) devices, wireless computer networks, alarms, etc. Non-radiocommunication services include applications in radio-frequency process heating, microwave ovens, and medical diathermy machines etc.

2. Scope

The equipment used in the ISM Band can cause a lot of interference to other radiocommunication services hence the need for regulatory guidelines. Therefore, these guidelines define the operational and technical requirements for radiocommunication equipment or radio communication networks operating in the ISM bands as set by the Zambia Information and communication Technology Authority (ZICTA).

3. ISM Bands in Zambia

The Zambia National Frequency Band Plan which ranges from 8.3 KHz to 100GHz has allotted the ISM bands as shown in the Table 1 below:

Table 1. ISM Bands in Zambia[1]

ISM Bands	Centre Frequency	Available Spectrum
6 765-6 795 KHz	6 780 KHz	30 KHz
13 553-13 567 KHz	13 560 KHz	14 KHz
26 957-27 283 KHz	27 120 KHz	326 KHz
40.66-40.70 MHz	40.68 MHz	40 KHz
433.05-434.79 MHz	433.92 MHz	1.74 MHz
2 400-2 500 MHz	2 450 MHz	100 MHz
5 725-5 875 MHz	5 800 MHz	150 MHz
24-24.25 GHz	24.125 GHz	250 MHz
61-61.5 GHz	61.25 GHz	500 MHz

4. ISM bands for commercial use

ZICTA is cognizant of the demand for the use of unlicensed bands for commercial purposes to foster ICT development. For this reason, the ISM bands 2.4GHz (2400-2500 MHz) and 5.8GHz (5725-5875 MHz) are opened for commercial purposes in Zambia. The permitted usage can be either for backhaul point-to-point links or wireless access points to ensure rapid expansion of services and accelerated increase in internet penetration. The other ISM bands shall not be used for commercial operations but will be used for short range communications etc.

5. General operational requirements

(a) Access to ISM band spectrum will be on a shared basis. There will be no exclusive assignment to any individual or organizations, whether for private, public or commercial use.
(b) Access to the ISM band spectrum will be on a license-exempt basis.
(c) Any radio communication network or radio communication equipment shall be subject to the provisions of the ICT Act No.15 of 2009 of the laws of Zambia and shall be operated according to these guidelines.

[1] Please note that in Zambia, the band **902-928 MHz** with centre frequency **915 MHz** is not designated as an ISM frequency band because it is planned for mobile cellular services

(d) All radio communication equipment to be deployed must be **type approved** by the Authority prior to importation and deployment in compliance with **Statutory Instruments (SIs) 6 and 65 of 2011 under the ICT Act no. 15 of 2009** of the laws of Zambia.

(e) Radio communication in the ISM band is permitted for both indoor and outdoor use.

(f) All sites in which commercial Wi-Fi (2.4 and 5.8GHz) hotspots are to be provided must be registered with the Authority and all operators shall be in possession of a valid ISP License.

(g) Any users are not required to seek permission from the Authority for using in any given ISM band.

(h) The relevant licence-exempt radio communication network or radio communication equipment shall not cause or contribute to any harmful interference. Any emission must not interfere with the operation of licensed radio communication network or equipment, or other licence-exempt radio communication network or equipment.

(i) Any person using ISM bands for radiocommunications services will not claim protection in case of interference and the Authority shall NOT in any way investigate the cause of interference.

(j) The operators of ISM bands for radio communication services shall be required to cease operation of these network or equipment if the same has been identified by the Authority to be causing harmful interference to authorized radio communication network or radio communication equipment. Operation of such radio communication network or radio communication equipment shall not resume until the condition or conditions causing the harmful interference have been corrected by the operators of these network or equipment.

(k) Radio communication inspection of ISM radio communication network or radio communication equipment shall not be conducted but the components of these networks or equipment must be made available for inspection by the Authority upon reasonable request.

(m) Due to congestion of the ISM bands especially in the 2.4GHz and 5.8GHZ band, quality of service (QoS) can be a challenge for commercial radio communication services. The Authority recommends that commercial operators use other backhaul technologies such as :

(i) Licensed microwave links
(ii) Satellites (VSATs)
(iii) optical fibre connections
(iv) free space optics.

6. The 2.4 GHz band operational requirements

(i) The 2.4 GHz band (2400-2500MHz) shall be used for deployment of Fixed Broadband Wireless Access (FBWA) and Nomadic BWA (NBWA) applications including Radio Local Area Network (RLAN).

(ii) The operation of BWA applications including RLAN in the 2.4 GHz band shall be licence-exempt, with the following eligibility criteria:

- Only licensed telecommunications service providers, private network operators including Internet Service Providers (ISPs), shall be allowed to operate in this band under high power conditions for point-to-multipoint, with maximum Effective Isotropic Radiated Power (EIRP) of 4 W (36 dBm), and point-to-point, with maximum EIRP of 4 W (36 dBm) .

- Other users shall operate in this band under low power conditions with maximum EIRP of 100 mW (20 dBm), in accordance with EN 300 328.

(iii) For operation of non BWA applications, users shall operate in this band on a licence-exempt basis, under low power conditions with maximum EIRP of 100 mW (20 dBm).

7. The 5.8 GHz Band operational requirements

(i) The 5.8 GHz band (5725-5850 MHz) band shall be used for deployment of FBWA and NBWA applications including point-to-point backhaul.

(ii) The operation of BWA applications including point-to-point backhaul in the 5.8 GHz band shall be licence-exempt, with the following eligibility criteria:

- Only licensed telecommunications service providers, private network operators, including ISPs, shall be allowed to operate in this band under high-power conditions for point-to-multipoint, with maximum EIRP of 4 W (36dBm) and point-to-point, with maximum EIRP of 4 W (36dBm), in accordance with EN 302 502.

(iii) For operation of non BWA applications, users shall operate in this band on a licence-exempt basis, under low power conditions with maximum EIRP of 25 mW, in accordance with EN 300 440.

(iv) BWA systems operating in this band shall employ the mitigation Techniques Dynamic Frequency Selection (DFS) and Transmit Power Control (TPC), as recommended in ECC/REC/(06)04 and EN 302 502.

8. Summary of Technical Requirements for ISM Bands

ISM Bands	Application	Maximum EIRP	Applicable Standard
6 765-6 795 KHz	Short Range Communication	100mW (20dBm)	EN 300 330-1
13 553-13 567 KHz	Short Range Communication	100mW (20dBm)	EN 300 330-1
26 957-27 283 KHz	Short Range Communication	100mW (20dBm)	EN 300 220-1
40.66-40.70 MHz	Short Range Communication	100mW (20dBm)	EN 300 220-1
433.05-434.79 MHz	Short Range Communication	50mW (17dBm)	EN 300 220-1
2 400-2 500 MHz	FBWA	4W (36dBm)	FCC Part 15,EN 301 753
	Short Range Communication	100mW (20dBm)	EN 300 328
5 725-5 875 MHz	FBWA	4W (36 dBm)	EN 302 502, EN 301489-17, EN 301893
	Short Range Communication	25mW (14dBm)	EN 300 440
24-24.25 GHz	Short Range Communication	100mW (20dBm)	EN 300 440
61-61.5 GHz	Short Range Communication	100mW (20dBm)	EN 305 550

References

ITU-R Radio Regulations 2012 (Section 5.138 and 5.150)

SADC Frequency Band Plan 2013

Zambia National Frequency Band Plan

ITU-R SM 2153-3 Technical and Operating parameter and Spectrum Use for Short Range Devices.

Framework for Harmonisation of Frequency for Short Range Device (SRDs) in SADC.

ECC/ERC Recommendation 70-03 Relating to Short Range Devices (SRD).

UK interface 2007, Fixed broadband requirement in the 5275-5875 MHz, Ofcom

Policy on the Use of FBWA in the 2.4 and 5.8GHz, Communication Division, Information and Communication Technology, Seychelles.

Guidelines on the Implementation of WLAN on Non-protected Basis, Communication Commission of Kenya.

Regulatory for the Use of 2.4GHz ISM band for Commercial Telecom services. Nigeria Communication Commission.

Short Range Devise Directive, Postal and Telecommunication Regulatory Authority of Zimbabwe.

EN 300 330-1: Electromagnetic compatibility and Radio spectrum Matters (ERM); Short Range Devices (SRD); Radio equipment in the frequency rang 9 kHz to 25 MHz and inductive loop systems in the frequency range 9 kHz to 30 MHz – Part 1: Technical characteristics and test methods.

EN 300 220-1: Electromagnetic compatibility and Radio spectrum Matters (ERM); Short Range Devices (SRD); Radio Equipment to be used in the 25 MHz to 1000 MHz frequency range with the levels ranging up to 500 mW – Part 1: Technical characteristics and test method.

EN 300 328 Electromagnetic compatibility and Radio spectrum Matters (ERM); wideband transmission systems; Data transmission equipment operating in the 2.4 GHz ISM band and using spread spectrum modulation techniques; Harmonised EN covering essential requirements under article 3.2 of the R&TTE Directives

EN 300 440 Electromagnetic compatibility and Radio spectrum Matters (ERM); Short Range Devices (SRD); Radio equipment to be used in the 1 GHz to 40 GHz frequency range – Part 1: Technical characteristics and test methods.

EN 302 502 Broadband Radio Access Networks (BRAN); 5,8 GHz fixed broadband data transmitting systems; Harmonized EN covering essential requirements of article 3.2 of the R&TTE Directive.

FCC Part 15 (Federal Communication Commission Part 15).

EN 301489-17 ElectroMagnetic Compatibility (EMC) standard for radio equipment; Part 17 Specific conditions for Broadband Data Transmission Systems

EN 301893 ElectroMagnetic Compatibility (EMC) standard for radio equipment; Broadband Radio Access Networks (BRAN); 5 GHz high performance RLAN; Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive