



**L E S O T H O  
C O M M U N I C A T I O N S  
A U T H O R I T Y**

**REGULATORY GUIDELINES FOR USE OF  
2.4 GHz ISM BAND FOR COMMERCIAL  
SERVICES IN LESOTHO**

## **Introduction**

The use of broadband for the last mile access or for final distribution to end users will open up new possibilities and enable a wider range or enriched services to be provided to subscribers. It will also allow home-based users to have access to a variety of IP-based services thereby enhancing universal services objectives; Wireless Fidelity (Wi-Fi) technology will ensure the attainment of the above objectives quickly and at an affordable cost to all categories of users. The Lesotho Communications Authority is hereby providing guidelines for the approved commercial use of the ISM frequencies in Lesotho employing Wi-Fi technology in order to ensure rapid expansion of services and accelerated increase in Internet penetration.

## **Purpose of Regulation**

The main objectives of this set of guidelines is to ensure interference-free operation by all users of the band and to ensure that a guaranteed grade of service is available to the subscribers through established quality of service benchmarks and consumer code of practice.

### **1. Operational Guidelines**

- 1.1. ISM band will be permitted for both indoor and outdoor use.
- 1.2. Access to the spectrum will be on a shared basis. There will be no exclusive assignment to any individual or organisations, whether private, public or commercial.
- 1.3. All users, both private and commercial service providers will be guided by the same technical specifications and operational restrictions, with respect to Wi-Fi hotspots deployment.
- 1.4. All equipment to be deployed must be type approved by the Authority prior to deployment. Existing ISM band operators who wish to adapt their present equipment to Wi-Fi deployment must seek approval from the Authority.
- 1.5. All sites in which commercial Wi-Fi hotspots are to be provided must be registered with the Authority.
- 1.6. Wide area deployment will not be allowed on the ISM bands, coverage or transmission distance from a single hotspot must be within the distance stipulated in the technical specification. Transmit power, antenna height and gain must be selected in order to keep emission stipulated distances.

## 2. Licensing Conditions

- 2.1. All Wi-Fi hotspots must be registered and authorised by the Authority and such authorisation shall be renewable annually.
- 2.2. All commercial Wi-Fi hotspot operators shall possess an ISP license.
- 2.3. All equipment to be deployed must be type approved by the Authority.
- 2.4. A reliable customer billing system must be installed.
- 2.5. Tariffs of operators must be displayed within the operator's premises and registered with the Authority.
- 2.6. All customer premises equipment supplied by the operator must conform with the items listed in the TECHNICAL SPECIFICATIONS.

## 3. Technical Specifications.

### 3.1. Basic Specifications: IEEE 802.11b (Industry open standard)

- a. *Operating Frequency:* 2.4 GHz (2 400 – 2483 MHz)
- b. *Maximum Data Rate:* 11/54 Mbps
- c. *Multiple Access Method:* Spread Spectrum/OFDM
- d. *Digital Modulation Scheme:* CCK, BPSK, QAM, etc.
- e. *Maximum Coverage Distance:* 200 metres indoor/outdoor
- f. *Media Access Protocol:* Collision Avoidance Technique
- g. Wi-Fi deployments must be IEEE 802.11a, b and g, and newer versions must be backward compatible with 802.11b and g.

### 3.2. Transmitter Parameter Limits

Transmitter Power Limits (EIRP) = 1 W

The peak power spectral density should not exceed 17 dB in any 1 MHz

- a. *Equipment using FHSS modulation*  $\leq 10$  –dBW (100 mW) per 100 kHz EIRP
- b. *Other types of modulation*  $\leq 20$  –dBW (10 mW) per MHz EIRP

### 3.3. Automatic Transmit Power Control (ATPC)

ATPC feature should be declared with the ranges, the related tolerances and subject to tests.

### 3.4. Dynamic Frequency Selection/Adaptive Frequency Hopping Technique

The equipment should have the capability for dynamic frequency selection from the range of hopping frequencies. The number of hopping channels should not be less than 75. Occupancy on any frequency should not be more than 0.4s in any 30s period.

### 3.5. Bandwidth and Carrier Separation

- a. Carrier frequencies must be separated by at least 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.
- b. Maximum bandwidth must not exceed 1 MHz.

### 3.6. Modulation

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

### 3.7. Adaptive Frequency Hopping/ Adaptive Dynamic Polling

- a. All systems must be capable of Adaptive Frequency Hopping/ Adaptive Dynamic Polling to enable dynamic allocation of hopping channels.
- b. FHSS modulation
- c. Number of channels > 75
- d. Channel separation = separated by channel bandwidth as measured at 20 dB below peak power
- e. Dwell time per channel < 0.4 seconds
- f. DSSS and other forms of modulation