INDEPENDENT COMMUNICATIONS AUTHORITY OF SOUTH AFRICA

NOTICE 74 OF 2019

NOTICE REGARDING THE DRAFT RADIO FREQUENCY SPECTRUM ASSIGNMENT PLAN FOR THE FREQUENCY BAND 440 TO 441 MHz FOR CONSULTATION.

1. The Independent Communications Authority of South Africa ("the Authority"), hereby publishes **Radio Frequency Spectrum Assignment Plan for the frequency band 440 to 441 MHz** in terms of Regulation 3 of the Radio Frequency Spectrum Regulations 2015, as amended, read with the Frequency Migration Plan 2013.

2. This Radio Frequency Spectrum Assignment Plan supersedes any previous spectrum assignment arrangements for the same spectrum location.

RUBBEN MOHLALOGA

CHAIRPERSON

Radio Frequency Spectrum Assignment Plan

Rules for Services operating in the Frequency Band 440 to 441 MHz

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1. Glossary

In this Radio Frequency Spectrum Assignment Plan, terms used shall have the same meaning as in the Electronic Communications Act 2005 (Act No. 36 of 2005), as amended, unless the context indicates otherwise:

"Act"	means the Electronic Communications Act, 2005 (Act No. 36 of 2005) as amended
Technical Sub-Committee	A group of people appointed by ICASA to oversee and advise ICASA with respect to the use of this frequency band.
Device	The transceiver responsible for transmitting the Burglary or Alarm telemetry Signal from the premises.
Gateway	A node in the network which receives and forwards the Burglary and Alarm Telemetry signals sent by the Base Transceivers
Burglar Alarm	Alarm service is a service where frequency-transmitting devices are placed at premises to detect intrusion and duress signals. The main users are security companies.
Security Telemetry Signals	Automated communication process by which security events are collected at a remote or inaccessible point and transmitted to receiving equipment for monitoring.
"DF"	means Dual Frequency
"ITU"	means the International Telecommunication Union;
"ITU-R"	means the International Telecommunication Union Radio Communication Sector
LPWAN	"is a wireless wide area network technology that is specialized for interconnecting devices with low- bandwidth connectivity, focusing on range and power efficiency.
"NRFP"	means the National Radio Frequency Plan 2013 for South Africa
"RFSAP"	means Radio Frequency Spectrum Assignment Plan
"SF"	means Single Frequency

"Spread Spectrum"	Spreading the signal over a bandwidth considerably larger than the data rate in order to increase communications range and reduce the effects of interference.
Rural Areas	Sparsely populated areas in which people farm or depend on natural resources, including the villages and small towns scattered across these areas.

2. Purpose

2.1 A Radio Frequency Spectrum Assignment Plan (RFSAP) provides information on the requirements attached to the use of a frequency band in line with the allocation and other information in the National Radio Frequency Plan (NRFP). This information includes technical characteristics of radio systems, frequency channelling, coordination and details on required migration of existing users where applicable.

2.2 This RFSAP states the requirements for the utilization of the frequency band 440 - 441 MHz. for Low-power wide area networks (LPWAN).

3. General

3.1 This RFSAP:

(a) Enable the assignment of Low Power Spread Spectrum Wide area network in the 400MHz band for the sole use of burglar alarms and security related telemetry signals.
(b) Promote use of compatible technology and coding protocols as defined in this document.
(c) Maximise the efficiency in the use of the Frequency Band.
(d) Facilitate the release of VHF and Midband spectrum currently used by (Burglar alarms, telemetry etc.)

3.2 Low power wide area networks (LPWAN) are attracting a lot of attention primarily because of their ability to offer affordable connectivity to the low-power devices distributed over very large geographical areas.

3.3 In realizing the vision of the Internet of Things (IoT), LPWA technologies complement the conventional cellular and short-range wireless technologies in performance for various emerging smart city and machine-to-machine applications. LPWAN technology is perfectly suited for connecting devices that need to send small amounts of data over a long range, while maintaining long battery life. Some IoT applications only need to transmit tiny amounts of information (e.g. *a parking garage sensor, for example, which only transmits when a spot is open or when it is taken*).

3.4 The ITU-R Report M.2224 recognizes that: "*There is a growing need to provide wireless access media that can link sensors and actuators associated with humans or widely-dispersed objects to core networks in order to support an increasing number of popular service applications. Mobile wireless access systems are in demand for a variety of services such as environment monitoring, stolen goods tracing, monitoring of gas, water, and electricity use for reducing environmental loads, social security and health care, etc*".

3.5 The ITU-R Recommendation M.2002 recommends that LPWAN systems to use the higher portion of VHF or the lower portion of UHF bands.

4. Technical Standards.

4.1 The following technical requirements shall be complied with:

Radio Type Approval:	ETSI EN 300 220-1:V2.4.1 (2012-05) Short Range Devices
Electromagnetic Compatibility:	ETSI EN 301 489-1:V1.9.2 (2011-09) Electro-Magnetic Compatibility (EMC)
	ETSI EN 301 489-3:V1.4.1 (2002-08) Electro-Magnetic Compatibility (EMC)
Safety:	IEC 60950-1:2005
	SANS 60950-1:2010

5. Device Requirements

Duty Cycle:	The device will be limited to a transmit duty cycle of 0.01%
Modulation and Data Rates:	The device shall conform to the modulation format and data rates as prescribed by the Requirements for the usage of the Frequency Band.
Radio Channel Planning:	The device will conform to the requirements of the Channelling Plan as prescribed in this document.
Transmission by Gateways	All Gateway transmissions are to be kept to a minimum and to be used solely for the purposes as prescribed in this document.
Encryption	AES128 Encryption will be applied to the data transmitted.

6. Channelling Plan

6.1 The LPWAN technologies uses minimum channel bandwidths of 125 KHz. Therefore, the channel arrangement in the 440 – 441MHz will be as follows:

6.1.1 The 440MHz to 441MHz frequency band is split into a total of five 125 kHz bandwidth channels.

6.1.2 These channels have a guard-band between them and are spaced 200 kHz apart as shown in Figure 1 and Table 1.

6.1.3 The frequency band 440 – 441 MHz provides a total bandwidth of 1 MHz for burglar alarms and related security telemetry services.

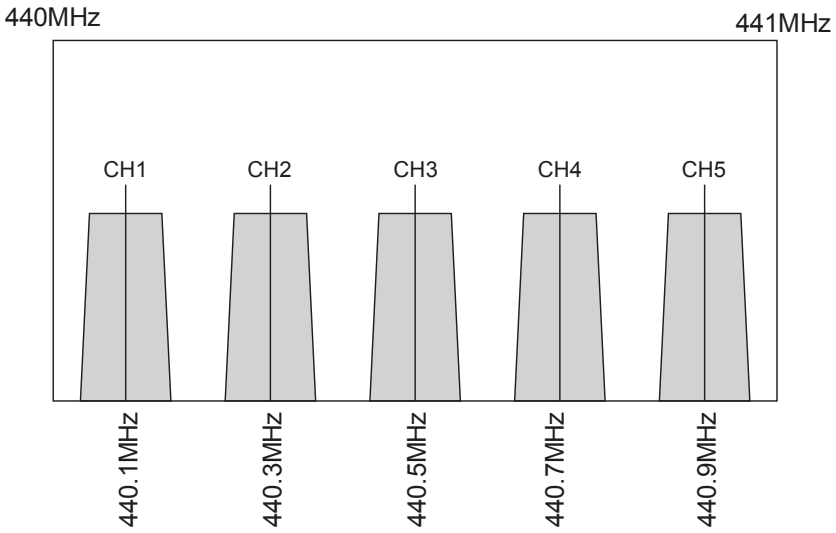

Figure 1: Frequency Band

Table 1 - Channel Arrangements

CHANNEL	CENTER FREQ	BANDWIDTH (kHz)
1	440.100MHz	125kHz
2	440.300MHz	125kHz
3	440.500MHz	125kHz
4	440.700MHz	125kHz
5	440.900MHz	125kHz

7. Requirements for usage of radio frequency spectrum

7.1 In the interest of efficient use of the available frequencies the following conditions shall apply:

7.1.1 Use of this band will be for national use of bidirectional spread-spectrum burglar alarms and related security telemetry signals.

7.1.2 Only systems using a spread spectrum as specified in this document that promote spectral efficiency will be issued with an assignment. Capacity-enhancing digital techniques are being rapidly developed and such techniques that promote efficient use of spectrum, without reducing quality of service are encouraged.

7.1.3 All transmissions in this band should not exceed 100mw (20dBm) EIRP.

7.1.4 On a case by case basis, for Rural applications, higher EIRP may be permitted if acceptable technical justification is provided. This is not applicable in urban or high-density areas.

7.1.5 Only chirp spread spectrum modulation technique will be employed.

7.1.6 The data rates of the devices are controlled by the Gateways in order to minimise transmission time.

7.1.7 The Gateways will set the device data rate in order to maintain a 6dB margin over the Gateway receive sensitivity at the specified data rate.

7.2 In order to increase the network capacity, transmissions by Gateways in this frequency band will be limited to:

7.2.1 The transmission of acknowledgement signals to devices.

7.2.2 The control of that data rates to be used by devices.

7.2.3 The disabling of devices on the network.

8. Implementation

8.1 This RFSAP comes into effect on the date of publication.

9. Co-ordination Requirements

9.1 Co-ordination with respect to non-shared spectrum shall be performed by the Authority during the process of assignment.

9.2 In the event of any interference, the affected parties may refer the matter to the Authority for a resolution. The Authority will decide on the necessary modifications and schedule of modifications to resolve the dispute. The Authority will be guided by the interference resolution process as shown in **Appendix A**.

9.3 Assignment holders shall take full advantage of interference mitigation techniques such as antenna discrimination, tilt, polarization, frequency discrimination, shielding/blocking (introduce diffraction loss), site selection, and/or power control to facilitate the coordination of systems.

10. Assignment

10.1 The assignment of frequency will take place according to the Standard Application Procedures in the Radio Frequency Spectrum Regulations 2015, as amended.

11. Revocation

11.1 Not applicable.

12. Radio Frequency Migration

12.1 The current unidirectional burglar alarm systems will be gradually migrated out of 140MHz and 152 MHz into 440 – 441 MHz

Appendix A: Interference Resolution Process

When requesting coordination, the relevant characteristics of the base station should be forwarded to the Administration affected. All of the following characteristics should be included:

a) carrier frequency [MHz]

b) name of transmitter station

c) country of location of transmitter station

d) geographical coordinates [latitude, longitude]

e) effective antenna height [m]

f) antenna polarisation

g) antenna azimuth [deg]

h) antenna gain [dBi]

i) effective radiated power [dBW]

j) expected coverage zone or radius [km]

k) date of entry into service [month, year].

l) code group number used

m) antenna tilt [deg]

The Administration affected shall evaluate the request for coordination and shall within 30 days notify the result of the evaluation to the Administration requesting coordination. If in the course of the coordination procedure the Administration affected requires additional information, it may request such information.

If in the course of the coordination procedure, an Administration may request additional information.

If no reply is received by the Administration requesting coordination within 30 days, it may send a reminder to the Administration affected. An Administration not having responded within 30 days following communication of the reminder shall be deemed to have given its consent and the code co-ordination may be put into use with the characteristics given in the request for coordination.

The periods mentioned above may be extended by common consent.