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Spectrum management issues: Kenya and South Africa Perspectives

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Outline

- Introduction to IoT
- Why IoT
- IoT deployment requirements
- Spectrum for IoT
- Role of Spectrum Management in IOT deployment
- What we have done
- Conclusion

Introduction to IOT

- Resolution ITU-R 66 - IoT is a concept encompassing various platforms, applications, and technologies implemented under a number of radiocommunication services

- Diversity of IoT application requirements:
  - Varying bandwidth requirements (how much information is sent)
  - Long range vs short range
  - Long battery life
  - Various QoS requirements.

- Spectrum needs to be made available in a range of frequency bands to cater for various cases.

Why IoT

- Open platforms designed to make building and deploying applications easier, faster, secure and more accessible for everyone
- Available technology to create the low-power, wide-area networks (LPWANs) for machine-to-machine (M2M) and (IoT) applications
- Contribute to socio economic development such as in Agriculture
- Need to manage utilities efficiently such as smart power, water grids, and transport management
- Enhance Population health and wellbeing

IOT deployment requirements

- **Availability of appropriate spectrum**
- **Communication networks with universal coverage**
- **Confidence in security and privacy of transactions in communication networks**
- **IoT networks that can connect sensors and devices containing smaller computer chipsets and requiring less power than smartphones.**
- **Affordable terminal equipment**
- **Addressing requirement for IoT devices: IPv6**

Spectrum for IOT

- **IoT devices are implemented in various radiofrequency bands**
- **IoT may use already allocated spectrum**
  - ✓ **Dedicated spectrum: Interference-free and uninterrupted operation**
  - ✓ **Shared spectrum: Short-range license-exempt frequency bands including industrial, scientific and medical (ISM) bands;**
- **Follow up developments in the proposed 733 - 736MHz paired with 788 – 801MHz.**

Spectrum for IOT

IOT SPECTRUM		
Dedicated Spectrum		Shared Spectrum
National Mobile Network. (LTE, GSM)	Wide area IOT network (e.g. LoRa, SigFox)	WIFI, Bluetooth, SRDs. Dynamic spectrum access techniques.
Wide Coverage		Short Range
Guaranteed QoS	Long battery life, low cost. propagation	Long battery life; low cost. Best effort QoS
800MHz, 900MHz 1800MHz, 1900MHz 2100MHz, 2600MHz	400MHz , 868MHz	SRD (various), WI-FI (2.4 & 5GHz) WI-GIG (60GHz), Bluetooth (2.4GHz), ZIGBEE, UWB?, TVWS?

Spectrum for IOT

Band	Use
1.9GHz	DECT ultra low energy
120-150 KHz	RFID
13.56 MHz	RFID
433 MHz	RFID
865 -868 MHz	RFID
5795 – 5815MHz	Road Traffic Telematics
57 – 66GHz	Multi gigabit wireless systems
915.1 – 915.2MHz	Real time location systems

Role of Spectrum Management in IoT deployment

- **Avail spectrum for a wide range of IoT applications i.e. short and long range, licensed and unlicensed**
- **Mitigate the additional load to existing services such as Wi-Fi and 4G mobile networks**
  - **Spectrum above 25 GHz for 5G and IoT for exponential traffic growth**
- **Establish standards: Interoperability among heterogeneous and distributed IoT systems such as ZigBee, Bluetooth, Wi-Fi, UNB, Mobile (GSM, 3G, LTE)**

What we have done…

- **Kenya has published SRD guidelines with specified parameters and conditions: available in website www.ca.go.ke**
- **South Africa has published an amendment to the national radio regulations to cater for license - exempt 60GHz and light licensing of the 70/80GHz**
- **Encouraging IPv6 adoption. Sensitised Government and Industry**

Conclusion

- **There is need to study technical and operational aspects of radio networks and systems for IoT**
- **New initiatives such as "licenced shared access (LSA)" may avail additional spectrum.**
- **ICASA will co-host the 2017 Dynamic Spectrum Alliance summit, 9 - 11 May 2017 in Cape Town, South Africa. http://dynamicspectrumalliance.org/global-summit/**