

Satellite Regulation: An Ofcom Perspective

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Introduction

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Summary

- Intro to Ofcom and our space team
- Trends on spectrum demand & spectrum management
- International spectrum management
 - How the process works
 - Relevant groups
 - What we have done in recent years

1. Overview of Ofcom roles and responsibilities

Why regulate in space & who regulates in the UK?

Why? Because of the potential for **physical damage** and **radio interference** caused by activities in space

- Because of this, nations of the world have agreed international treaties on the use of space and radio spectrum
- The **UK Space Agency** is responsible for mitigating **physical** risk
- **Ofcom** is responsible for managing **radio spectrum**

In addition, satellite earth stations on the Earth have the potential to interfere with, and be interfered by, other radio spectrum users

Ofcom manages all spectrum use in the UK



Ofcom's Space Team

Sets the [strategy](#) for Space Spectrum Management

Justin Moore & Liz Quintana

[Processes filings through the ITU](#) on behalf of UK organisations

Callum Gray

Authorises the use of [Satellite Earth Stations](#) in the UK
(includes RSA to protect Space Science and EESS downlink)

James Richardson

Represents [UK Interests on space and science spectrum matters](#) at
international fora

Nandan Patel, Stephen Limb & Jesus Arnau-Yañez

For all matters related to scientific use of space:
(EESS, Radio Astronomy, GNSS, Timing)

Bharat Dudhia

2. Trends in Spectrum Use and Spectrum Management

Ofcom and the Electromagnetic Spectrum

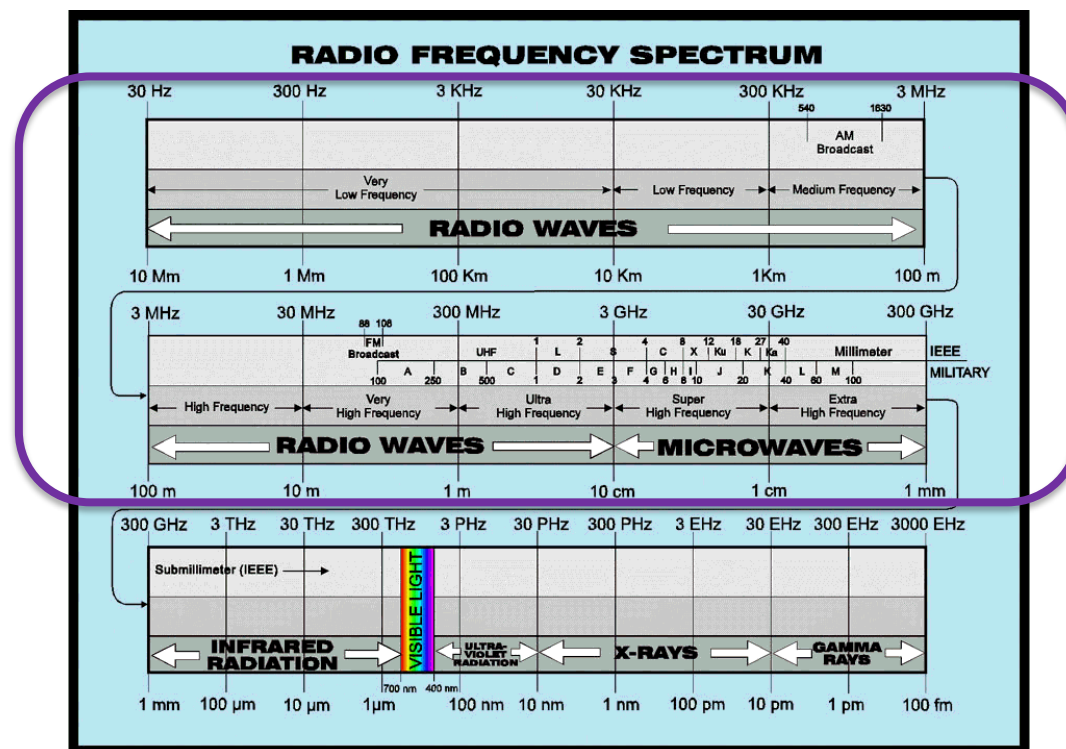
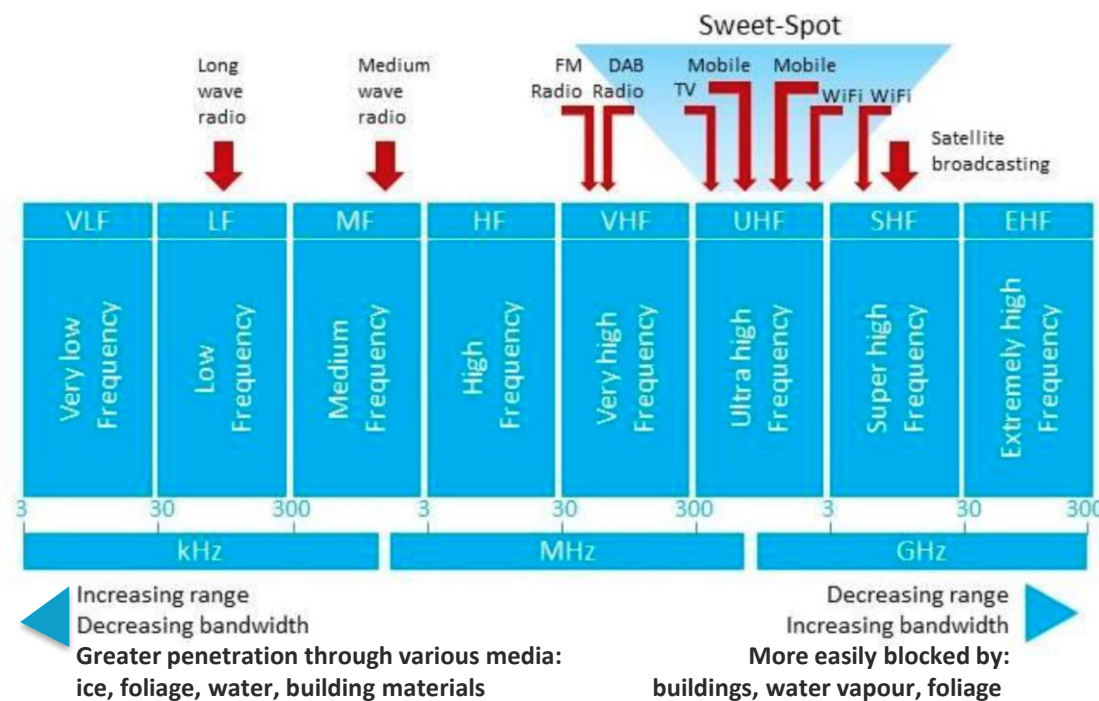


Image: Itstactical.com – emphasis author's

The space sector utilises the entire electromagnetic spectrum to study the Earth and the Universe but the ITU – and subsequently Ofcom - only regulates the use of radio and microwaves.

Spectrum “Sweet Spot”



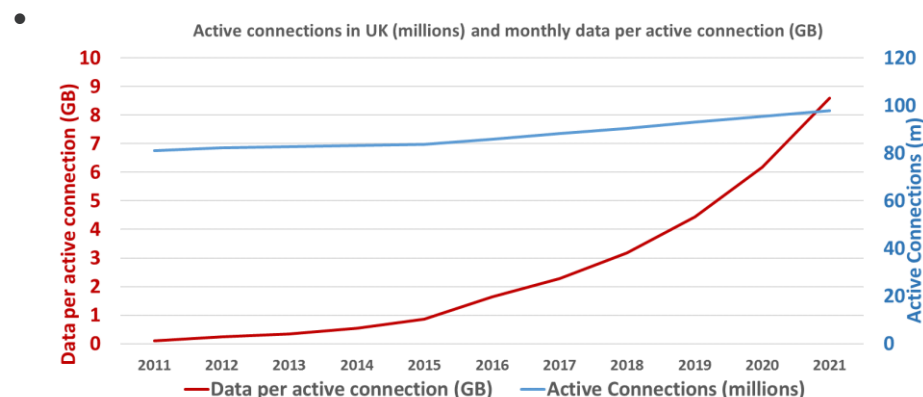
There is a sweet spot for most commercial operations and therefore competition for those frequencies.

The ‘sweet spot’ range is expanding: Frequencies > 20 GHz of interest to both satellite and mobile and will be discussed at the World Radiocommunication Conference in 2019; Frequencies > 100GHz are now being discussed

Everyone is going wireless: there are more and more sectors interested in wireless communication

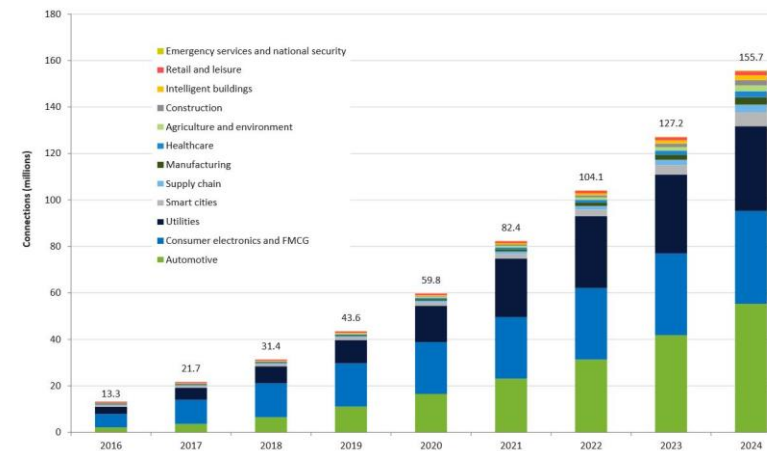
General Trends

- Ofcom’s [spectrum management strategy \(2014\)](#) sets out how we manage spectrum use
- Spectrum is finite (although there are many ways for different operators to co-exist)
- There is increasing demand for access to spectrum especially from mobile network operators to meet the growing demands for data



Tenfold increase in mobile traffic 2011-2016.

Source: Ofcom Connected Nations 2016 and CISCO VNI (note: active connections do not include IoT)

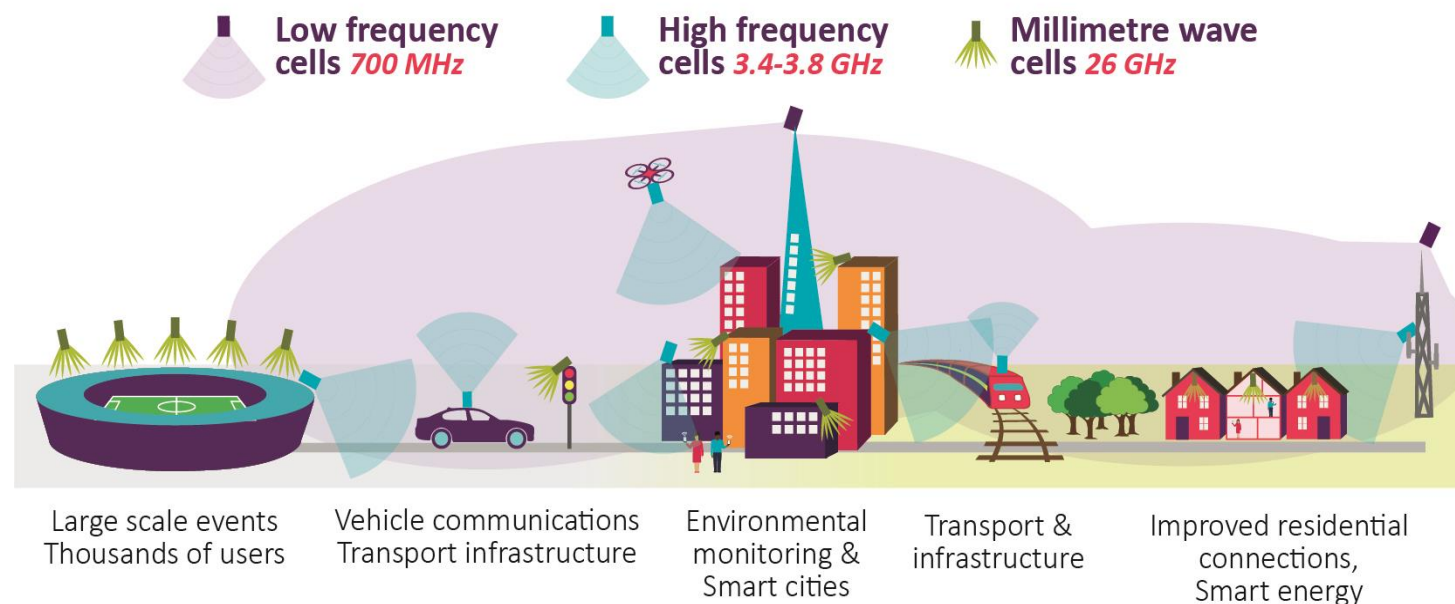


Source: “Review of the latest developments of the Internet of Things”, Ofcom 2017

- Ofcom report into IOT estimates IOT growth from 13.3bn connections in 2016 to 156bn by 2024
- Now greater emphasis on spectrum sharing rather than allocating portions of spectrum for specific sectors or applications

5G – 5th generation mobile networks

The European Commission’s Radio Spectrum Policy Group has identified several bands for 5G in Europe, including three ‘pioneer bands’: **700 MHz**, **3.4-3.8 GHz** and **26 GHz**. Many of these are global 5G bands. Higher frequencies for 5G will also be considered at WRC-2019.



Source: "Update on 5G spectrum in the UK", Ofcom Feb 2017

UK is keen to be forward leaning on 5G. There is a potential role for satellite: M2M, cellular backhaul, fixed & mobile broadband... but some potential restrictions to earth stations and possibly some earth observation capabilities as a consequence of proposed roll out

5. Representing the UK at International Fora

International Bodies

Ofcom represents UK interests at:

UN International Telecommunications Union (<https://www.itu.int/en/pages/default.aspx>)

CEPT – European Communications and Postal Service (<https://cept.org/>)

RSPG – Radio Spectrum Policy Group (<http://rspg-spectrum.eu/>)

RSC – Radio Spectrum Committee (<https://ec.europa.eu/digital-single-market/radio-spectrum-committee-rsc>)

ETSI – European Telecommunications Standards Institute (<https://www.etsi.org/>)

Radio Regulations



Radio regulations (RR) - rights and obligations

- Radiocommunication service definitions
 - Frequency allocations and status
 - Technical and regulatory conditions on the use of the bands
 - Procedures (i.e. coordination and notifications, interference management, recoding of frequency assignments etc.)
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- The RR are updated at every WRCs (World Radio Conference) and next WRC Nov 2019
 - National regulations are largely based on the RRs
 - The RR is very important for space services due to nature of the applications
 - Complying with national and international regulations essential in preventing harmful interference to other services
 - Using the right bands (i.e. the use consistent with the RR allocations)

International Groups relevant to Earth Observation

Global

- ITU-R Study Group 7: covering all science issues
- ITU-R Working Party 7C: EO and MetAids
- ITU-R Working Party 7B: Space research/EO/SRS data comms, including TT&C

Within Europe (ITU Region 1)

CPG Project Team A: deals with all science related WRC19 agenda items

Within UK (Ofcom)

IFPG Working Group 2: discusses UK position

World Radiocommunications Conferences: Previous Successes

- **WRC-12**
 - AI 1.6 Identification of frequency bands for passive sensing between 275 GHz and 3000 GHz
 - AI 1.24 Extension of the existing primary allocation for non-geostationary MetSat at 7750 - 7850 MHz into the band 7850 - 7900 MHz
- **WRC-15**
 - AI 1.12 Additional allocation for active EESS at 10GHz for high resolution Earth imaging
 - AI 1.11 new allocation for EESS uplink at 7GHz to support science missions

WRC-19: Upcoming issues

- AI 1.2 Ensuring protection of METSAT at 401-403 MHz and 460MHz
- AI 1.6 Coordination of NGSO constellations in Q/V bands
- AI 1.13 IMT >24GHz (ensuring continued protection of existing EESS bands)
- AI 10 – Sets the study programme for future Agenda Items:
 - Space Weather and radar are two proposals

So What?

- Spectrum is increasingly in demand across a wide range of frequencies
 - Making efficient use of spectrum through a variety of means – including sharing – is key
 - Particularly important when designing active sensors but also for passive sensing too
 - For more information
- Radio Regulations
- Ofcom's Spectrum Information Portal
- Continues to represent the UK interest

Thank you for listening....any questions!