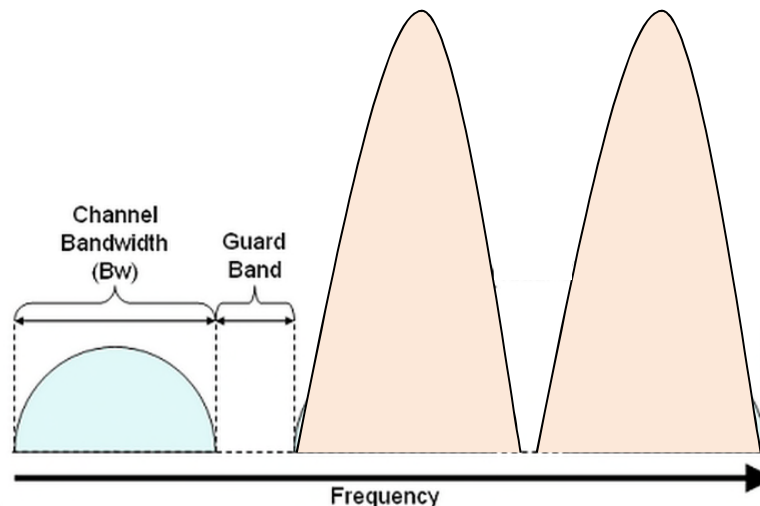# Adjacent Band Interference Concerns

Separating different radio types

- As described in previous sessions, the Radio Regulations divide radio spectrum into separate "allocations" to reduce the potential for interference between different types of radio use
  - eg GNSS and TV have separate frequencies
- To minimize interference, "guard bands" between very different services were used in the past

Channel Bandwidth (Bw) Guard Band

Frequency

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Maximizing spectrum efficiency

- However, because spectrum is scarce and valuable, guard bands are avoided today

- Instead regulators work at the ITU to identify service types that can either work together in the same bands or with minimal frequency separation

- An example of services that can sometimes use the **same bands** are point-to-point links and point-to-satellite links (fixed and fixed-satellite services in ITU speak), which use highly directional radio beams (dish antennas)

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What is an adjacent band?

- Two frequency bands next to each other are called "**adjacent bands**"

- Radio Regulation services allocated in adjacent bands have characteristics that allow them to be **compatible**

- compatible adjacent band services are typically similar, eg ground to Earth satellite emissions

- services that are incompatible and therefore not suitable to be in adjacent bands are typically very different in nature
  - eg TV (very high power) and mobile phone networks

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Being a 'good neighbour'

- Adjacent band compatibility means that the emissions of radio services in adjacent bands do not cause unacceptable interference to each other – they are good neighbours

- How do you know different services will be good neighbours?

- Ask the ITU!

- ITU Member State experts (working within ITU **Working Parties**) consider in detail how two different services work as neighbours

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Adjacent band compatibility studies

- ANY change to the Radio Regulations that considers making new allocations to a radio service will have to be carefully studied to assess the impacts on existing services

- the studies will consider the parameters for each service as well as how they are used, or would be used

  - eg power levels, antenna types/direction, receiver sensitivity, frequency characteristics, indoor/outdoor, fixed position or mobile

  - these are built into a model to determine the degree to which the two services interfere with each other

  - depending on the results, the new allocation may or may not be compatible with the existing service

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When it can go wrong

- If new allocations/services are introduced:
  - without compatibility studies being carried out
  - or if incorrect parameters are used
  - or assumptions about existing usage are incorrect
    - ⇨ then **interference is a real risk!**
- this could happen if a country decides to introduce new services without proper studies
- this is especially risky for GNSS, with such low level signals:
  - spectrum occupancy measurements do not show the presence of GNSS signals
  - if other radio services use nearby frequencies
    - ⇨ **interference to GNSS is a real risk!**

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