# TV White Space Networks
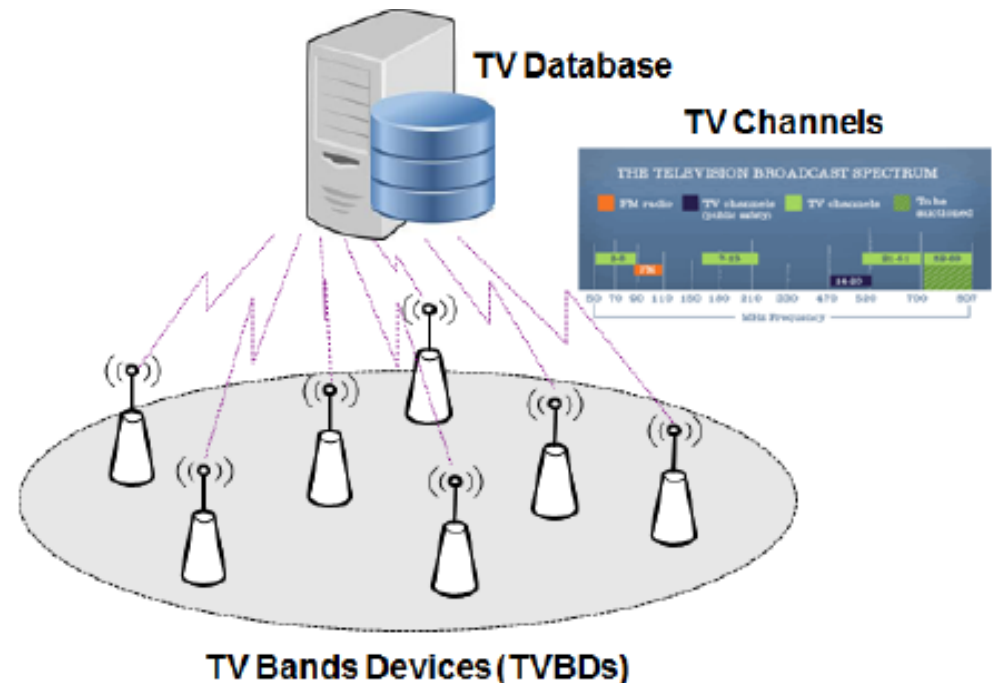
☐ The RF spectrum is a scarce resource in wireless communication systems

☐ The dramatic development of the mobile telecommunication industry

☐ The FCC has made the unused spectrum in the *TV bands* (also called "*White Space*") available for unlicensed broadband wireless devices.
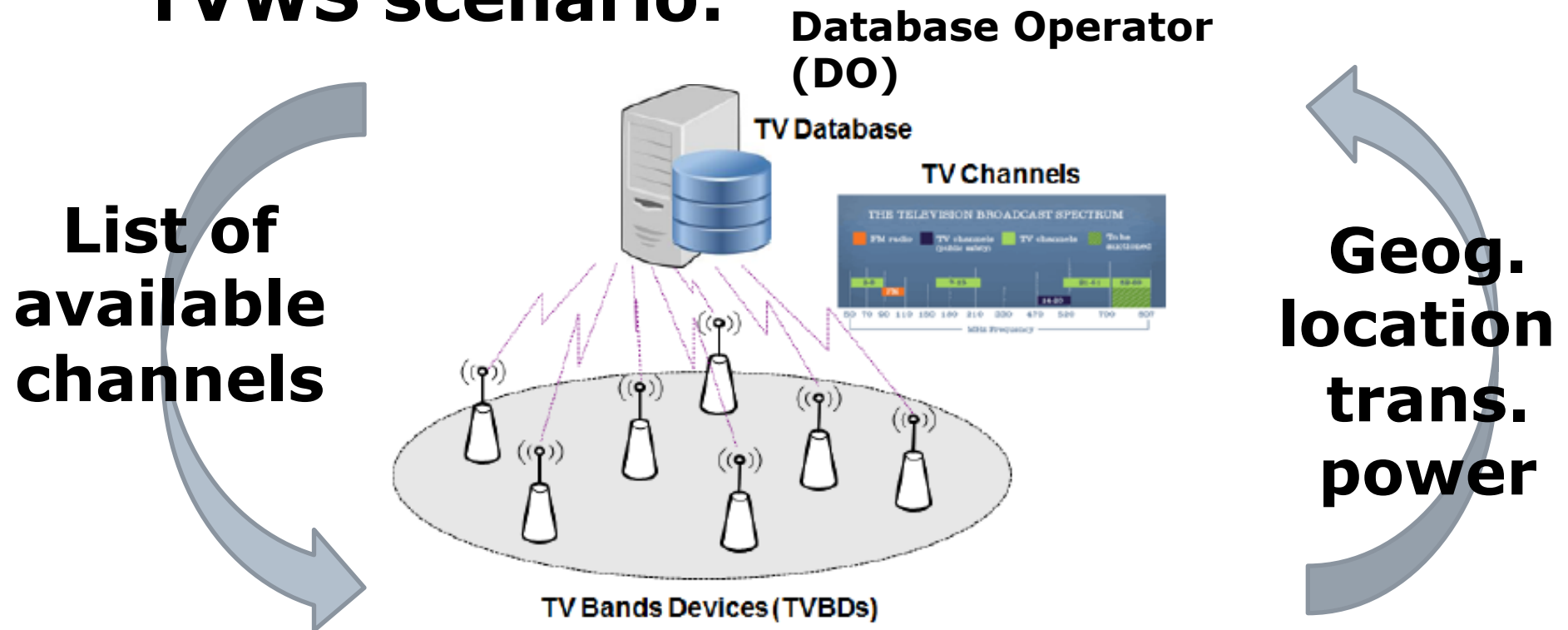
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# Context

## TVWS scenario:

☐ A TV database operated by a Database Operator (DO)

☐ A set of unlicensed devices/TV bands devices (TVBDs)



TV Database

TV Channels

THE TELEVISION BROADCAST SPECTRUM

TV Bands Devices (TVBDs)

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# Context

## TVWS scenario:



**Database Operator (DO)**

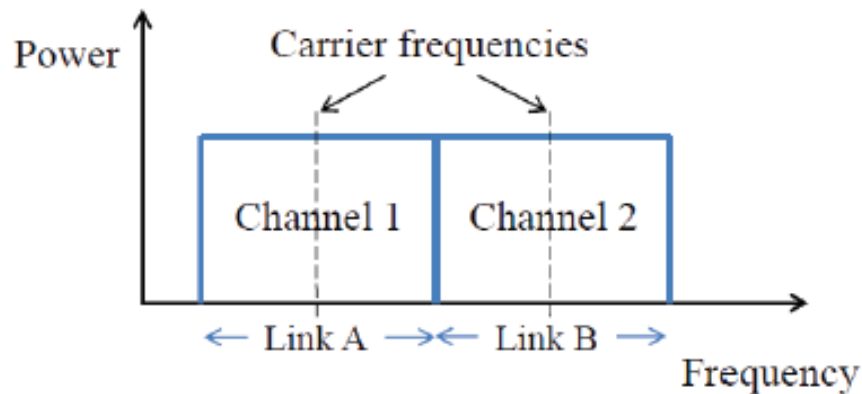**List of available channels**

**Geog. location trans. power**
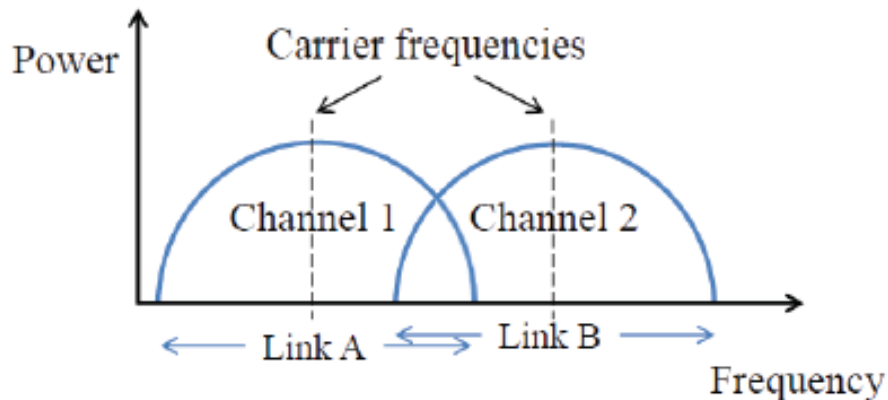
# Motivations

- TVWS spectrum access is often designed without taking into account ACI

- However, ACI can occur between transmissions of TV stations and TV Bands Devices (TVBDs) as well as between different transmissions of TVBDs.
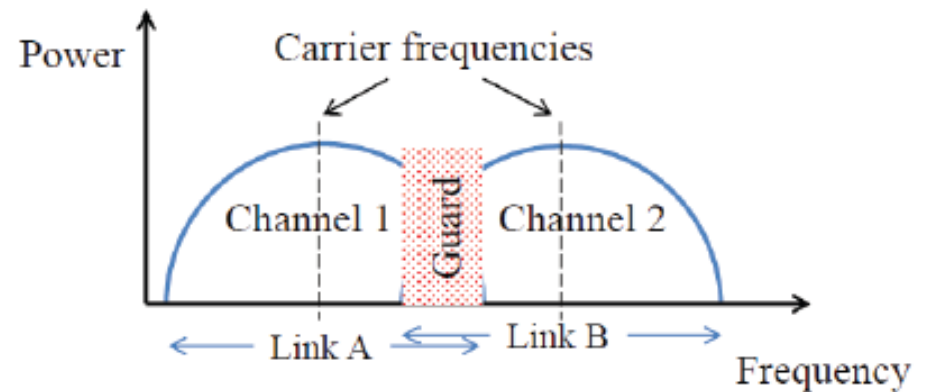
# Adjacent-Channel Interference (ACI)



- ☐ (a) Ideal power spectral density (PSD)
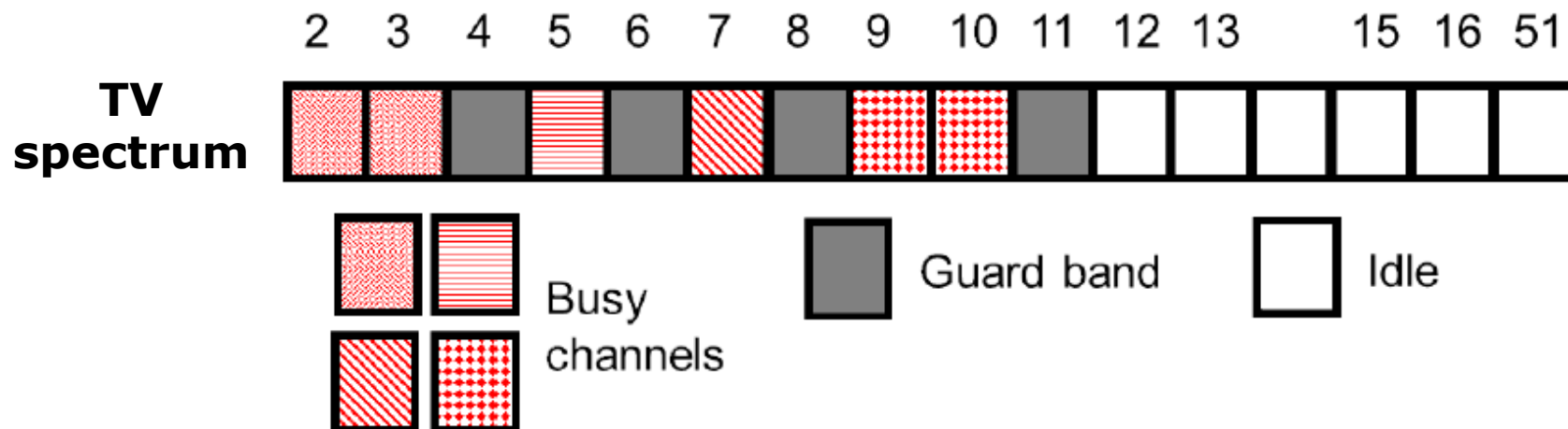- ☐ (b) PSD in a practical communication system
- ☐ (c) PSD with "Guard Bands"

# Guard bands - which model?

☐ Guard band (GB) reuse: GBs can be shared by two different interfering links

☐ No GB reuse: two adjacent transmissions require their own GBs



**H. Salameh, M. Krunz, and D. Manzi. Spectrum bonding and aggregation with guard-band awareness in cognitive radio networks. IEEE Transactions on Mobile Computing, 13(3):569–581, 2013.**

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