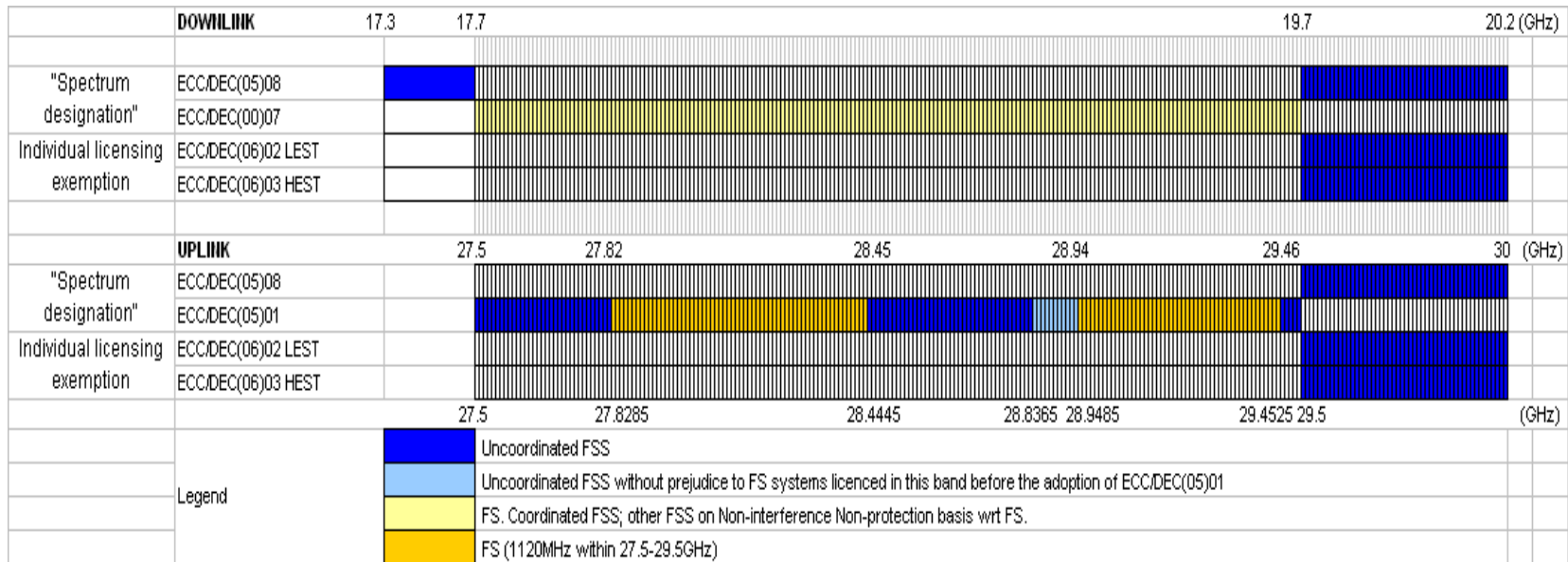


# Short range communications: Spectrum Sharing and wireless backhauling

- One major venue in 5G networks is dense deployment of small cells coexisting comprising a Heterogeneous Network (HetNet).
- Due to novel network architectural components, wireless backhauling will become very important in the future. For **small cells**: LOS,  $\mu$ W, mmW,...

# Spectrum allocation for the microwave communications

- Satellites are an interesting option for smart backhauling



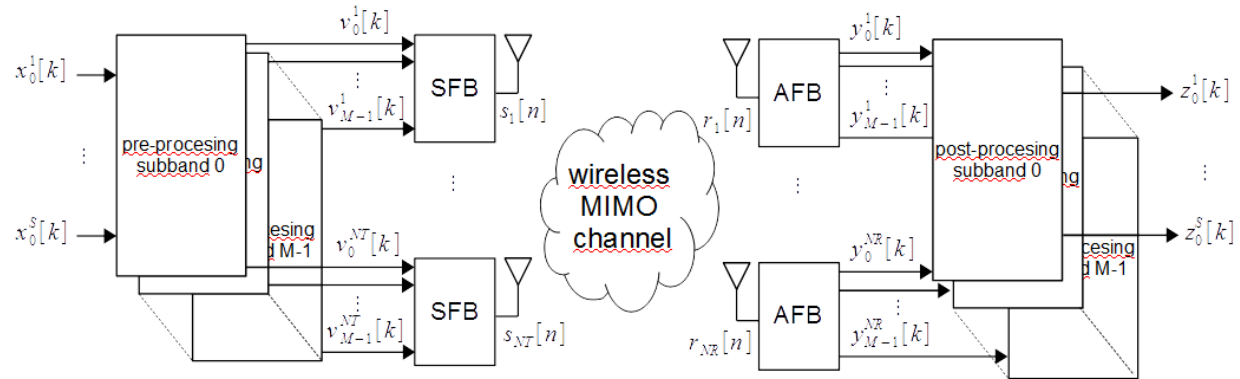
ECC recommendation for the Ka band

- Also, spectrum sharing improves the network efficiency for operators
- In order to achieve 50% to 100% increase of spectral efficiency different enablers and base station capabilities are required as

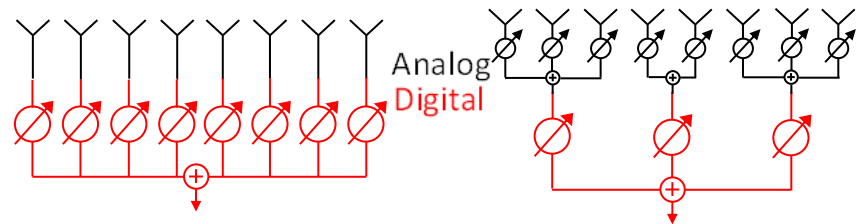
## non-orthogonal spectrum sharing

# Key Enabling Technologies

**MIMO-FBMC:** from cooper to wireless to optical



**Cognitive Beamforming :** Shared Spectrum Access with Hybrid analog-digital RF front-ends processing and control



**Software Defined MAC:** from TDMA to CDMA...to solve management heterogeneity automatically

- We have expertise (patents): **in** Satellite-terrestrial PHY layer and dynamic radio resource management **in** centralized and decentralized access sharing