Editorial suggestions for the 16h Working Document facilitating License-Exempt amendment to 802.16-2004

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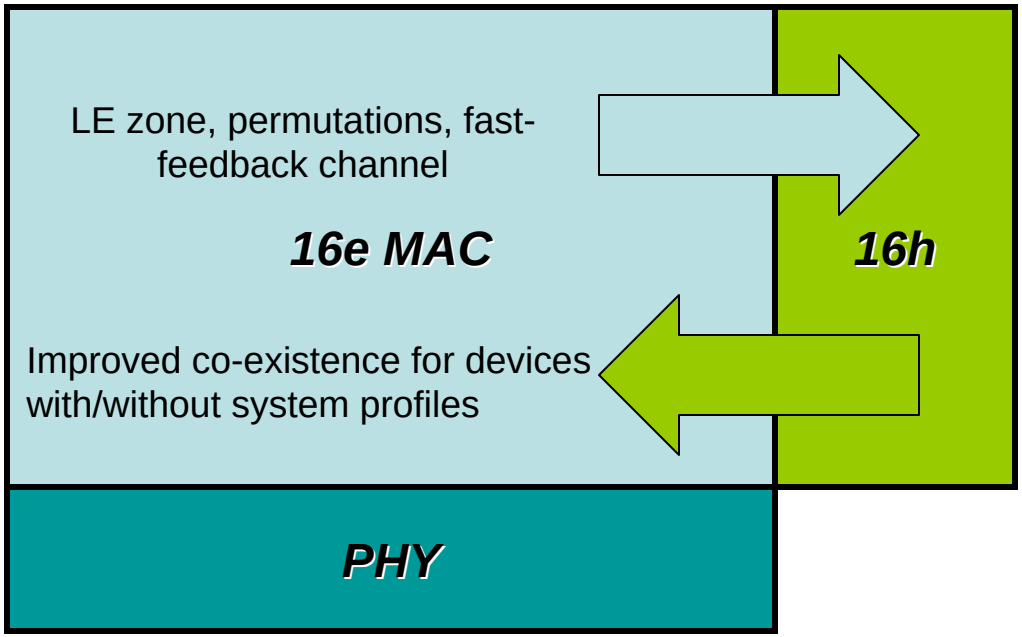
Motivation

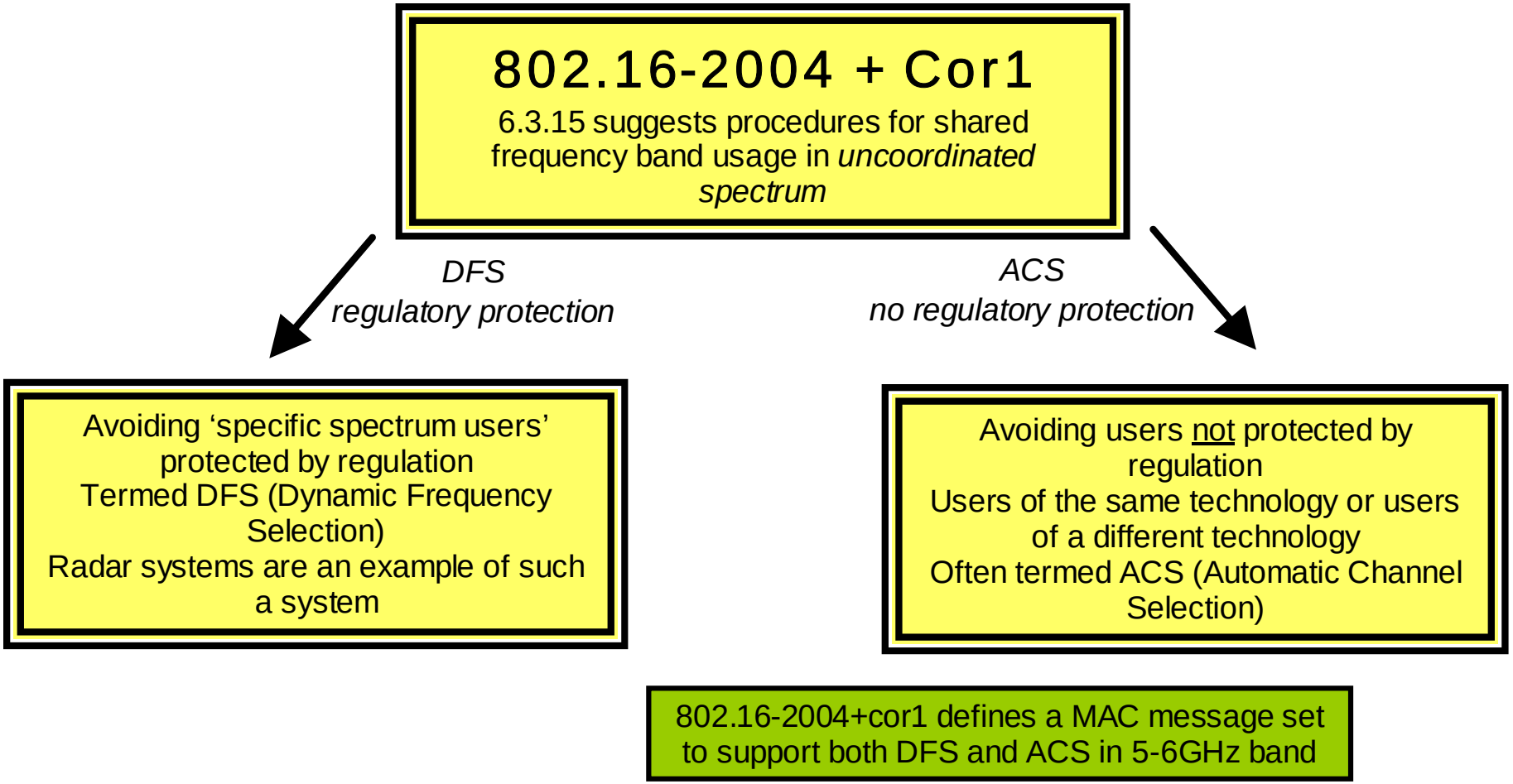
- Providing high-level modifications to the base standard for support of 16h-based amendments
- Considering sections *other than* section 15 - '*Mechanisms for improved coexistence*'
- Provision of a framework for MAC enhancement – leaving scope for additional schemes at a later date
- A framework drawn from the WirelessHUMAN (High-speed Unlicensed Metropolitan Area Network) PHY already include in the base standard
- Provide a 16h 'option' based on a set of existing MAC messages and some additions added in the 16h amendment
- Recognising the tenet that PHY changes are out of scope of this project

Functionality division

- How can functionality be conceptually partitioned?



Current realization



→ Developing the idea of ACS via the WirelessHUMAN route

What enhancements can be achieved beyond ACS?

- ACS could be based on existing MAC support
- Guideline schemes for coordinated and un-coordinated co-existence
  - coordinated and un-coordinated operation could be realised by a device's ability to communicate one with another
- Schemes based on MAC enhancements that will improve detection, avoidance and minimise service outage rates
- Performance requirements for interference mitigation, i.e. the speed at which an interference situation (which is service limiting) can be rectified and the network stabilised
- Used within a '*LE zone*' in OFDM parlance and others

- ***In summary a 16h-enhanced MAC based on the 802.16 PHY - possibly using the 16e amendment***

Summary of issues to be discussed

- Backwards compatibility
- Capability negotiation
- Application of the WirelessHUMAN concept
  - The ACS route and the use of features added by 16e

Backwards compatibility

Policy on how 16h and non-16h devices inter-work:

- This is a device question and goes beyond any deployment situation as the deployment scenario imposed by a given regulatory region is not known ahead of time.
- A device with 16h functionality will need to *interact* with infrastructure that has no knowledge of 16h
- A non-16h device will need to *interact* with 16h compliant infrastructure
- A non-16h device should have the ability to be barred from working in a 16h network – deployment specific and capability negotiation
- A 16h device shall work in a non-16h network as ‘normal’ non-16h device

The WirelessHUMAN route for LE operation

At present the base standard as amended by Cor1/D5 uses the WirelessHUMAN PHY to implementation operation in an LE manner (section 8.5). The sections of the standard where this is apparent are:

- Section 8.5 ('*WirelessHUMAN specific components*')
  - Channelization
  - Transmit spectral mask
- Section 1.3.3 ('*License-exempt frequencies below 11 GHz (primarily 5–6 GHz)*')
  - Scope description and overview
- Table 1 ('*Air interface nomenclature*')
  - Limited to TDD
  - Applicable to WirelessMAN-SCa, WirelessMAN-OFDM, and WirelessMAN-OFDMA PHYs
  - Options supported
- Section 6.3.15 ('*Procedures for shared frequency band usage*')
  - Introduces 'specific spectrum users' and DFS

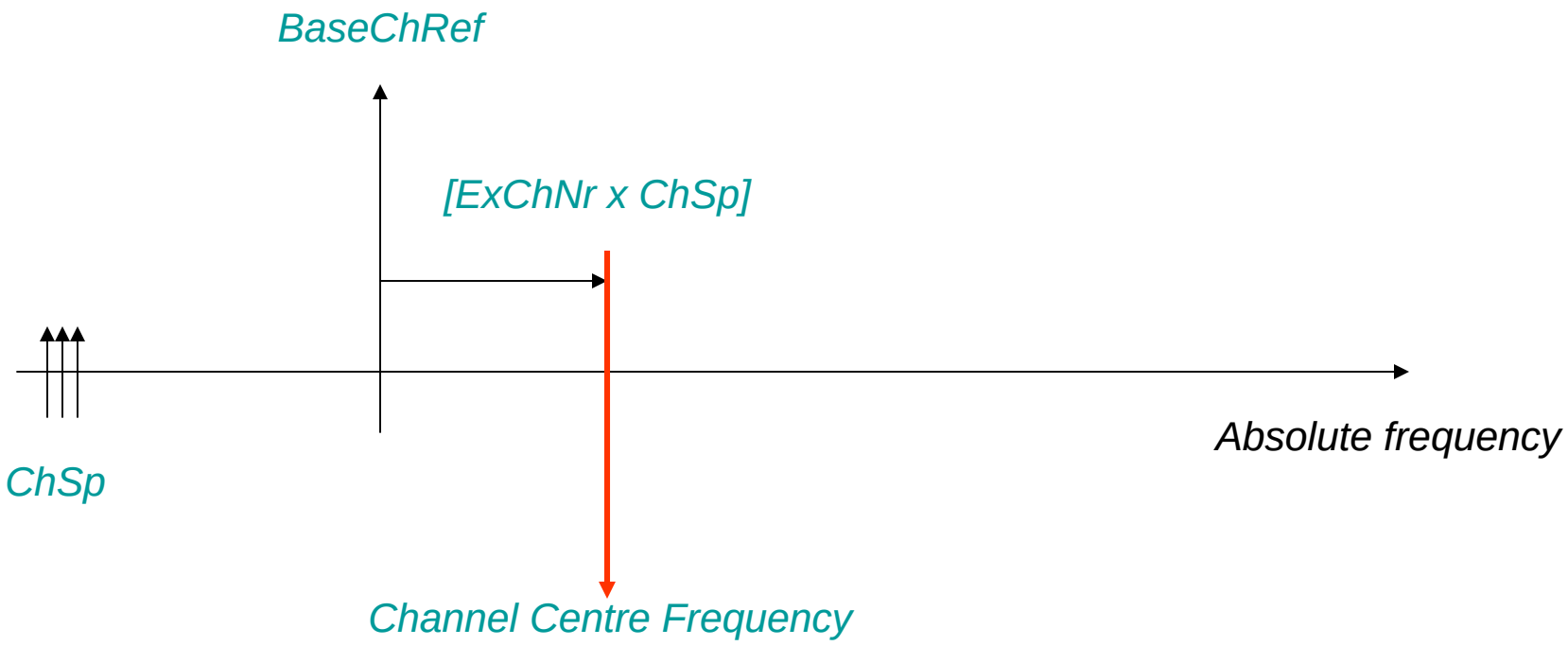
Specific editorial changes

Amendments to:

- Section 8.5 – WirelessHUMAN
- Section 11.7.8.14 – WirelessHUMAN capability
- Section 11.11 – REP-REQ
- Section 11.12 – REP-RSP

Calculation of *Channel Centre Frequency*

Channel Centre Frequency [MHz] = *BaseChRef* [MHz] + (*ExChNr* [MHz]. *ChSp* [200kHz])



Further work

- Investigate the use of current features
  - The addition of a ‘LE zone’ for the OFDMA PHY. This could be one way of grouping together all LE functionality and supporting specific permutations used for LE operation.
  - The use of a fast-feedback channel (16e)
- Consideration of certification testing of the 16h amendment
- Consideration of a set of performance parameters for LE operation. Parameters could include:
  - Expected performance,
  - Air interface overhead incurred by a given LE scheme, including signaling overhead,
  - interference thresholds and reaction times, time for network settling once interference has been detected and acted upon,
  - assessment of maintenance of QoS

Thank you

Back up slides

DFS and ACS realisations

DFS *ACS*