HIPERMAN Liaison Report

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HIPERMAN Liaison Report

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Purpose:

HIPERMAN work status update

ETSI BRAN HIPERMAN
April 16-19, 2002, Sofia Antipolis, France

Liaison Report

Marianna Goldhammer
Liaison Officer

Alvarion

Scope

- Present HM organization up-date
- Present HM progress during April meeting
- Address the documents mentioned in the BRAN Liaison Letter
- Address the HM Call for Contributions

All the mentioned documents are available at:

http://www.ieee802.org/11/private/ETSI_documents/BRAN/Docfile/BRAN28/

Organization and Responsibilities

- Acting chair
  - Nico van Waes, Nokia, for the remainder of this calendar year
- PHY
  - Rapporteur: Frederic Leroudier, Aperto
- MAC
  - Rapporteur: Marianna Goldhammer, Alvarion
- Spectrum, Licensed bands
  - Rapporteur: Nico van Waes, Nokia
- Spectrum, License exempt bands
  - Rapporteur: Kokkos Asimakis, Nokia
- Liaison Officer to 802.16
  - Marianna Goldhammer, Alvarion

HM activities

- Joint PHY and MAC work
  - Adoption of relevant parts from 80216a D3 MAC and PHY
  - Progress in defining sub-channelization/OFDMA for 256FFT
  - Base-line PHY+MAC improvements
- FWA in 5GHz – System Reference Document- DTR 4004
  - Spectrum request in 5.725-5.875GHz
  - Spectrum parameters:
    - 1W maximum mean EIRP
    - Channel spacing of 5,10,20MHz
  - draft considered mature enough to be forwarded to ETSI ERM and CEPT

DTR 4004 Content

- Describe considered technologies
  - P-MP, AP-MP, Mesh
- Market size, forecast, timing
- Coexistence studies with existing spectrum users
  - Fixed satellite service
  - Road Transport and Traffic Telematics
  - Radar
  - Short Range Devices

Progress in defining OFDMA/sub-channelization for 256FFT

- 2 contributions were merged
  - BRAN28d020-Nokia
  - BRAN28d043r1(presentation BRAN28d080)- Alvarion+IMEC
- Other contributions helped to take decision on specific parameters
  - BRAN28d014 - Performance of 256 carrier OFDMA in up-link- IMEC
    - Recommended CC only for 1 and 2 sub-channels, based on simulations
  - BRAN28d049 – OFDMA for 256FFT - co-existence aspects – Alvarion
    - Recommended clustered mode (not lumped) based on interference scenarios between 2 providers in the same area

Benefits of OFDM 256FFT with sub-channelization

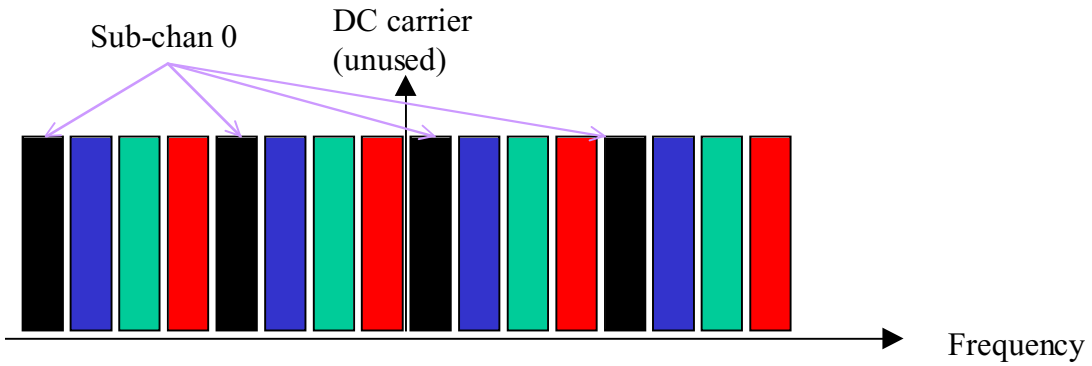
- Up to 6dB additional link-budget
- Improved granularity with relatively short packets
  - Improved BW efficiency

Working assumptions regarding 256FFT sub-channelization mode

- BRAN28d062
- The HIPERMAN working assumptions:
  - OFDMA up-link: Optional
  - Carrier allocation: Clustered
  - Max. sub-channel number: 4
  - Pilot number/sub-channel: 2
  - Data carriers: 48
  - Coding type: 1,2 sub-channels -CC only; 4 channels: CC+RS
  - CC termination: Same as the mandatory mode
  - UL MAP length field: 5bits
  - Length explicitly declared
  - Bits for combination number: 3
  - Ranging accuracy: –25% GI

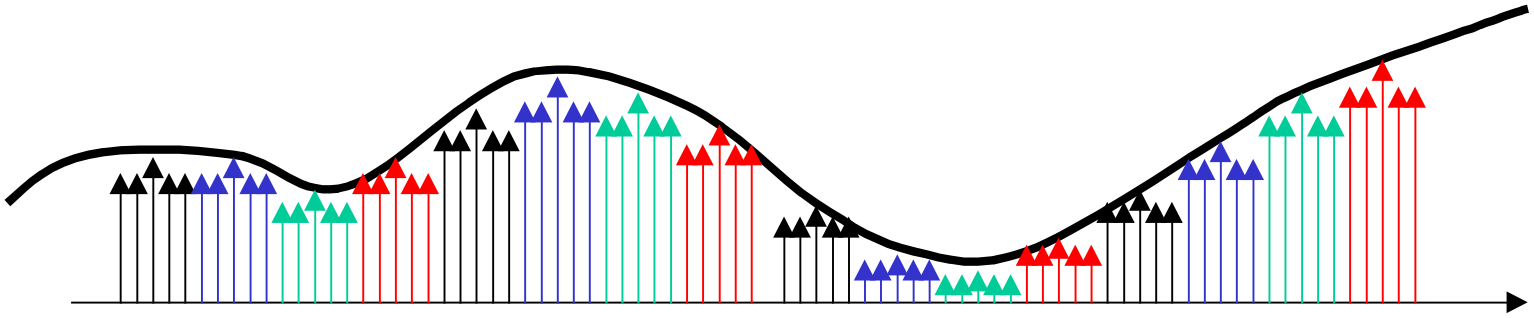
OFDMA/sub-channelization carrier allocation

- 12 data carriers/cluster



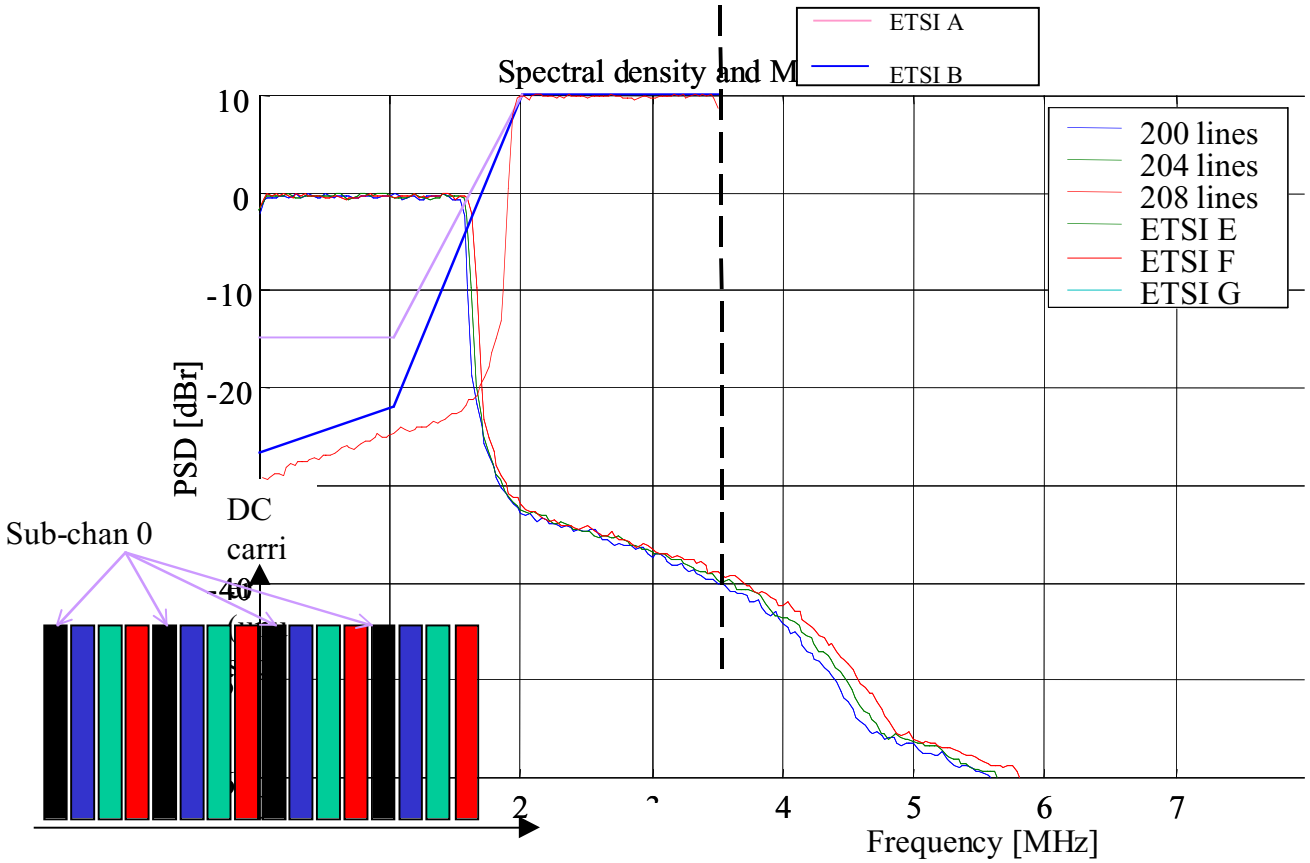
Benefits of the clustered mode - 1

- Frequency diversity with selective fading
- AAS: good exploitation of correlation between channel coefficients in channel estimation.
- Better ICI immunity with phase noise



Benefits of clustered mode - 2

- With clustered approach, only the edge cluster in a sub-channel is affected.



256FFT sub-channelization: changes to 80216a-D3

- BRAN28d063 contains full text
- Interleaving:
  - N_{CBS} (number of coded bits per symbol) depends also of 256FFT OFDMA used sub-channel number
- UL MAP information element format
  - Rename “offset” to “minislot start”
  - Specify which sub-channels are used: 1,2,3,4,1+3,2+4, all
- Subscriber Station synchronization
  - UL symbols arrive to BS with a time accuracy of 25% of the guard interval or better

256FFT sub-channelization: changes to 80216a-D3 - continuation 1-

- Parameters of transmitted signal
  - Carrier allocation per sub-channel, indicating exact carrier position for the 4 clusters
- Coding
  - when using 1 or 2 sub-channels, use CC only, with the same overall coding rate as indicated in table 229
- Preamble structure
  - Send only the relevant sub-carriers

256FFT sub-channelization: changes to 80216a-D3 - continuation 2 -

- UCD channel encoding
  - Add for 256FFT the sub-channelization mode
- Bandwidth allocation support
  - Add 2 new classes:
    - OFDM, no channelization support
    - OFDM, channelization support

MAC and PHY base-lines modifications

- Decisions and text in BRAN28d087
- Mesh licensed-bands adjustments
  - Split table 170 to make distinction between general parts, licensed bands and un-licensed bands – editorial change
- Better Mesh centralized scheduling
  - Replace Table 181
  - Centralized scheduling configuration
    - Insert new figure
- Mesh system profile definition
  - Mandatory messages for Mesh
  - Messages to support P-MP
  - Messages not used, when working in P-MP mode

MAC and PHY base-lines modifications - continuation -

- OFDM PHY
  - Receiver sensitivity
    - Ask by 4dB better performance
- Delete 8.3.4.2.9 – General requirements
  - Not in scope of the WI

Trellis termination method

- HM discussions indicated large support for “zero-tail” trellis termination
  - Add 6 bits, but makes implementation much simpler
  - Should be the same for both:
    - OFDM
    - OFDM sub-channelized mode
- TGa is requested to address this issue

Call for Contributions

- Discussions are reflected by BRAN28d062
- Contributions are expected in the areas:
  - B.T.C. coding
  - Applicable UIUC
  - Training sequences
  - Contention slot definition and usage
  - Carrier allocation scheme
  - Number and allocation of pilots
  - Naming

What next

- BRAN HM and 802.16a should work together to produce a better, world-wide standard
- 802.16a is invited to adopt the HM improvements to the draft:
  - HM decisions for PHY/MAC base-line modifications
  - HM working assumptions regarding OFDM 256FFT sub-channelization
    - This will create the environment to better consolidate this mode, due to larger comment base, as an OFDM enhancement
- Expect to have 802.16a comments available next meeting
  - BRAN29, July 2-5, Sophia Antipolis, France