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Title	**802.16m Frame structure for intra-system interference management**
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Re:	16m Frame Rap. Group - Call for Comments
Abstract	Proposed 802.16m Frame Structure for better interference management and E-MBS support
Purpose	Actions: 1. Modification of ToC 2. Capture of the text in the SDD
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802.16m Frame structure for intra-system interference management

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Introduction

The contribution IEEE C802.16m-08/039 has presented the coverage improvement based on a Frame structure having as scope to improve the C/I at the cell margin while using a FULL frequency channel in every sector. The proposed solution is using a combined Reuse 1/Reuse 3 approach in OFDMA and power density domain. While the contribution C802.16m-08/039 has proposed a number of variants, this contribution is focusing on a single simplified variant. In response to the observations reflected in C802.16m/08-96r10, this contribution also tries to better clarify the proposed concepts.

The proposed scheme will be named CFR (Combined Frequency Reuse), in order to differentiate from the FFR (Fractional Frequency Reuse) or Reuse 1 with different loading factors. The CFR is a Reuse 1 scheme from point of view of frequency reuse and a combined Reuse 1 and Reuse 3 scheme from point of view of maximum power density reuse.

The advantages of the CFR scheme are:

- Frequency channel can be fully reused
- The interference at the cell margin is reduced
- The "single point of failure" – single FCH and MAP transmission at the maximum power density is removed
- Splitting in time domain between Reuse 3 and Reuse 1 is not longer necessary; this legacy split mode contradicts with the sub-frame concept and the Relay concept, which both add time-domain splitting. Splitting everything in time domain introduces spectral efficiency problems due to the granularity of time resource allocations for Zones and overheads related to excessive fragmentation.

The translation of the CFR scheme in OFDMA domain is a concept named "SET", which is an enhancement of the "major group" concept in the basic 802.16 standard. Was preferred the introduction of a new term in order to avoid confusions between the major groups in the legacy standard and the major groups in the 802.16m Amendment.

From here insert text for SDD

11.4.4 Cell Coverage Support in Frame Structure

11.4.4.1 Interference management

The interference management is based on separation of interferers in sub-channel and power density domains. The frequency channel is split in sub-channel SETs (see fig. xx for downlink), including:

- **Reuse 1 E-MBS SET**, for Multi-cast and Broadcast services, forming a "single downlink frequency" channel. All the Base Stations will use this sub-channel partition for providing the E-MBS services. The E-MBS SET is used only in downlink.

- **Reuse 1 Control/Data**, used for sending/receiving the Control/Data information to/from those users which do not suffer from significant interference. In order to avoid the creation of such interference levels, it might be necessary the limitation of the power density used in this SET.
- **Master Control/Data** used for sending the Control/Data information at maximum power density and to receive at minimum interference. Each sector in a BS will have its dedicated Master SET.
- **Slave Control/Data SET**, which can be used for sending/receiving Data and eventually Control information. The transmission can take place only if it is not creating interference to the Master SETs in other Base Stations. The interference can be reduced based on the reduction of the power density (see example in fig. yy) or using SDMA techniques.

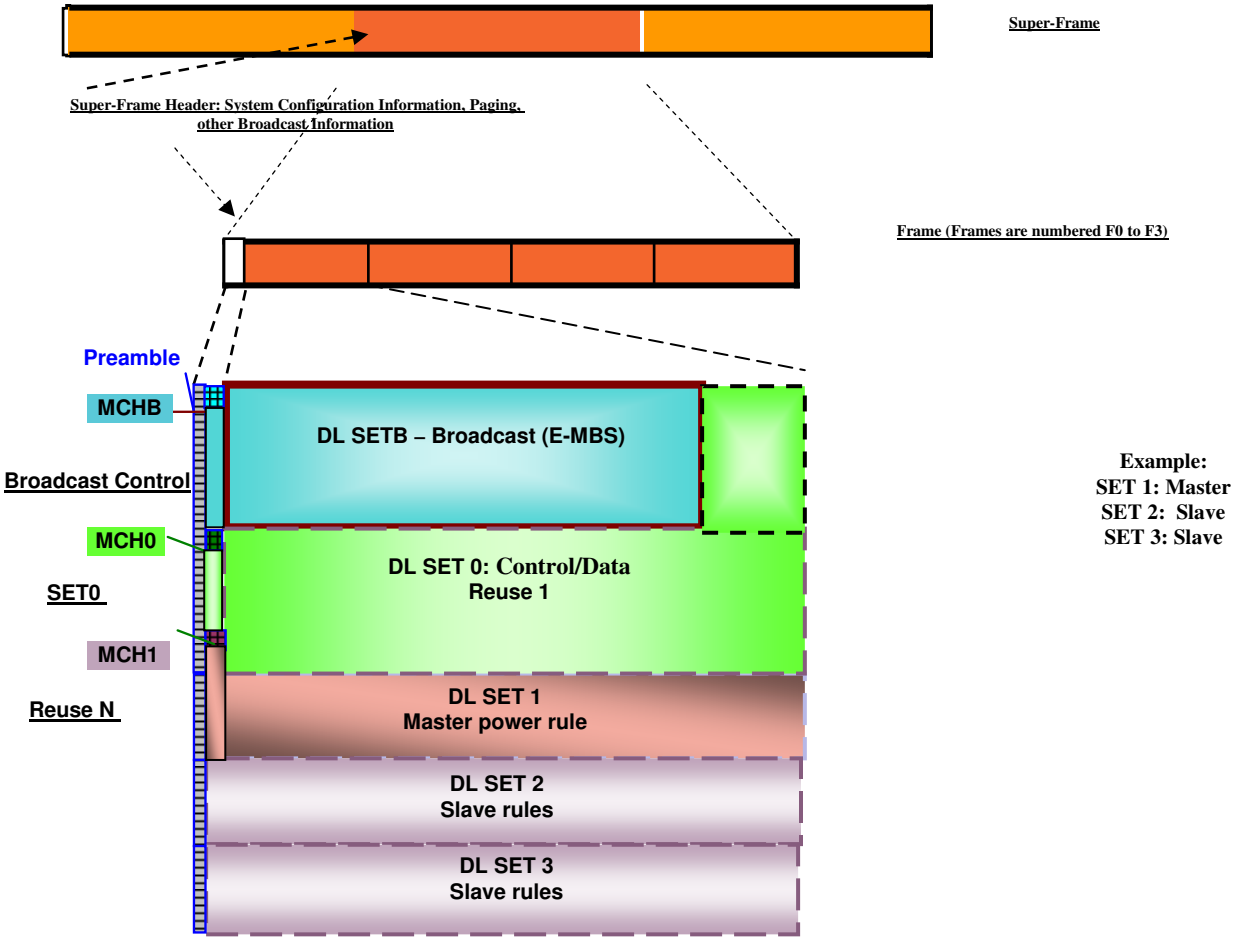

Fig. xx DL Frame splitting in SETs

The Multi-frame preamble and the Frame preambles are sent following the SET power rules.

Within each one of the three main SETs, the Master SET, Reuse 1 E-MBS and Reuse 1 C/D, the Base Station will be able to transmit MAPs at the beginning of the Frame. The MAPs are preceded by a MAP Control Header, sent on a well-known OFDMA partition and containing information as:

- Sub-channel allocation to SETs
- STC used for MAP transmission
- Modulation/coding for the MAP of the SET

- Type of the SET: Reuse 1 control/data, Reuse 1 E-MBS, Master
- Etc.

The MAP transmission follows the MCH transmission in the pre-defined sub-channel partition and continues in the SET to which it belongs.

The number of sub-channels allocated per SET may be changed every multi-frame. In this way, the SET capacity can be adapted to both interference and traffic conditions. Fig. xx provides an example of Reuse 1 and Master/Slave partitions, for a 3 sectors deployment.
The uplink can use its own sub-channel partition in SETs. The SETs used in up-link are: Reuse C/D, Master and Slave SETs.

Fig. yy presents an example of the power distribution between sectors. The Master SETs can use a high power density, while the Slave SETs use a limited power density. The Reuse 1 Control/Data SET may be also limited a certain level of power density. The power density of the E-MBS SET transmissions can be significantly higher if a special radio amplifier will be used.

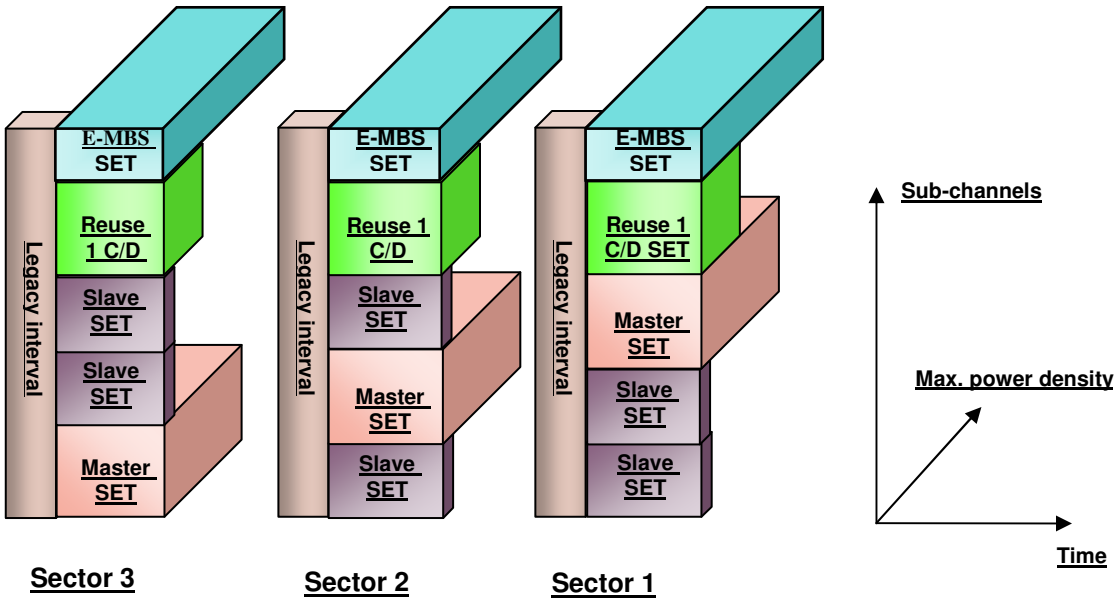

Fig. yy – Example of possible power density distribution for SETs

The E-MBS service involves transmission of video frames carrying variable amounts of data. The remaining time may be used for Reuse 1 Control/Data transmissions; an example of SET allocations in a multi-frame is given in fig. zz.

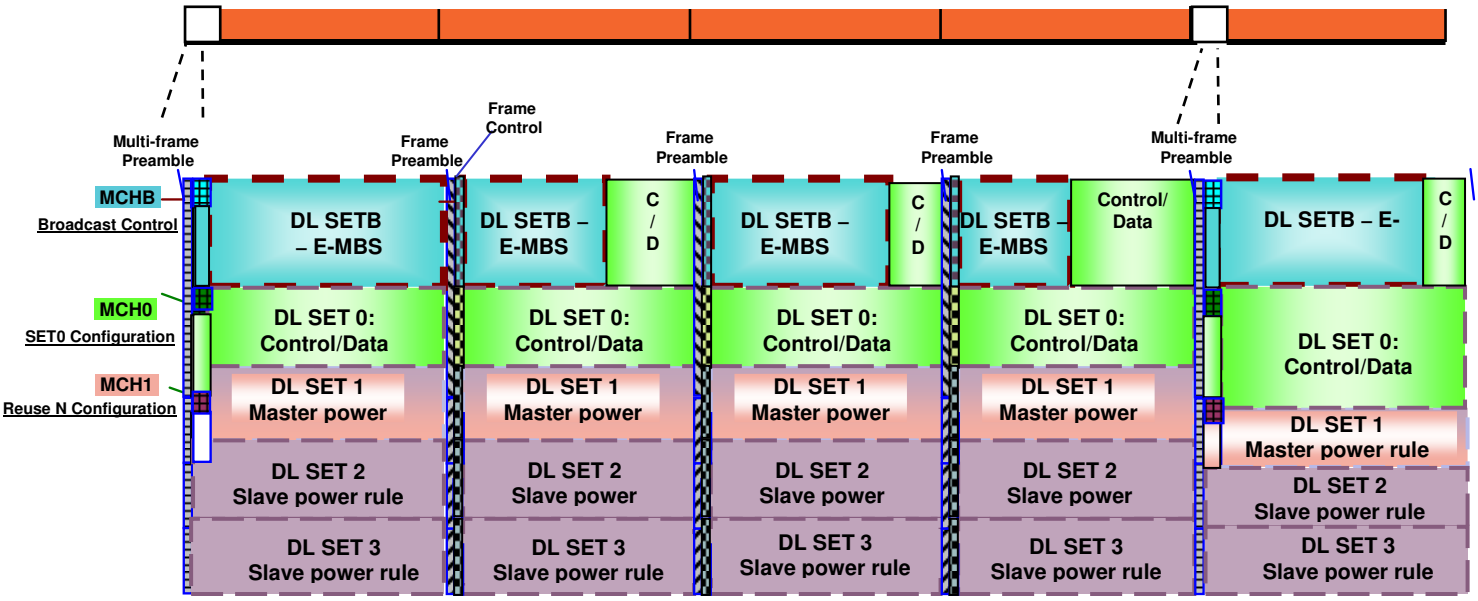

Fig. ZZ DL SET allocations in a multi-frame

The relay support will include a Relay Zone, as described in clause 11.4.5. The Relay Zone may include its own sub-channel allocation to SETs.

End text insertion