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Re:	LE TG Call for Contributions
Abstract	
Purpose	Approval
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Radio Signature scheduling

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Introduction

This contribution proposes a number of text improvements.

Specific changes

Page 113, line 45

Move the text as modified to new clause 15.4.2.3.3

During some of the Master sub-frames, the Base Station will create a slot, possibly not overlapping with another slot of a coexistence neighbor Base Station, during which every transmitter (BS or associated SS) will send a predefined signal; this signal, called "radio signature", will be used to measure the interference created by that transmitter.

- The "radio signature slot" for a Base Station will be created during its ~~Tx~~ DL Master sub-frame and the following rules apply:
  - ~~, every B MAC frames;~~ Only one Base Station in a CX Community can have a scheduled radio signature transmission
  - No other BS will transmit during this time interval, including other Base Stations which use the sub-frame as Master
- The "radio signature slot" for a ~~Subscriber Station~~SS/MS will be created during the ~~Rx~~ UL Master sub-frame~~;~~ and the following rules apply:
  - Only one SS/MS in a CX Community can have a scheduled radio signature transmission
  - No other SS/MS will transmit during this time interval, including other MS/SS which use the sub-frame as Master
-
- The MAC messages for scheduling both the Radio Signatures and the silence intervals during the transmission of the Radio signatures are CX-UL MAP and CX-DL-MAP, using ~~and~~ suitable DIUC/UIUC. ~~for scheduling the "radio signature" are t.b.d.~~
- During the "radio signature" intervals, all the other BSs and SS~~s~~/MS in the CX Community shall use a Gap interval, during which no transmission is to be made;
- ~~The Base Station shall provide enough transmit opportunities for the active SSs.~~

Alloca shows the possible allocation of the "radio signature" transmission opportunity for a given system, using for example the Type 1 repetitive pattern, with a focus on system 2.

The system 2 will transmit its Base Station radio signatures from time to time (every N MAC intervals); different radio signatures will be sent for every used power/sub-channelization/OFDMA sub-channel/ spatial direction combination. During these intervals the other Base Stations will schedule a Gap interval, in order to identify one Base Station solely. Base Stations using the same MAC sub-frame as the Master sub-frames shall schedule the transmission of their "radio-signatures" in such a way that they will not interfere with each other.

The transmission of "radio-signatures" used by the active SSs will take place during the Master sub-frame, from time to time (a timer shall be defined). The repetition period and the duration of the signature transmission shall be a parameter in the BS Database. The active SSs will provide a signature for every used power/OFDMA/sub-channelization/ direction setting.

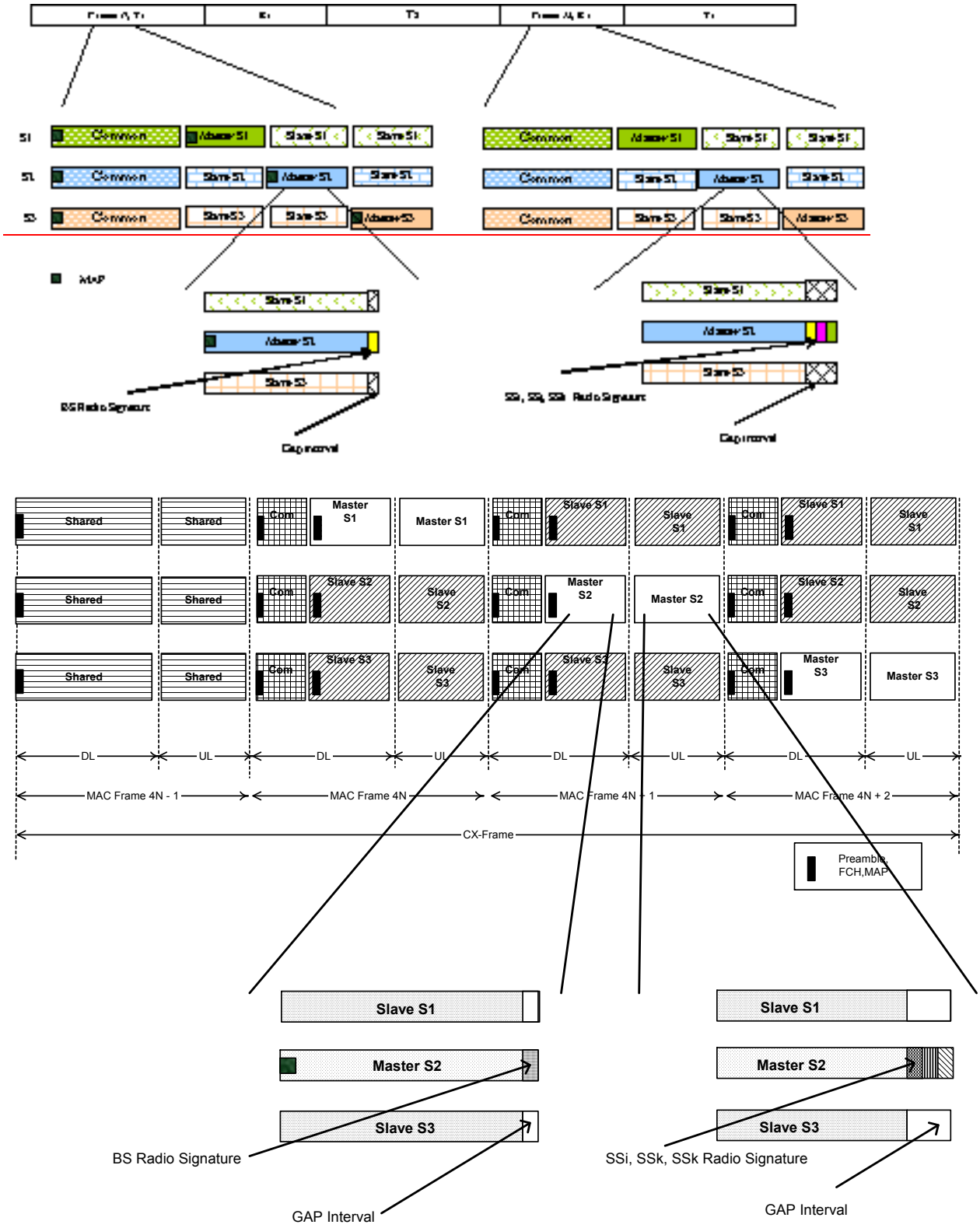

Figure h51—Allocation of slots for BS and SS radio signature

Changes to CX DL MAP and CX UL MAP Messages:

6.3.2.3.82 CX-DL-MAP (CX DL MAP) message

The CX-DL-MAP message defines the access to the DL information and has an extended scope and flexibility in comparison with the DL-MAP Message. If the length of the CX-DL-MAP message is a non-integral number of bytes, the LEN field in the MAC header is rounded up to the next integral number of bytes. The message shall be padded to match this length, but the SS shall disregard the 4 pad bits.

A BS shall generate CX-DL-MAP messages in the format shown in Table 40, including all of the following parameters:

PHY Synchronization

The PHY synchronization field is dependent on the PHY specification used. The encoding of this field is given in each PHY specification separately.

DCD Count

Matches the value of the configuration change count of the DCD, which describes the DL burst profiles that apply to this map.

Base Station ID

The Base Station ID is a 48-bit long field identifying the BS. The Base Station ID shall be programmable. The 24 MSBs shall be used as the operator ID. This is a network management hook that can be sent with the DCD message for handling edge-of-sector and edge-of-cell situations.

DL MAC IE relevance

This parameter indicates the virtual shift to be added to the MAC Frame number appearing in the subsequent DL-MAP Information Elements. In this way the relevance of the allocations in the succeeding DL-MAP Information Elements can be extended to future MAC frames.

Conditional DL transmission type

This parameter indicates the type of the condition to be checked in order to enable the scheduled transmissions in the following DL MAP and the scheduling of the Radio Signatures. The possible values are:

0 – No condition

1 – Radio power at the receiver

2 – Radio Signature transmitted by this system – no condition

3 – Radio Signature transmitted by another system – no condition

~~2~~4-15 – Reserved.

Max Power Level

This negative parameter indicates the max. power level (in dB) at which a transmission cannot be enabled.

The encoding of the remaining portions of the CX-DL-MAP message is PHY-specification dependent and may be absent. Refer to the appropriate PHY specification.

The DL-MAP IEs in the CX-DL-MAP shall be ordered in the increasing order of the transmission start time of the relevant PHY burst. The transmission start time is conveyed by the contents of the DL_MAP IE in a manner that is PHY dependant.

Multiple CX-DL-MAP Messages may be transmitted and every CX-DL-MAP Message may use a different DIUC.

Table 108xx—CX-DL-MAP message format

Syntax	Size (bit)	Notes
CX-DL-MAP_Message_Format() {	—	—
Management Message Type = 82	8	—
PHY Synchronization Field	*variable*	See appropriate PHY specification; may include MAC Frame Number.
if (WirelessMAN-CX) {		
No. OFDMA symbols		
}		
DCD Count	8	—
Base Station ID	48	—
Begin PHY-specific section {	—	See applicable PHY subclause.
if (WirelessMAN-OFDMA) {	—	—
No. OFDMA symbols	8	Number of OFDMA symbols in the DL
}	—	subframe including all AAS/
for (*i=1; i <= m; i++*) {		
for (*j* = 1; *i <= n; j++*) {	—	permutation zone.
DL MAC IE relevance	4	
Conditional DL transmission type	4	0 – no condition 1 – max. detected power level 2 – Radio Signature transmitted by this system – no condition 3 – Radio Signature transmitted by another system – no condition ~~2~~4..15 - Reserved
if (Conditional DL transmission type = 1) {		-
Max power level	8	Negative value, in dBm
}		
DL-MAP_IE()	*variable*	—
}		For each DL-MAP element 1 to *n*
}	—	For each DL-MAP element 1 to *m*.
}	—	See corresponding PHY specification.
if !(byte boundary) {	—	—
Padding Nibble	4	—
}	—	—
}	—	Padding to reach byte boundary.

The logical order in which MPDUs are mapped to the PHY bursts in the DL is defined as the order of DL-MAP IEs in the DL-MAP message.

6.3.2.3.83 CX-UL-MAP (CX UL MAP) message

The CX-UL-MAP message defines the access to the UL channel and has an extended scope and flexibility in comparison with the UL-MAP Message. The CX-UL-MAP message shall be as shown in Table 108yy.

Table 108yy—CX-UL-MAP message format

Syntax	Size (bit)	Notes
CX-UL-MAP_Message_Format() {	—	—
Management Message Type = 83	8	—

Reserved	8	Shall be set to zero.
UCD Count	8	—
Begin PHY-specific section {	—	See applicable PHY subclause.
if (WirelessMAN-OFDMA) {	—	—
No. OFDMA symbols	8	Number of OFDMA symbols in the UL
}	—	subframe
for (*i=1; i <= m; i++*) {		
for (*j* = 1; *i <= n; j++*) {	—	permutation zone.
Allocation Start Time	32	—
Conditional UL transmission type	4	0 – no condition 1 – max. detected power level 2 – Radio Signature transmitted by this system – no condition 3 – Radio Signature transmitted by another system – no condition ~~2~~4..15 - reserved
if (Conditional UL transmission type = 001) {		-
Max power level	8	Negative value, in dBm
}		
UL-MAP_IE()	*variable*	—
}		For each UL-MAP element 1 to *n*
}	—	For each UL-MAP element 1 to *m*.
}	—	See corresponding PHY specification.
if !(byte boundary) {	—	—
Padding Nibble	4	—
}	—	Padding to reach byte boundary.
}	—	—

The BS shall generate the CX-UL-MAP with the following parameters:

UCD Count

Matches the value of the Configuration Change Count of the UCD, which describes the UL burst profiles that apply to this map.

Allocation Start Time

Effective start time of the UL allocation defined by the UL-MAP (units are PHY-specific, see 10.3). The Allocation Start Time may indicate allocations in subsequent MAC frames.

Map IEs

The contents of a UL-MAP IE is PHY-specification dependent.

Conditional UL transmission type

This parameter indicates the type of the condition to be checked in order to enable the scheduled transmissions in the following UL MAP. The possible values are:

0 – No condition

1 – Radio power at the receiver

2 – Radio Signature transmitted by this system – no condition

3 – Radio Signature transmitted by another system – no condition

2..15 - Reserved.

Max Power Level

This negative parameter indicates the max. power level (in dB) at which a transmission cannot be enabled.

IEs define UL bandwidth allocations. Each UL-MAP message (except when the PHY is an OFDMA PHY) shall contain at least one information element (IE) that marks the end of the last allocated burst. Ordering of IEs carried by the UL-MAP is PHY-specific.
The CID represents the assignment of the IE to either an unicast, multicast, or broadcast address. When specifically addressed to allocate a bandwidth grant, the CID shall be the Basic CID of the SS. A UIUC shall be used to define the type of UL access and the UL burst profile associated with that access. An Uplink_Burst_Profile shall be included in the UCD for each UIUC to be used in the UL-MAP.

The logical order in which MPDUs are mapped to the PHY bursts in the UL is defined as the order of UL-MAP IEs in the UL-MAP message.