IEEE P802.15
Wireless Specialty Networks

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| IEEE 802.15.13 Suggested Topics for Next Teleconference |
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Abstract

# This document contains topics suggested for consideration for MAC frame format and services.

## MAC frame format topics

### The subfields within “Frame Control” field

The proposed Frame Control field includes two subfields: To backhaul and From backhaul. Together with following “Receiver Address” and “Transmitter Address” “Auxiliary Address 1” “Auxiliary Address 2”, it implies a different network topology with a “backhaul”. A description of the topology and its associated OWPAN IDs should be explained.

ACK info, together with the following ACK Information field implies a piggyback solution of sending acknowledgement. However, this introduces additional implementation complexity while not being able to reduce the overhead of a standalone ACK frame which still exists as a MAC frame. Besides, even with it being optional, it takes one bit in the Frame Control field to turns it off. Its advantage needs to be shown.

### New MAC frame Frame Type/Subtype

* 1. The HCM downlink transmission, i.e., coordinator to device, has been presented. The downlink transmissions are simultaneous for all receiving devices. This is achieved by coordinator using different HCM row(s) from HCM matrix to encode the outgoing traffic for different devices and each device decoding the received data with its assigned HCM row(s). To accommodate HCM assignment, one new MAC frame subtype of Management Type is to be proposed: HCM assignment notification frame.
	2. The modulation and coding scheme (MCS) can be dynamically changing based on many factors, such as channel condition etc. The receiver can request the change of the MCS for future incoming traffic. The transmitter can respond the request to indicate the MCS for future transmission. Two new MAC frame subtypes are to be proposed: MCS change request frame and MCS change response frame.
	3. LED selection request frame is transmitted by the transmitter that is equipped with multiple LED modulation lines and has the flexibility choose only using a subset of the LEDs to transmit. The receiver then sends LED selection response frame to suggest the LEDs to be used.

### IE: its types and content

IE is mentioned in 802.15.4-2015. The purpose of IE is to allow certain information to be included in every MAC frame, while maintaining a simple MHR. It also allows encryption to the content by putting it in the payload. Similar to the proposed “Ack Info” and “Ack Information” field, MCS change request and response can be integrated in each MAC frame. However, it will make the MHR complex and with overhead. An IE can be used for each of these functions then a single IE Present subfield in the Frame Control field can be used to turn IE on or off.

It is also suggested that if IE is to be included, a fixed number of IEs in each frame should be suggested to keep the implementation complexity low.

### Dynamic fields

"Dynamic fields", for lack a better word, refers to fields in the frame that can be interpreted differently based on the fields in front of them. Often the meaning of the field differs. Sometimes, the boundary of the fields also changes. E.g., in IEEE 802.15.4-2015, the "Frame Control" field consists of many subfields. Based on the "Frame Type" field, which is the first subfield of the "Frame Control", the following subfields can be configured for general MAC frame or multipurpose frame.

## MAC service topics

### Random access mechanism

The presented superframe structure from VLNComm requires a time-slotted CAP combined with “handshake” process between coordinator and associated devices.

There have been several other discussions regarding CSMA/CA. Need a motion to keep it in the standard as optional similar to RTC and CTS.

### Inactive state

One of the main differences between 802.15.4 and VLNComm's proposal and what, as far as I know, is also the consensus among the task group is whether to regulate devices to be active or not active. 802.15.4 not only allows inactive state for devices but also develop its protocol around this option. E.g.,

* + there is an active period and inactive period of a superframe;
	+ Indirect transmission to make sure device is on when transmission occurs.
		- coordinator advertises pending frames etc.

We are proposing to remove the option of "inactive state". Therefore, the coordinator assumes devices are always active, i.e., ready to receive.

* There is no inactive potion of the superframe.
* Indirective transmission is removed.
	+ Coordinator no longer advertises pending frame.