**IEEE P802.15**

**Wireless Personal Area Networks**

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| Project | IEEE P802.15 Working Group for Wireless Personal Area Networks (WPANs) | |
| Title | **Intel Preproposal** | |
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| Abstract |  | |
| Purpose |  | |
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**Intel Proposal Overview**

1. PHY OCC Techniques for point light sources
   1. Normal Image Sensor (e.g. 30 fps): Under-sampled Frequency Shift ON/OFF Keying (UFSOOK)
      1. Sampling is at less than Nyquist rate; OOK frequencies are arbitrary but at a high enough rate to prevent noticeable flicker
      2. Represent a logic “0” as OOK at multiple integer of the frame rate
         1. Aliases to ≈0 Hz
      3. Represent a logic “1” as OOK at (multiple integer + ½) of the frame rate
         1. Aliases to ≈15 Hz
      4. FEC chip rate is ≈½ the camera frame rate; data rate depends upon FEC rate (user selectable)
      5. Assumption is that the data sink camera frame rate is regular and has a small frequency offset with respect to the data source
      6. The camera is not synchronized to the data source; that is, the actual data transmission is asynchronous
      7. Works with either rolling-shutter or global-shutter camera
   2. Region-of-interest sampling
      1. Over a small region of the image sensor (region-of-interest), sample at the Nyquist rate
      2. Modulation format is VPPM
      3. Data rate is TBD
   3. Dual modulation format mode
      1. Allows broadcast of modulation from sections 1.1 and 1.2 above simultaneously
      2. Allows use of low frame rate camera to identify high frame rate light sources
   4. All PHY types support limited range dimming
2. PHY video broadcast of 2-D symbols with a large number of bits per symbol (e.g. QR codes)
   1. Video broadcast at 1/3 the image sensor frame rate
   2. Maximum bit rate ~ 236 kbps
   3. Range is very short (NFC experience)
3. MAC allocation is via beacon free, random contention access
   1. Set super-frame for no beacon
   2. Access is non-slotted contention based
   3. Supports both bi-directional and unidirectional transmission with low overhead
4. MAC supports coordinated MIMO and uncoordinated multi-user access for PHY in section 1.0