Project: IEEE P802.15 Working Group for Wireless Personal Area Networks (WPANs)

Submission Title: [Answers for the ISC questions]
Date Submitted: [3 July 2009]
Source: [(1)Tom Matsumura, VLCC]
Address [(1)2-15-9 Nishigotanda Shinagawa-ku Tokyo 141-0031 Japan]
Voice:[(1)81-3-5437-5120]
E-Mail:[(1) tom@naka-lab.jp]

Re: []

Abstract: [Answers from VLCC for the ISC questions in TCD discussion.]

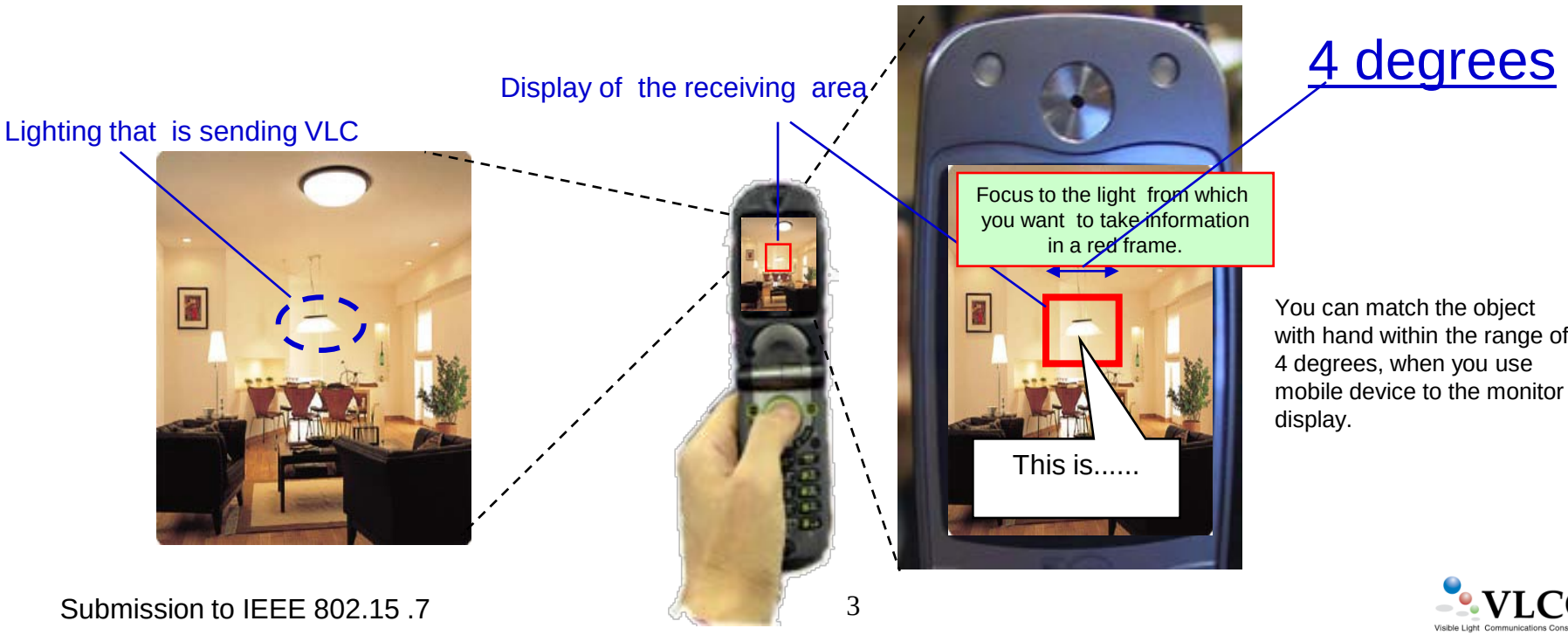
Purpose: [Contribution to IEEE 802.15 TG7]

Answers to the questions in 802.15.7 ML about an amendment from VLCC for TCD.

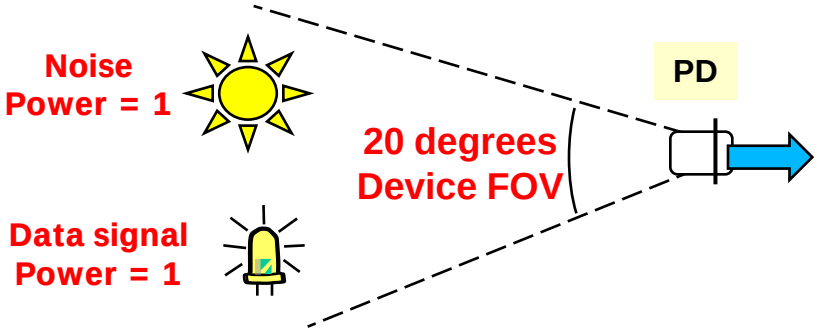
1. Reasons for Device FOV at minimum 4 degrees
2. Reasons why Device FOV doesn't influence SNR

Why is a minimum FOV of VLC in arrayed PD/image sensor good at 4 degrees?

- The object can be matched at 4 degree-FOV by using image sensor in the mobile device.
  - The object can be matched easily with our hands by camera and binocular, etc.
    - In general, these camera and binocular have about 10 times zoom magnification capability at the maximum zoom.
    - The field angle of camera is about 40 degrees in width. => This means that a 10 times zoom shows 4 degrees in width at the focus-point.



Why is Device FOV not related directly to SNR in the case of Arrayed PD/Image Sensor ?

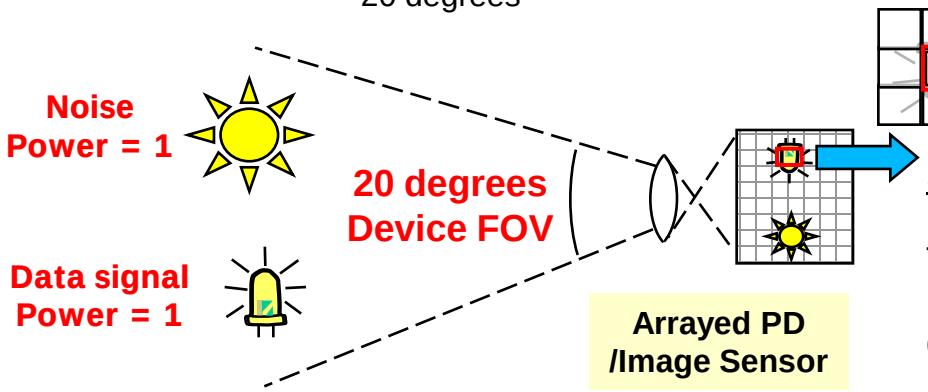


Signal : Noise = **1:1**

Everything is multiplied.

SNR deteriorates because the noise ratio increases when Device FOV is getting larger.

Same device FOV
20 degrees



Signal : Noise = **1:0**

The noise is excluded by the spatial separateness.
Device FOV doesn't relate directly.
(Not Device FOV but Element FOV of Array decides SNR.)

*1 An appropriate array element can be properly selected.
*2 Array and optical system have a sufficient resolution capability.