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

Submission Title: [A Vehicle application in Visible Light Communication]
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Re: [vlc_ig]

Abstract: [This document describes a mass market, application, vehicle communication, and visions for VLC]
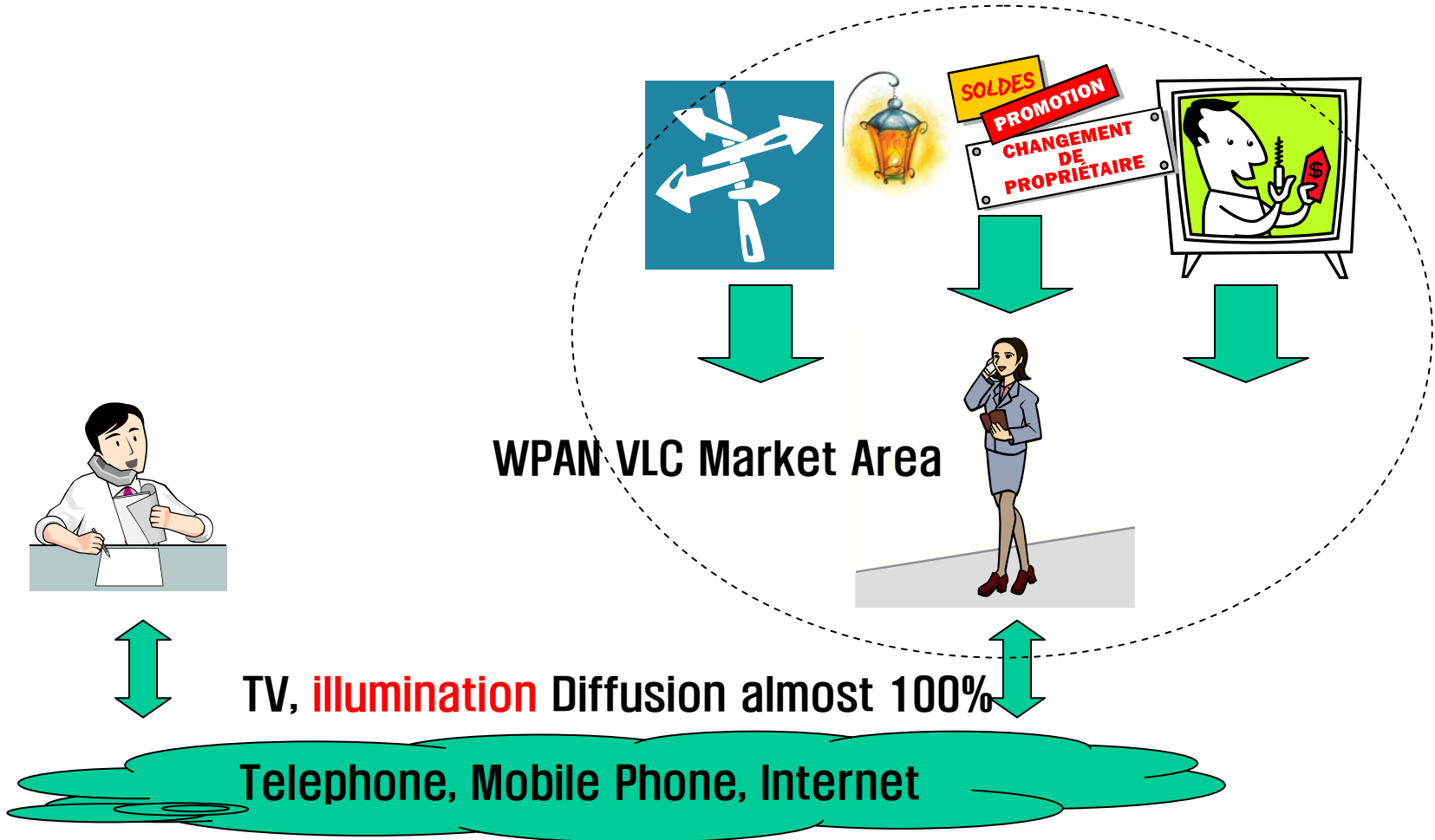
Purpose: []

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Vehicle Application in Visible Light Communication

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Creation New Market Area of VLC

WPAN VLC Market Area

TV, illumination Diffusion almost 100%

Telephone, Mobile Phone, Internet

Why VLC using LED

- ## One Lighting Source
  - Illumination and communication
  - No extra special transmitter

- ## Fast Deployment
  - Traffic Signal, Vehicle Tail Light
  - Street Light, Indoor Lamp

- ## New Mass Market
  - New Numerous Applications
  - Mass Transmitter/Receiver Devices

Starting LED Performance Burst
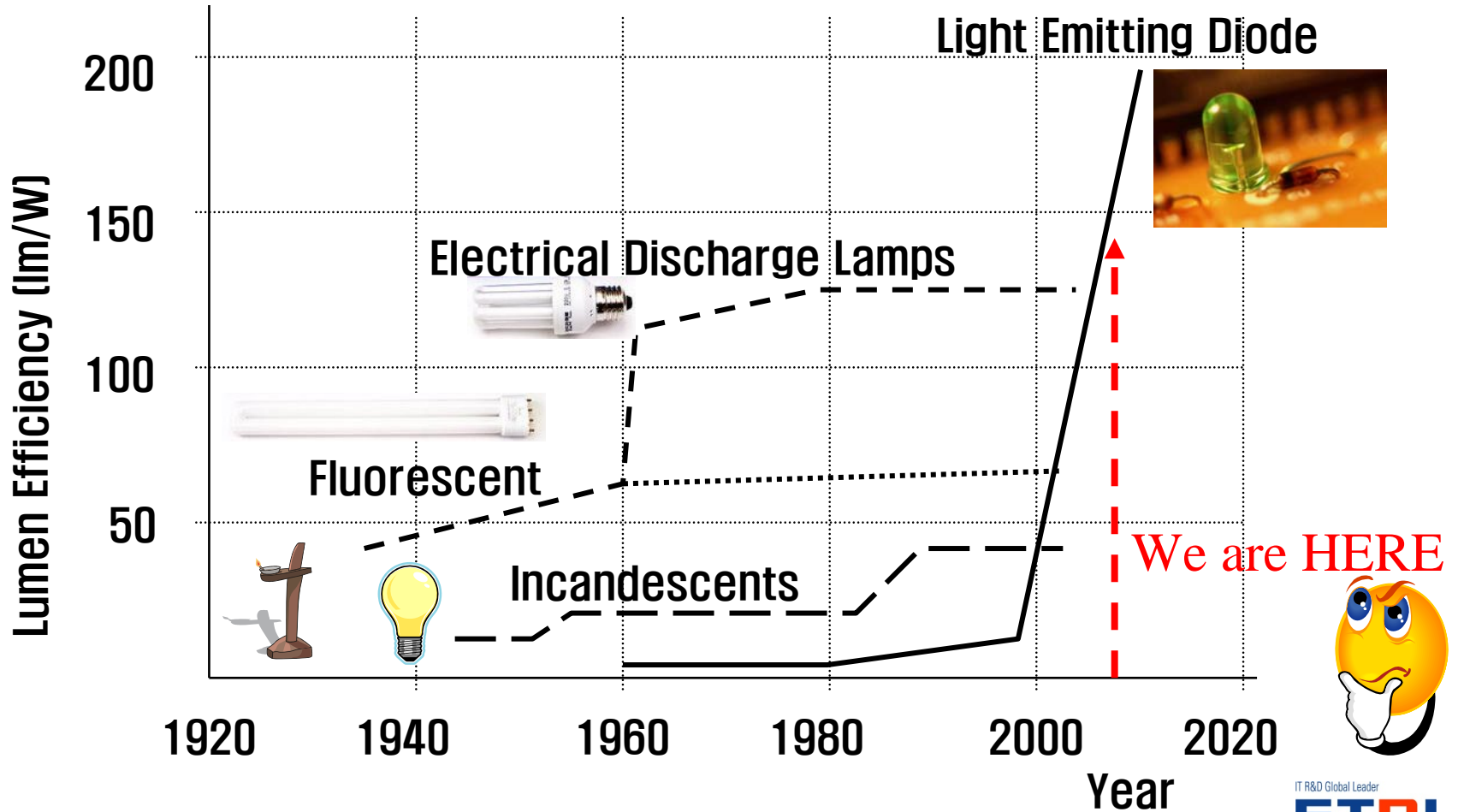
LED Advantages as Light

- Power Saving
  - Use only 10% power than before

- Long Living
  - Longer than 10 times (about 50,000 hours)

- Conservation of nature
  - No Mercury
 - Better waste treatment

Expectation

- Do you think that LED will be replaced traditional lighting?

- How may %, when?

- Can you imagine another LED Application?

VLC Application Area

- ## Inter Mobile handsets
  - Mobile handset, MP4, Notebook

- ## LED Display to handset
  - Handset, TV, Signboard

- ## Inter Vehicles
  - Taillight, Headlight, On-and-off light

- ## Lamp applications
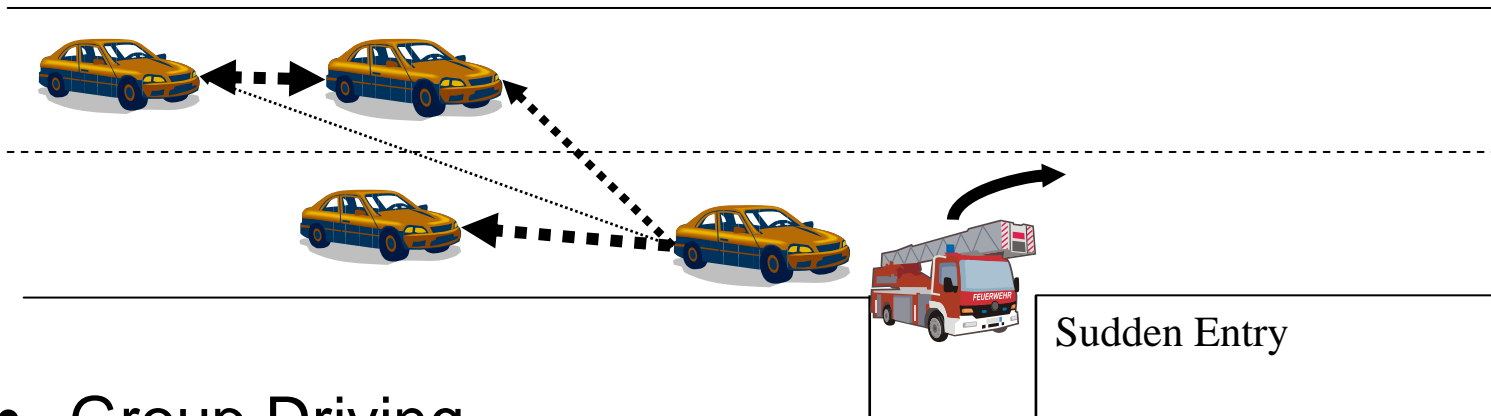 - Indoor illumination, Traffic signal, Route beacon
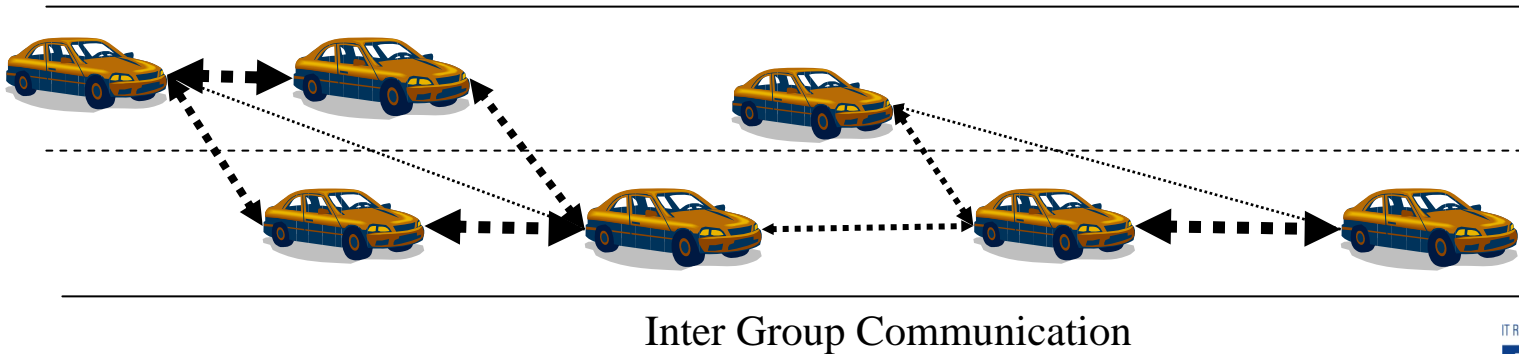
VLC Vehicle Communication
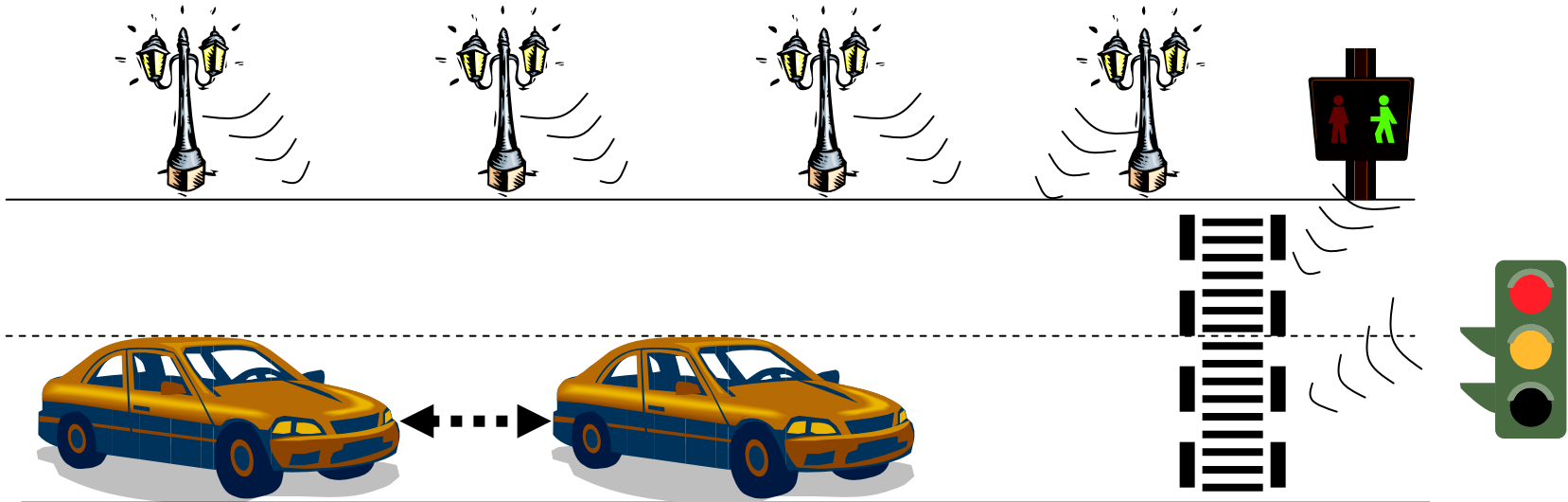
- Vehicle to Vehicle
- Vehicle to Traffic signal
- Vehicle to Streetlight

VLC Vehicle to Vehicle Application
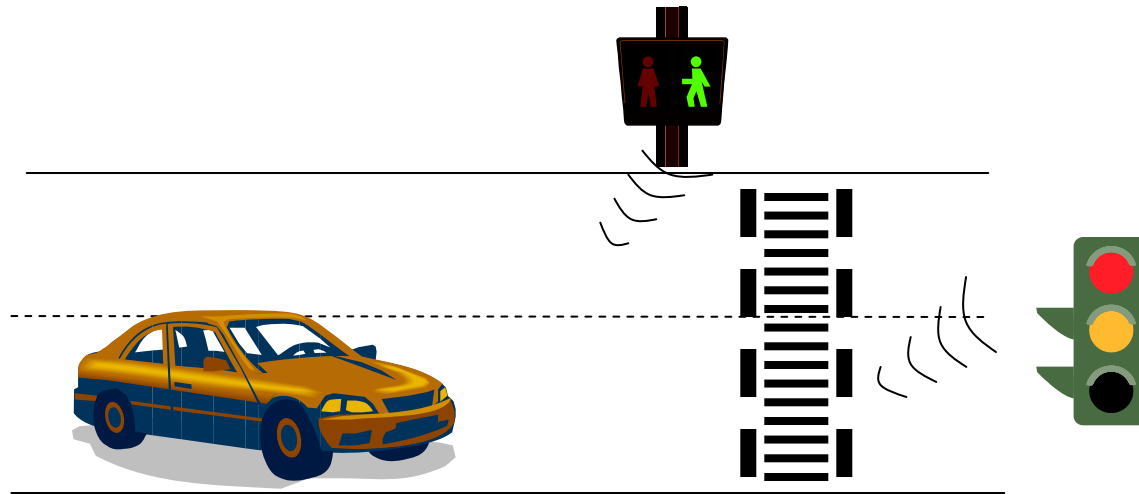
- Emergency Brake to sudden entry vehicle

Sudden Entry

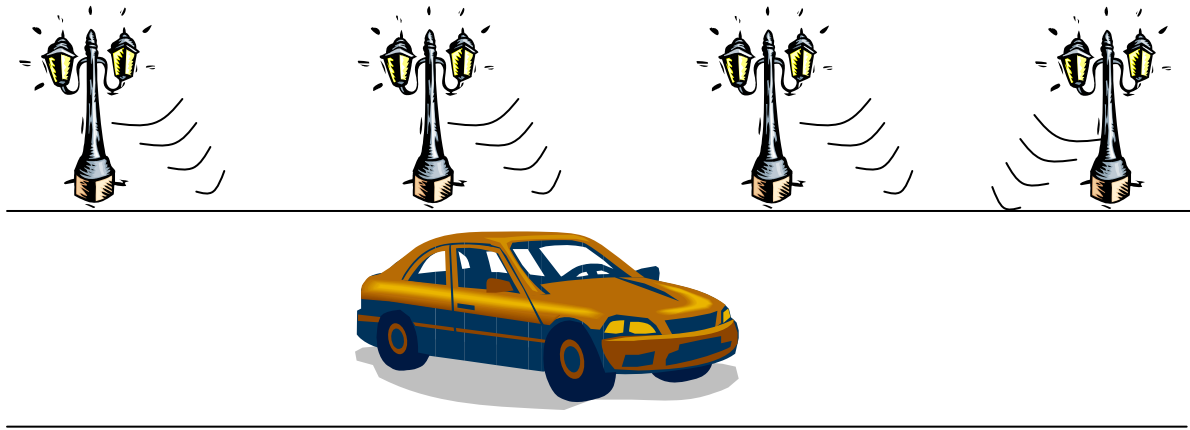- Group Driving

Inter Group Communication

VLC Vehicle to Traffic signal Application

- Alarm to vehicle: stop
- Indication to vehicle: go
- Providing location information to vehicle

VLC Streetlight to Vehicle Application

- Providing location information to vehicle
- Providing street, shop, tour information to vehicle
- Connecting to Internet via streetlight

Application Specific Requirements

- Long Range Low speed

- Short Range High speed

- Multiple channels

- One-way or two-way

- Symmetry or asymmetry speed

- Support Area: voice, data, video

TTA VLC Standard Working Items

- ## VLC PHY
  - PHY at transmitting part
  - PHY at receiving part
  - LED Interface

- ## VLC MAC
  - MAC for infrastructure mode
  - MAC for peer-to-peer mode

- ## Application specific relationships
  - Special Interface inter cross layering
  - ITS, LBS, Machine-to-Machine, Sensor

TTA: Telecommunication Technology Association, 10 organizations involved for VLC standard

Discussion on working methods

- ## Integration or Separation
  - PHY and MAC

  - Transmitting and Receiving

  - Applications
    - Handset, Display, Vehicle, Lamp

- ## Documentation
  - Requirement

  - Application Model

  - Detailed Specification

Vision for VLC

- Promotion
  - Co-work, Workshop
  - LED: LED Driver, Lighting, Display
  - Communications: Telecommunication, Ubiquitous, ITS
- Standardization
  - Relationship inter-organizations: IEEE 802.15 WPAN, ITU-T SG16 AMS, VLCC, TTA VLC WG, The Fully Networked Car
  - TTA 2008 VLC Standard Roadmap
- Market
  - New Communication with LED applications: Vehicle, Signboard, Streetlight, Traffic Signal
  - New Functions: LBS, Security, New Frequency Bandwidth, Sensing

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