Submission Title: Preliminary Proposal of Usage model for THz communication in WLAN

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Abstract: In this document we propose an use case and some required items of WLAN application for THz wireless communications.

Purpose: for discussion

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Preliminary Proposal of Usage model for THz communication in WLAN

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Use Case Vision

Outdoor Inter-building (point to point) Ultra High Speed Wireless Communication (Optional)

- Small Size Transceiver With High Gain Antenna
- Optical Fiber
- Access Point
- Mobile Tools, Personal Computer
- Indoor WLAN-like Ultra High Speed downlink

~10m

~a few hundred meters
WLAN-like Application (1/3)

- Wireless network topology
  - Star topology
  - Asymmetry: Ultra high rate only for downlink
- Antenna
  - Directional (but not so highly directive)
  - With support of beam steering
WLAN-like Application (2/3)

• Frequency and bandwidth
  – Several tens Bandwidth within 275~400GHz

• Data rates
  – Several tens of Giga bit/s for downlink

• Transmission range
  – About 10m
WLAN-like Application (3/3)

• Size, weight and power
  – Equivalent to conventional WLANs
  – Less than a few liters of volume, several hundreds gram of weight, and several tens of Watt of power consumption for an access point
  – Less than 1 Watt of power consumption for RF except for power amplifier
Point to Point Application (Optional)

- Inter-building communications
- Emergency use (If it can be carried by hand and worked by buttey power)
- Technical expectation similar to WLAN except using higher directive antenna without beam steering

Outdoor Inter-building (point to point) Ultra High Speed Wireless Communication

Small Size Transceiver With High Gain Antenna

~a few hundred meters
### Required Antenna Gain

<table>
<thead>
<tr>
<th>Item</th>
<th>Value</th>
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</thead>
<tbody>
<tr>
<td>Modulation</td>
<td>OOK</td>
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<tr>
<td>Tx Power</td>
<td>20 dBm</td>
</tr>
<tr>
<td>Total NF</td>
<td>20 dB</td>
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<tr>
<td>Link Margin</td>
<td>10 dB</td>
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<td>None</td>
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</table>

**WLAN-like case**

(GTX+GRX) > 62dB@100Gbps, 10m

**Example 1:**
- Grx=15dB (d=1.8mm) [25°]
- Gtx=47dB (d=72mm) [0.7°]

**Example 2:**
- Grx=20dB (d=3mm) [17°]
- Gtx=42dB (d=40mm) [1.3°]
We would like to discuss about more detail in the July meeting.

Thank you!