5.5 MIPI—In the Smart City

**In Smart Lighting:**
- I3C to provide a shared, two-wire low-power interface to connect sensors to the application processor and supporting in-band interrupts to enable active sleep mode, with sensors waking the application processor only when required
- RFFE within cellular communications module

**In Environmental Monitoring:**
- I3C to provide a shared, two-wire low-power interface to connect sensors and actuators to the application processor and supporting in-band interrupts to enable active sleep mode, with sensors waking the application processor only when required (critical for devices powered from constrained power supplies)
- RFFE within cellular communications module

**In Public Safety Surveillance Cameras:**
- CSI-2 as a highly scalable interface to connect high-resolution cameras, using CCI for camera command and control over single MIPI C/D/A-PHY interface using USL
- SoundWire to drive high-quality audio components such as multiple microphones and speakers. Enabling advanced noise cancellation
- RFFE within cellular communications module

**In Smart Trams:**
- CSI-2 over A-PHY to connect high-resolution cameras, DSI-2 over A-PHY to drive high-resolution displays, and MIPI Touch to enable touchscreen user interfaces
- A-PHY as a ultra-reliable, long reach (≤15m), EMI hardened physical interface to connect cameras, displays and sensors within the tram to a central control unit
- RFFE within cellular communications module

**In Smart Parking Sensors:**
- I3C to provide a shared, two-wire low-power interface to connect sensors to the application processor; in-band interrupts to enable active sleep mode, with sensors waking the application processor only when required (critical for devices powered from solar power)
- RFFE within cellular communications module

**In Smart Waste Bins:**
- I3C to provide a shared, two-wire, low-power interface to connect an ultrasonic sensor to the application processor; in-band interrupts to enable active sleep mode, with sensors waking the application processor only when required (critical for devices powered from a constrained power supply such as solar)
- CSI-2 over C/D-PHY to connect a camera to sense waste type and sort into the appropriate receptacle
- RFFE within cellular communications module

**USE CASES**

*Functionally safe and secure IoT device that will benefit from MIPI’s focus on safety and security*

*IoT device with constrained power supply that will benefit from use of MIPI low-power interfaces*

*IoT device with wide-area cellular connectivity that will benefit from MIPI’s 5G preparedness*

*Size-constrained, tightly packaged IoT device, benefiting from MIPI’s low pin count, low wire count, low EMI interfaces*

*Associated MIPI SOFTWARE and DEBUG specifications also available to accelerate design process*

*Use of MIPI specifications can aid product compliance to functional safety standards such as IEC 61508*