**IEEE P802.15**

**Wireless Personal Area Networks**

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| Project | IEEE P802.15 Working Group for Wireless Personal Area Networks (WPANs) | |
| Title | C**omments on 15-14-0338-05** | |
| Date Submitted | June 11, 2014 | |
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| Re: | [Subclause 7.1 of 802.15 TG10 TGD and [TGD Scenario Parameters #319r0](https://mentor.ieee.org/802.15/dcn/14/15-14-0319-00-0010-tgd-scenario-parameters.docx)] | |
| Abstract | [Comments on 15-14-0338-05, Scenario Parameters for CfFP] | |
| Purpose | [Define the parameters to consider in the scenario for final proposals] | |
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**Introduction**

This document has been prepared to suggest some comments on 15-14-0338-05 regarding the operational scenarios which will be included in the TG10 TGD so that the TG10 scenarios **meet all requirements and fit better to real situations, by which proposals can be fairly compared.**

**Comments on 15-14-0338-05**

**The comments are as shown in purple in the following:**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | | | **Scenarios** | | | |
| **Parameter** | | | **Mostly Upstream:**  **Smart metering, infrastructure monitoring, Irrigation Optimization** | **Mostly Downstream:**  **Street lighting, smart lighting** | **Balanced upstream and downstream:**  **CEMS, BEMS, HEMS 3** | **P2P:**  **Variety of applications** |
| Packet size | | | 100 bytes | | | 31 bytes,  255 bytes,  2047 bytes |
| Data rate | | | 100kbps, 250kbps | | | 20kbps, 250kbps, 2Mbps[6] |
| Packet birth rate | | | 1 packet every 30 min | | 1 packet / sec[[1]](#footnote-1)  1 packet/min,  1 packet/30min | |
| Duty cycle | | | 100%, 1% | | | |
| Mobile devices (Y/N) - speed | | | N | | | Y – 1.4m/s (human walking speed)\* |
| Number of entry points | | | 1 | | | 1, 3\* |
| Number of exit points | | | 1 | | | 1, 3\* |
| PAN Coord to Device | Unicast[[2]](#footnote-2) (Y/N) | | Y | | | N |
| Multicast (Y/N) | |
| Broadcast (Y/N) | |
| Device to PAN Coord[[3]](#footnote-3) | | |
| Device to device | Unicast (Y/N) | | N | | | Y |
| Multicast (Y/N) | |
| Broadcast (Y/N) | |
| Multiple devices to device (Y/N) | | |
| Number of PAN coordinators | | | 1 | | | 1, 3\* |
| Linear Topology (Y/N) | | | N | Y | N | N |
| Energy consumption | | TX | 28 mA | | | 30 mA |
| RX | 11.2 mA | | | 37 mA |
| Idle | 1.5 uA [1] | | | 500 uA |
| Sleep | 0.1 uA [1] | | | 0.2 uA |
| Link failure rates | | | |  |  | | --- | --- | |  |  | | a) | b) | | | | |

**Definitions**:

Data rate: data rate at the physical layer

Packet birth rate: rate at which packets are being generated at the application layer of the device

Duty cycle: ratio of wake-up time to total operational time including sleeping time of a device

Device: node other than the PAN coordinator

M: Number of nodes in the PAN

M = 121 (11x11), 1089 (33x33), 10000 (100x100)

For linear topology, only 1 row of m nodes is considered, with m = 100

Unicast: transmission from 1 source to 1 destination

Multicast: transmission from 1 source to m destinations (m < M -1)

m=11 for M=121, m=33 for M =1089, and m=100 for M =10000

Broadcast: transmission from 1 source to M -1 destinations

Multiple devices to device: transmission from n devices to one device

m=11 for M =121, m=33 for M =1089, and m=100 for M =10000

**References**

1. <http://www.semtech.com/images/datasheet/sx1272.pdf>
2. MC13202, Low power transceiver for the IEEE 802.15.4 Standard, http://cache.freescale.com/files/rf\_if/doc/data\_sheet/MC13202.pdf?pspll=1&Parent\_nodeId=1141674020187711908069&Parent\_pageType=product
3. Tokyo statistical yearbook, Population and Households, <http://www.toukei.metro.tokyo.jp/tnenkan/2012/tn12qa021000.xls>
4. 15-14-0239-02 Proposed operational scenarios of L2R networks for TG10 TGD
5. C. Townsend, S. Arms (2005). Wireless Sensor Networks: Principles and Applications. In J.S. Wilson (Ed), Sensor Technology Handbook (pp. 575-589). Oxford, UK: Elsevier.
6. Nordic Semiconductor, nRF24L01+, https://www.sparkfun.com/datasheets/Components/SMD/nRF24L01Pluss\_Preliminary\_Product\_Specification\_v1\_0.pdf

**Additional comments on this table**

**Comment 1**

**From 6.18 of TGD (**Multiple Entry and Exit points)

*For the proposal:*

* *Devices shall implement a method to select the most appropriate entry/exit point for their communications with entities outside the network*
* *If a device becomes unable to communicate with an entity outside the network at the required quality of service using its preferred entry/exit point, it shall be possible for the device to find an alternative entry/exit point (if one exists) and begin to use that*
* *It shall be possible for devices to use different entry/exit points to communicate with different external entities*

**Use of multiple entry/exit points seems to be mandatory.**

**Comment 2**

## From 6.1 of TGD (Deployment architecture)

It should be possible to merge an independent subnet into a larger network when connectivity between them becomes available, providing both are using similar operating parameters. The merge operation should ideally take place without outside intervention. It should be possible for a network to operate as a number of independent subnets in the event of failure of parts of the network.

**Use of multiple networks seems to be mandatory even though “should” be used for this subclause.**

**Comment 3**

## Link failure rates should be specified.

1. This data rate is to be simulated only with data rates of 250 kbps and 2 Mbps [↑](#footnote-ref-1)
2. In a PAN coord to device unicast communication, the PAN coord shall send a packet to every devices (M-1) alternately

   3 CEMS: continuous emission monitoring systems, BEMS: building energy management system, HEMS: home energy management systems [↑](#footnote-ref-2)
3. In a device to PAN coordinator communication, all the devices (M-1) shall send a packet to the PAN coordinator with the packet birth rate specified in the table

   \* Values followed by “\*” are optional since they correspond to “MAY” statements of the TGD [↑](#footnote-ref-3)