**IEEE P802.15**

**Wireless Personal Area Networks**

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| Project | IEEE P802.15 Working Group for Wireless Personal Area Networks (WPANs) | |
| Title | **Comments and modifications for TG10 Scenario Parameters #338r6** | |
| Date Submitted | 19 June, 2014 | |
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| Re: | [TG10 Scenario parameters #338r6] | |
| Abstract | [Scenario Parameters for CfFP - Working Document.] | |
| Purpose | [To discuss the parameter table modification in #338] | |
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**Introduction**

We modified the parameter table to be reflected our comments sent to ML on July 17th. Modification point is in blue. Followings are our comments already sent to ML and additional comments.

**Comment 1: Link failure rate**

In practice, link failure rates depend on a frame length and frame length of data/command frames may vary. For example a length of CSL wake-up frame is very short compared with a 100 bytes data frame. So, it is not reasonable to use same link failure rate to all frames. So, I propose that instead of a link failure rate, a bit error rates on each link are defined. I propose each bit error rate is replaced to 1/1000 times link failure rate so that the frame error rate of 100 bytes data frame is about same as originally defined link failure rate.

**Comment 2: Duty cycle**

In the case of many low energy functions, duty cycle is highly related to data birth rate. If the data birth rate is low, duty cycle will be quite small. The duty cycle should not be a parameter of configuration of networks but it should be result value of operating a scenario. I recommend removing this parameter since we use fixed value of data birth rate.

**Comment 3: Reduction of simulation patterns**

I think there are too many simulation patterns in the current scenarios because of some parameters have multi values. Do we really mandate to run simulation for all of combinations of these parameters? It is not reasonable. So I recommend reduce parameter sets or make them optional.

**Comment 4: Energy consumption**

I cannot remember the reason why we use different parameters for Many2One and M2M scenarios. Should we use same one?

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|  | | | **Scenarios** | | |
| **Parameter** | | | **Upstream** | **Downstream** | **P2P** |
| Packet size | | | 100 bytes | | 31 bytes\*,  255 bytes\*,  2047 bytes\* |
| Data rate | | | 100kbps, 250kbps\* [1][2] | | 20kbps\*, 250kbps\*[5], 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) | | | N | | Y\*[[2]](#footnote-2) |
| PAN Coord to Device | Unicast[[3]](#footnote-3) (Y/N) | | Y | | N |
| Multicast (Y/N) | |
| Broadcast (Y/N) | |
| Device to PAN Coord[[4]](#footnote-4) | | |
| 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, 4 (2 x2)\*[[5]](#footnote-5) |
| Linear Topology (Y/N)[[6]](#footnote-6) | | | Y | | Y\* |
| Energy consumption | | TX | 28 mA [1] | | 30 mA [2] |
| RX | 11.2 mA [1] | | 37 mA [2] |
| Idle | 1.5 uA [1] | | 500 uA [2] |
| Sleep | 0.1 uA [1] | | 0.2 uA [2] |
| Bit Error Rate | | | |  | | --- | |  | | | |

**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=5 for M=121, m=10 for M =1089, and m=20 for M =10000

Broadcast: transmission from 1 source to M -1 destinations

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

m=5 for M =121, m=10 for M =1089, and m=20 for M =10000

**Special cases of source(s) and destination(s) placement**



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| PAN coordinator to device, multicast |  |
| Device to device, unicast |  |
| Device to device, multicast |  |
| Multiple devices to device |  |

**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

1. This data rate is to be simulated only with data rates of 250 kbps and 2 Mbps [↑](#footnote-ref-1)
2. If the proposers include mobility, they shall describe the behavior [↑](#footnote-ref-2)
3. In a PAN coord to device unicast communication, the PAN coord shall send a packet to every devices (M-1) alternately [↑](#footnote-ref-3)
4. 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 [↑](#footnote-ref-4)
5. A Multi-PAN scenario shall be simulated using the unicast device to device traffic pattern [↑](#footnote-ref-5)
6. Unicast and broadcast PAN coordinator to device, and unicast device to PAN coordinator traffic patterns shall be simulated in a linear topology. The device to device traffic pattern may optionally be simulated.

   \* Values followed by “\*” are optional [↑](#footnote-ref-6)