**IEEE P802.15**

**Wireless Personal Area Networks**

|  |  |  |
| --- | --- | --- |
| Project | IEEE P802.15 Working Group for Wireless Personal Area Networks (WPANs) | |
| Title | **TG10 Scenario Parameters** | |
| Date Submitted | 16 June, 2014 | |
| Source | \*[Verotiana Rabarijaona, Fumihide Kojima], †[Hiroshi Harada]  \*[NICT], †[Kyoto University] \*[3-4, Hikarino-oka, Yokosuka, 239-0847 Japan], †[36-1 Yoshida-Honmachi, Sakyo-ku, Kyoto 606-8501 Japan] | Voice: [+81-46-847-5075] Fax: [+81-46-847-5089] E-mail: [rverotiana@nict.go.jp] |
| Re: | [[TGD Scenario Parameters #319r0](https://mentor.ieee.org/802.15/dcn/14/15-14-0319-00-0010-tgd-scenario-parameters.docx)] | |
| Abstract | [Scenario Parameters for CfFP - Working Document.] | |
| Purpose | [Define the parameters to consider in the scenario for final proposals] | |
| Notice | This document has been prepared to assist the IEEE P802.15. It is offered as a basis for discussion and is not binding on the contributing individual(s) or organization(s). The material in this document is subject to change in form and content after further study. The contributor(s) reserve(s) the right to add, amend or withdraw material contained herein. | |
| Release | The contributor acknowledges and accepts that this contribution becomes the property of IEEE and may be made publicly available by P802.15. | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | | | **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] |
| Link failure rates | | | |  | | --- | |  | | | |

**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**



|  |  |
| --- | --- |
| 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)