IEEE P802.22  
Wireless RANs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| TGb LB2 Comment Resolution for Section 3 and 4 | | | | |
| Date: 2014-06-19 | | | | |
| Author(s): | | | | |
| Name | Company | Address | Phone | email |
| cwpyo | NICT |  |  | [cwpyo@nict.go.jp](mailto:cwpyo@nict.go.jp) |
| Masayuki Oodo | NICT |  |  |  |

Abstract

Tables related to data rate are updated

**Notice:** This document has been prepared to assist IEEE 802.22. 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 grants a free, irrevocable license to the IEEE to incorporate material contained in this contribution, and any modifications thereof, in the creation of an IEEE Standards publication; to copyright in the IEEE’s name any IEEE Standards publication even though it may include portions of this contribution; and at the IEEE’s sole discretion to permit others to reproduce in whole or in part the resulting IEEE Standards publication. The contributor also acknowledges and accepts that this contribution may be made public by IEEE 802.22.

**Patent Policy and Procedures:** The contributor is familiar with the IEEE 802 Patent Policy and Procedures

<[**http://standards.ieee.org/guides/bylaws/sb-bylaws.pdf**](http://standards.ieee.org/guides/bylaws/sb-bylaws.pdf)>, including the statement "IEEE standards may include the known use of patent(s), including patent applications, provided the IEEE receives assurance from the patent holder or applicant with respect to patents essential for compliance with both mandatory and optional portions of the standard." Early disclosure to the Working Group of patent information that might be relevant to the standard is essential to reduce the possibility for delays in the development process and increase the likelihood that the draft publication will be approved for publication. Please notify the Chair Apurva Mody <[apurva.mody@ieee.org](mailto:apurva.mody@ieee.org)> as early as possible, in written or electronic form, if patented technology (or technology under patent application) might be incorporated into a draft standard being developed within the IEEE 802.22 Working Group. **If you have questions, contact the IEEE Patent Committee Administrator at <**[**patcom@ieee.org**](mailto:patcom@ieee.org)**>**.

|  |  |  |  |
| --- | --- | --- | --- |
| **ID** | **Commenter Name** | **Comment** | **Suggested Remedy** |
| 53 | Sunghyun Hwang | There is no data rate and spectral efficiency for MIMO and multiple channel operation. | Add the data rate and spectral efficiency for MIMO and multiple channel operation. |
| 79 | Masayuki Oodo | In Table 198, on the row of "Data rate", the maximumm data rate is 31.78 Mbit/s. In Table GQ1, on the other hand, on the column of 1/16CP of 6MHz BW, the maximum data rate is 32.12 Mbit/s. The maximum data rate should be the same value. This may affect the data rate in PHY Mode2. | How to calculate the maximum data rate (for 4D- 192TCM) should be made clear and the maximum data rate in Table 198 and in Table GQ1 should be the same. |

**Table HE1 — System parameters**

|  |  |  |
| --- | --- | --- |
| **Parameters** | **Specifications** | **Remark** |
| Frequency Range | 54~862 MHz |  |
| Channel bandwidth | 6, 7, or 8 MHz | According to regulatory domain (see Annex A). |
| Data rate (Channel BW=6MHz and CP=1/16) | 3.61 to 18.05 up to 25.27 Mbit/s (optional) for SISO and single channel operation case  57.77 to 288.85 up to 404.39 Mbit/s for 4-stream MIMO and 4-channel aggregation operation case | See Table HU1 |
| Spectral Efficiency　(Channel BW=6MHz and CP=1/16) | 0.60 to 3.01 up to 4.21 bit/(s・Hz) for SISO and signle channel operation case  2.41 to 12.05 up to 16.85 bit/(s・Hz) for 4-stream MIMO and 4-channel aggregation operation case | See Table HU1 |
| Payload modulation | QPSK, 16-QAM, 64-QAM, 256-QAM (optional), MD-TCM (optional) | BPSK used for preambles, pilots and CDMA codes. |
| Transmit EIRP | 4W maximum for CPEs. 4W maximum for BS’s in the USA regulatory domain. | Maximum EIRP for BS’s may vary in other regulatory domains. |
| Multiple Access | OFDMA |  |
| FFT Size (NFFT) | 1024 |  |
| Cyclic Prefix Modes | 1/4, 1/8, 1/16, 1/32 |  |
| Duplex | TDD |  |

**Table 198 — System parameters**

|  |  |  |
| --- | --- | --- |
| **Parameters** | **Specifications** | **Remark** |
| Frequency Range | 54~862 MHz |  |
| Channel bandwidth | 6, 7, or 8 MHz | According to regulatory domain (see Annex A). |
| Data rate (Channel BW=6MHz and CP=1/16) | 4.54 to 22.69 up to 31.78 Mbit/s (optional) for SISO and single channel operation case  72.59 to 362.96 up to 513.91 Mbit/s for 4-stream MIMO and 4-channel aggregation operation case | See Table HB1 |
| Spectral Efficiency　(Channel BW=6MHz and CP=1/16) | 0.76 to 3.78 up to 5.3 bit/(s・Hz) for SISO and signle channel operation case  3.04 to 15.12 up to 21.2 bit/(s・Hz) for 4-stream MIMO and 4-channel aggregation operation case | See Table HB1 |

|  |  |  |  |
| --- | --- | --- | --- |
| **ID** | **Commenter Name** | **Comment** | **Suggested Remedy** |
| 38 | Shigenobu Sasaki | Consider to add the optional PHY mode as in subclause 9.2 in this table. | Consider to add the optional PHY mode as in subclause 9.2 in this table. |

**Table HU1— PHY Modes and their related modulations, coding rates**

**and data rates for TCP = TFFT/16**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **PHY**  **Mode** | **Modu-lation** | **Coding rate** | **Data rate**  **(Mb/s)** | **Spectral Efficiency3**  **(for 6 MHz bandwidth)** |
| 11 | BPSK | Uncoded | 4 | 4 |
| 22 | QPSK | 1/2,Repeti-tion:4 | 4 | 4 |
| 3 | QPSK | 1/2 | 3.61 | 0.60 |
| 4 | QPSK | 2/3 | 4.81 | 0.80 |
| 5 | QPSK | 3/4 | 5.42 | 0.90 |
| 6 | QPSK | 5/6 | 6.02 | 1.00 |
| 7 | 16-QAM | 1/2 | 7.22 | 1.20 |
| 8 | 16-QAM | 2/3 | 9.63 | 1.60 |
| 9 | 16-QAM | 3/4 | 10.83 | 1.81 |
| 10 | 16-QAM | 5/6 | 12.04 | 2.01 |
| 11 | 64-QAM | 1/2 | 10.83 | 1.81 |
| 12 | 64-QAM | 2/3 | 14.44 | 2.41 |
| 13 | 64-QAM | 3/4 | 16.25 | 2.71 |
| 14 | 64-QAM | 5/6 | 18.05 | 3.01 |
| 15 | 256-QAM | 1/2 | 14.44 | 2.41 |
| 16 | 256-QAM | 2/3 | 19.26 | 3.21 |
| 17 | 256-QAM | 3/4 | 21.66 | 3.61 |
| 18 | 256-QAM | 5/6 | 24.07 | 4.01 |
| 19 | 256-QAM | 7/8 | 25.27 | 4.21 |
| 20 | 4D-48TCM | 10/11 | 18.05 | 3.01 |
| 21 | 4D-192TCM | 14/15 | 25.27 | 4.21 |