IEEE P802.22
Wireless RANs

|  |
| --- |
| [802.22b MR-BS initialization] |
| Date: 2013-06-20 |
| Author(s): |
| Name | Company | Address | Phone | email |
| Changwoo Pyo | NICT | 3-4, Hikarino-oka, Yokosuka, 239-0847, Japan |  | cwpyo@nict.go.jp |
| Zhang Xin | NICT | 20 Science Park Road, #01-09A/10 TeleTech Park, Singapore |  | amy.xinzhang@ieee.org |
| Chunyi Song | NICT | 3-4 Hikarion-Oka, Yokosuka, Japan |  | songe@ieee.org |
| Keiichi Mizutani  | NICT | 3-4 Hikarion-Oka, Yokosuka, Japan |  | mizk@nict.go.jp |
| Pin-Hsun Lin | NICT | 3-4 Hikarion-Oka, Yokosuka, Japan |  | pslin@nict.go.jp |
| Gabriel Porto Villardi | NICT | 3-4 Hikarion-Oka, Yokosuka, Japan |  | gpvillardi@nict.go.jp |
| Masayuki Oodo | NICT | 3-4 Hikarion-Oka, Yokosuka, Japan |  | moodo@nict.go.jp |
| Ryuhei Funada | NICT | 3-4 Hikarion-Oka, Yokosuka, Japan |  | funada@nict.go.jp |
| Hiroshi Harada | NICT | 3-4 Hikarion-Oka, Yokosuka, Japan |  | harada@ieee.org |

Abstract

This document is a revision of initialization and network association (7.14) for 802.22b systems and provies definitions related with the revision.

**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> 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****>**.

**7.14 Initialization and network association**

Before a CPE can enter the network, it needs to be serviced by a BS/MR-BS or a distributed scheduling R-CPE and its capabilities need to be negotiated with the BS/MR-BS or the distributed scheduling R-CPE. This may involve many tasks (e.g., geolocation and sensing channels) and handshaking between the CPE and the BS/MR-BS or the distributed scheduling R-CPE, and this whole procedure is hereby referred to as initialization and network association. More importantly, during this process the BS/MR-BS or the distributed scheduling R-CPE needs to minimize the CPE communication so as potentially not to cause harmful interference with incumbents. In other words, the initialization and network association process is *incumbent safe*, which essentially means that incumbent system protection shall be maximized.

**7.14.1 BS/MR-BS initialization**

The WRAN BS/MR-BS initialization procedure shall consist of the following steps:

1) BS/MR-BS is professionally installed.

2) BS/MR-BS acquires the antenna gain information.

3) Determine the BS/MR-BS geographic location.

4) If a database service exists for BS/MR-BS area of service, the SM at the BS/MR-BS receives an initial list of available channels from the database service. If there is no database service, the SM initially considers all channels available.

5) Operator disallows channels on the available channel list as needed.

6) Perform incumbent detection in all usable channels and synchronize network to neighboring BSs/MR-BSs.

7) Presentation of the available channel list to the higher layers for selection of an operating channel.

8) Commence operation on the selected operating channel(s).

This BS/MR-BS initialization procedure is depicted in Figure 32.

**7.14.1.1 Professional installation**

The BS/MR-BS shall be installed by a professional who will be responsible for assuring that its installation is compliant with local regulations (see Annex A) and the IEEE P802.22.2. The professional installer should make sure that the antenna pattern meets the pattern specified in 9.12.1 and that the antenna is directed toward the selected BS/MR-BS.

**7.14.1.2 MR-BS antenna gain information acquisition**

The BS/MR-BS shall determine if its antenna is integrated or not by querying it using the M-ANTENNA- INTEGRATED primitive structure described in 10.7.6.1and 10.7.6.2. The BS/MR-BS shall acquire the antenna information including the maximum antenna gain information for the channels that can be used in the regulatory domain of interest. This information is stored in a MIB, *wranIfBsCpeAntennaGainTable*. If the antenna is integrated to the BS TRU, this MIB object shall be pre-populated by the manufacturer of the BS. If the antenna is not integrated into the BS TRU, the MIB object shall be populated by querying the antenna unit (AU) through the interface defined in 9.12.2. This information at the antenna shall be pre-populated by the antenna manufacturer.

**7.14.1.3 Determine geographic location**

The geolocation requirement for the BS/MR-BS is that the WRAN system shall know the latitude and longitude of the BS/MR-BS transmitting antenna within a radius of 15 m and its altitude above mean sea level. The BS/MR-BS geographic location information shall be stored in the BS/MR-BS memory.

**7.14.1.4 Access TV bands database service and receive list of available channels**

The BS/MR-BS shall access a TV bands database service if one exists.

The BS/MR-BS SM communicates with the TV bands database service using the primitives that are defined in 10.7.1. Each WRAN device shall enlist with the TV bands database service by providing information that is required for access to the TV bands. The BS/MR-BS SM, which shall act as a proxy for all of its registered client devices, shall perform enlistment using the M-DEVICE-ENLISTMENT primitives. Each instance that a device is required to get a new set of available channels, the BS/MR-BS SM shall provide its geographic coordinates or those of one of its registered client devices to the TV bands database service using the M- DB-AVAILABLE-CHANNEL-REQUEST primitive. The BS/MR-BS shall receive the available channels from the TV bands database service using the M-DB-AVAILABLE-CHANNEL-INDICATION primitive. The SM shall generate the composite available channel list using only those channels that have been indicated as available for every device on the network.

The BS/MR-BS shall prohibit WRAN operation on any channel not on this initial list of available channels.

**7.14.1.5 Operator disallows channels**

Access shall be provided for the operator to disallow channels that are listed on the available channel list from being selected for WRAN operation. The operator shall not have access to channels that are not listed on the available channel list. To further classify channels on the available list, the BS/MR-BS SM shall submit an M-AVAIL-TV-CH-REPORT primitive with the mode set equal to 1 to provide the available channel list to the higher layers. Once channels on the available channel list are further classified as disallowed, the SM shall receive an M-DISALLOWED-TV-CHS primitive submitted by the SM.

**7.14.1.6 Perform incumbent detection and synchronize network with neighboring networks**

The BS/MR-BS shall perform incumbent detection in each of the channels listed on the available channel list and each adjacent channel if its EIRP is beyond the limit specified by the regulatory domain classes in Annex A (e.g., 40 mW in the USA) to detect other legitimate incumbent services that do not exist in the database service. The BS/MR-BS SM shall use the output from the BS/MR-BS spectrum sensing function to identify occupied channels on the available channel list.

The BS/MR-BS shall perform neighboring IEEE 802.22 network discovery on selected channels according to 7.20.1.3. The BS/MR-BS shall synchronize with neighboring BSs/MR-BSs using its installed satellite-based geolocation technology.

**7.14.1.7 Present the available channel list to the higher layers**

After incumbent detection during which channels may have been identified as protected or occupied, the resulting list shall be presented to the higher layers using an M-AVAIL-TV-CH-REPORT primitive with the mode set equal to 2 for selection of an operating channel. The required information presented shall be each channel number that is available for the BS/MR-BS to commence WRAN service and the maximum allowed EIRP for each channel. Additional information can be provided to the higher layers to help with the selection of an optimal channel, such as a list of channels where other wireless services were detected during the incumbent detection stage. As a result of the selection from the higher layer, the SM shall receive an M-OPERATING-TV-CH primitive from the NCMS.

**7.14.1.8 Commence operation**

The BS/MR-BS may now commence operation on any one channel listed on the available channel list.