P802.19.1 Requirements

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Abstract

This contribution proposes requirements for P802.19.1 based on the official requirement guidelines created during LA meeting.

Requirements will serve as a framework for developing system architecture and draft standard.

Introductory notes

- **Slides 3 – 8 are providing introductory notes that assist in understanding of system requirements**
  - They are not part of P802.19.1 system requirements
- **Introductory notes include**
  - Guidelines to create system requirements
  - Explanation of terms
  - Overview of system requirements

Guidelines to Create System Requirements

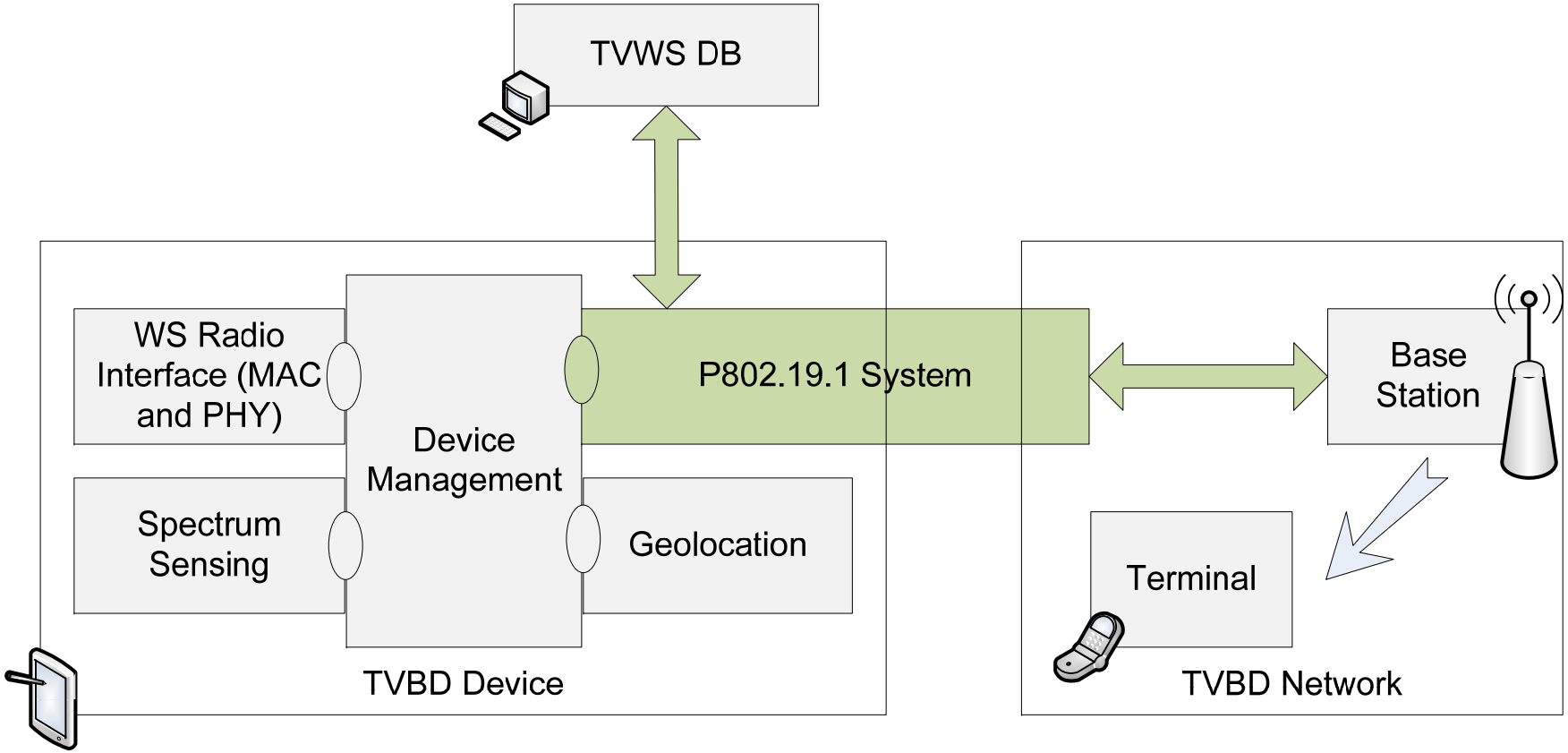
- **SDD Components:**
  - System Architecture
  - Outline
  - Terminology
  - System Requirements
  - Assumptions
- **Requirements Guidelines Agreed in January Meeting:**
  - Provide wording for system requirements for the coexistence system as a single entity.
  - Provide general functional requirements, which should be categorized according to the following categories:
    - Discovery
    - Communications
    - Etiquette
    - Algorithms
    - General
- **Should the paragraph above be used as guidelines for functional requirements section of the SDD?**
  - No objections

Explanation of Terms

- **P802.19.1 system**
  - For the purpose of this contribution we understand the term "P802.19.1 system" as follows:
    - P802.19.1 system is a system that provides or enhances the coexistence of dissimilar or independently operated TVWS networks and devices.
    - P802.19.1 system is a set of entities and interfaces defined in P802.19.1 standard
      - This means that P802.19.1 system is distinguished from TVBD network or device
      - Some entities and interfaces of the P802.19.1 system can be implemented inside TVBD network or device, while some entities and interfaces of the P802.19.1 system can be implemented outside TVBD network or device

Explanation of Terms

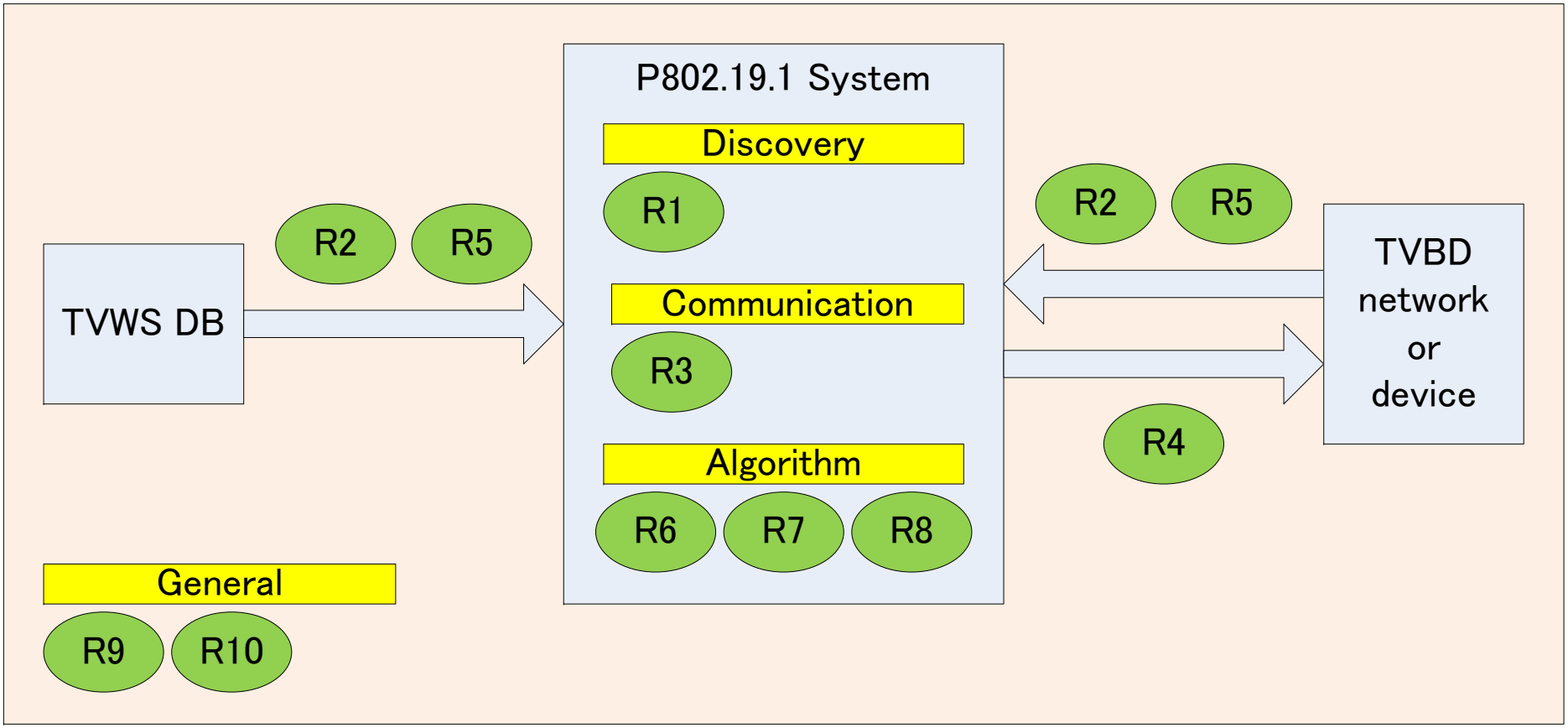
- **P802.19.1 system**



Explanation of Terms

- **P802.19.1 compliant TVBD network or device**
  - For the purpose of this contribution we understand the term "P802.19.1 compliant TVBD network or device" as follows:
    - P802.19.1 compliant TVBD network or device is network or device that contains the mandatory elements which P802.19.1 draft standard defines for TVBD network or device
    - This term is used to distinguish from non-compliant TVBD network or device which does not contain mandatory elements of P802.19.1 draft standard and thus cannot use P802.19.1 coexistence methods
    - Mandatory parts of P802.19.1 draft standard should be clarified at a later stage during draft development

Overview of system requirements



Requirement 1

- **P802.19.1 system shall enable discovery of P802.19.1 compliant TVBD networks and devices**
  - Discovery
- **Explanatory notes**
  - P802.19.1 system is required to identify potential P802.19.1 compliant TVBD networks or devices that need to coexist as one crucial step in order to achieve coexistence
  - The term discovery should be understood as determining the presence of TVBD network or device and identifying its attribute such as ID

Requirement 2

- **P802.19.1 system shall be able to obtain information required for TVWS coexistence**
  - Communication
- **Explanatory notes**
  - P802.19.1 system obtains this information from outside world, for example, from TVWS database, from P802.19.1 compliant TVBD networks/devices and etc

Requirement 3

- **P802.19.1 system shall have means to exchange obtained information**
  - Communication
- **Explanatory notes**
  - Without constraining the mechanism of communication, this requirement puts a high level requirement to provide a means of exchanging information necessary for TVWS coexistence

Requirement 4

- **P802.19.1 system shall be able to provide reconfiguration requests and/or commands and corresponding control information to P802.19.1 compliant TVBD networks and devices to implement TVWS coexistence decisions**
  - Communication
- **Explanatory notes**
  - Examples of reconfiguration commands are: to change center frequency, to adjust transmit power, possibly affect time scheduling, etc
  - Reconfiguration requests and/or commands and corresponding control information are provided from P802.19.1 system to TVBD networks or devices, for example
    - From a part of P802.19.1 system deployed in TVBD device to device management system via a SAP internal for the TVBD device
    - From a part of P802.19.1 system deployed in TVBD network (e.g. in network management system) to radio nodes of the TVBD network, e.g., base stations, access points, etc

Requirement 5

- **P802.19.1 system shall be able to update information required for TVWS coexistence**
  - Communication
- **Explanatory notes**
  - This requirement highlights the capability to update/refresh coexistence related information, such as location information of TVBD networks and devices, spectrum utilization by TVBD networks and devices

Requirement 6

- **P802.19.1 system should be able to analyze obtained information**
  - Algorithm
- **Explanatory notes**
  - An example of analysis is the processing of raw data to generate a set of new data for assisting decision making

Requirement 7

- **P802.19.1 system shall enable TVWS coexistence decision making**
  - Algorithm
- **Explanatory notes**
  - As an example of decision making, deciding on which actions should be taken by TVBD networks/devices to solve coexistence problem

Requirement 8

- **P802.19.1 system shall be able to support different topologies of decision making for TVWS coexistence (e.g. centralized, distributed and autonomous)**
  - Algorithm
- **Explanatory notes**
  - This requirement underlines the possibility of having various approaches to implement decision making in coexistence scenarios
  - It also underlines P802.19.1 system must be capable to support these different approaches of decision making for coexistence

Requirement 9

- **P802.19.1 system shall support appropriate security mechanisms. This shall include user/device authentication, integrity and confidentiality of open exchanges, and data privacy and policy correctness attestation and enforcement.**
  - General
- **Explanatory notes**
  - P802.19.1 system shall be able to authenticate, provide integrity and/or confidentiality to all entities involved in P802.19.1 data exchange
  - P802.19.1 system shall support privacy of sensitive data, and secure means to store and process such data while it resides in P802.19.1 entities
    - Sensitive data may be geolocation, user and device credentials, and time alignment
  - P802.19.1 system shall enable enforcement of coexistence policies for the P802.19.1 compliant TVWS networks or devices
    - This includes secure means to detect and/or to remediate compromised behavior

Requirement 10

- **P802.19.1 system should be able to support common time**
  - General
- **Explanatory notes**
  - Efficient use of the available spectrum resources may require timesharing between the coexisting networks or devices
  - Also, common silence periods for sensing the TVWS primary users enable more reliable sensing results
  - Thus, P802.19.1 system shall be able to support common time reference for coexisting P802.19.1 compliant networks and devices