Protocol To Access Spectrum Database

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Database Interface Protocol

- IETF is defining a Protocol to Access Spectrum Database in PAWS (Protocol to Access White Space) WG

- **Important Characteristics**
  - Interface agnostic - can be wired or unwired
  - Spectrum agnostic – protocol should be able to be used in any spectrum
  - Globally applicable - a common messaging interface between device and database that can operate in different countries and with different regulators
  - Flexible and extensible data structures – should support different device characteristics

• **Master Device**: A device that queries the database, on its own behalf and/or on behalf of a slave device, to obtain available spectrum information (e.g., AP or BS)
  
  – **Slave Device**: A device that queries the database through a master device (e.g., STA, UE)
Interface Protocol Features

• Protocol supports the capability for the
  – devices and the database to authenticate each other
  – devices to identify the database to register with
  – devices to find out the available spectrum use
  – database to inform the devices of regulatory rule set
  – database to inform the devices of changes to spectrum availability
  – database to track the spectrum usage

• All protocol messages exchange are integrity protected
Sequence of Operation

- The Master Device obtains (statically or dynamically) the URI for a Database appropriate for its location to send subsequent PAWS messages.
- The Master Device establishes an HTTPS session with the Database.
- The Master Device optionally sends an initialization message to the Database to exchange capabilities.
- If the Database receives an initialization message, it responds with a message in the body of the HTTP response.
- If required by regulatory domain, the Database registers the Master Device.
Sequence of Operation Contd..

• The Master Device sends an available-spectrum request message to the Database.
• If required by the regulatory domain, the Master Device must verify with the Database that the Slave Device is valid.
• The Database responds with an available-spectrum response message in the body of the HTTP response.
• Depending on regulatory domain requirements and database implementation, the Master Device sends a spectrum-usage notification message to the Database.
• If the Database receives a spectrum-usage notification message, it responds by sending the Master Device a spectrum-usage acknowledgement message.
Spectrum Query Call Flows

Slave WS Device

AVAIL_SPEC_REQ

AVAIL_SPEC_RESP

SPEC_USE

Master WS Device

AVAIL_SPEC_REQ

AVAIL_SPEC_RESP

SPEC_USE_NOTIFY

SPEC_USE_RESP

Spectrum Database
Data Model

• Data Model supports
  – geo-location of the device
  – rule set that applies to white space devices at a specific location (e.g., regulator specific)
  – device description (e.g., device serial number, manufacturer serial number, certification ID, and so on)
  – specifying antenna and radiation related parameters (e.g., antenna height, antenna gain, EIRP and so on)
  – owner and operator contact information
  – spectrum availability based on location
  – specifying the frequencies and power levels selected for use