## Antenna

| | |
|---|---|
| **PK** | <u>antenna_number</u> |
| | beamwidth |
| | gain |
| | height_above_average_terrain |
| | height_to_tip |
| | antenna_action_performed |

**Uses Antennas**

## License

| | |
|---|---|
| **PK** | <u>unique_system_identifier</u> |
| | name |
| | email |
| | street_address |
| | city |
| | state |

**Uses Paths**

**Uses Locations**

## Path

| | |
|---|---|
| **PK** | <u>path_number</u> |
| | transmit_location_number |
| | receiver_location_number |
| | transmit_antenna_number |
| | receiver_antenna_number |
| | path_type_desc |

## Locations

| | |
|---|---|
| **PK** | <u>location_number</u> |
| | location_address |
| | location_city |
| | location_county |
| | location_state |
| | id |

**specifies**

## Coordinate

| | |
|---|---|
| **PK** | <u>id</u> |
| | lat_degrees |
| | lat_minutes |
| | lat_seconds |
| | lat_direction |
| | long_degrees |
| | long_minutes |
| | long_seconds |
| | long_direction |

**ER Diagram Description**:

A path represents a radio communications path with references to both the transmit and receiver locations and antennas. There is also a path_type_desc attribute that tells the type of path. A path can be uniquely identified using its unique_system_identifier and its path_number. The identifier is used by the FCC to uniquely identify each license.

A license represents a registered communications license. The license is identified by its unique_system_identifier and has attributes name, email, street_address, city, and state. A license can have multiple associated paths, locations, and antennae.

The location table represents a location of transmission and/or a location of reception for a path. Each entry can be identified using the associated license and location number. It has the attributes location_address location_city, location_county, and location_state.

The antenna represents the properties of antennas used within a license. Each entry can be identified from its associated license and an antenna number. It has attributes beam_width, gain, height_above_average_terrain, height_to_tip, antenna_action_performed.

The coordinate uses a unique id to identify a set of latitude and longitude coordinates. For both latitude and longitude, we have attributes for degrees, minutes, seconds, and direction. A location must be associated with a coordinate, and a coordinate can be associated with 0 or many locations.

**Relational Schema:**

*License*(unique_system_identifier: INT [PK], name:VARCHAR(100), email:VARCHAR(100), street_address:VARCHAR(255), city:VARCHAR(100), state:VARCHAR(20))

*Path*(path_number:INT [PK], unique_system_identifier:INT [foreign key to License.unique_system_identifier][PK], transmit_location_number:INT, receiver_location_number:INT, transmit_antenna_number:INT, receiver_antenna_number:INT, path_type_desc:VARCHAR(255))

*Locations*(location_number:INT [PK], unique_system_identifier:INT [foreign key to License.unique_system_identifier][PK], location_address:VARCHAR(100), location_city:VARCHAR(100), location_county:VARCHAR(100), location_state:VARCHAR(100), id:INT [foreign key to Coordinate.id])

*Antenna*(antenna_number:INT [PK], unique_system_identifier:INT [foreign key to License.unique_system_identifier][PK], beamwidth:DOUBLE, gain:DOUBLE, height_above_avg_terrain:DOUBLE, height_to_tip:DOUBLE, antenna_action_performed:char(1))

*Coordinate*(id:INT [PK], lat_degrees:DOUBLE, lat_minutes:DOUBLE, lat_seconds:DOUBLE, lat_direction:VARCHAR(10), long_degrees:DOUBLE, long_minutes:DOUBLE, long_seconds:DOUBLE, long_direction:VARCHAR(10))