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# Wireless test report – 376028-4TRFWL

Type of assessment:
Original Certification

Applicant:
RADWIN Ltd.

Description of product as marketed:
Television Band Device (TVBD)

| Model (BS): | Model number variant (BS): | FCC ID (BS): |
|---|---|---|
| TVWS BS EXT | RW-5PG5-02WS | Q3K-500TVWSBS |
| **Model (CPE):** | **Model number variant (CPE):** | **FCC ID (CPE):** |
| TVWS SU INT | RW-5HA0-0PWS | Q3K-500TVWSSU |

Test Standard Specification:
FCC 47 CFR Part 15 Subpart H, §15.713
White Space devices; White space database.

Date of issue: December 10, 2019

| | |
|---|---|
| Andrey Adelberg, Senior Wireless/EMC Specialist | |
| Test engineer(s) | Signature |
| Kevin Rose, Wireless/EMC Specialist |  |
| Reviewed by | Signature |

## Test location

| | |
|---|---|
| Company name | Nemko Canada Inc. |
| Address | 303 River Road |
| City | Ottawa |
| Province | Ontario |
| Postal code | K1V 1H2 |
| Country | Canada |
| Telephone | +1 613 737 9680 |
| Facsimile | +1 613 737 9691 |
| Toll free | +1 800 563 6336 |
| Website | www.nemko.com |
| Site number | FCC: CA2040; (3 m semi anechoic chamber) |

### Limits of responsibility

Note that the results contained in this report relate only to the items tested and were obtained in the period between the date of initial receipt of samples and the date of issue of the report.
This test report has been completed in accordance with the requirements of ISO/IEC 17025. All results contain in this report are within Nemko Canada's ISO/IEC 17025 accreditation.

### Copyright notification

# **Section 1.** Report summary

## 1.1 Applicant and manufacturer

| | |
|---|---|
| Company name | RADWIN Ltd. |
| Address | 27 Habarzel Street |
| City | Tel Aviv |
| Province/State | – |
| Postal/Zip code | 6971039 |
| Country | Israel |

## 1.2 Test specifications

Code of Federal Regulations (CFR)

| | | |
|---|---|---|
| Title | 47 | Telecommunication |
| Chapter | I | Federal Communications Commission (FCC) |
| Subchapter | A | General |
| Part | 15 | Radio Frequency Devices |
| Subparts | H | White Space Devices |

## 1.3 Test methods

| | |
|---|---|
| KDB 416721 D01 v03 | White Space Test Procedures |
| Nominet manual V1.0 | TVWS Radio Testing Manual FCC |

## 1.4 Statement of compliance

In the configuration tested, the EUT was found compliant.

Testing was performed against all relevant requirements of the test standard except as noted in section 1.5 below. Results obtained indicate that the product under test complies in full with the requirements tested. The test results relate only to the items tested.

*See "Summary of test results" for full details.*

## 1.5 Exclusions

None

## 1.6 Test report revision history

| Revision # | Date of issue | Details of changes made to test report |
|---|---|---|
| TRF | December 10, 2019 | Original report issued |

# **Section 2.** Summary of test results

## 2.1 FCC Part 15 Subpart H test results

| Part | Test description | Verdict |
|---|---|---|
| §15.713(g)(3) | Fixed white space device registration | Pass |
| §15.713(g)(3)(iii) | Unsuccessful registration – restricted coordinates | Pass |
| §15.713(g)(3)(v) | Unsuccessful registration due to incomplete information – missing owner | Pass |
| §15.713(g)(3)(vi) | Unsuccessful registration due to incomplete information – contact name | Pass |
| §15.713(g)(3)(vii) | Unsuccessful registration due to incomplete information – contact address | Pass |
| §15.713(g)(3)(vii) | Unsuccessful registration due to incomplete information – contact state (province) | Pass |
| §15.713(g)(3)(vii) | Unsuccessful registration due to incomplete information – contact zip (postal) code | Pass |
| §15.713(g)(3)(vii) | Unsuccessful registration due to incomplete information – contact city | Pass |
| §15.713(g)(3)(vii) | Unsuccessful registration due to incomplete information – contact country | Pass |
| §15.713(g)(3)(viii) | Unsuccessful registration due to incomplete information – contact email | Pass |
| §15.713(g)(3)(ix) | Unsuccessful registration due to incomplete information – contact telephone | Pass |
| §15.713(e)(6) | Unsuccessful registration due to HAAT > 250 m | Pass |
| §15.713(e)(6) | Unsuccessful registration due to antenna height that exceeds 30 m | Pass |
| §15.713(g)(3)(i) and (ii) | Unsuccessful registration due to incomplete information – FCC ID and Serial number | Pass |
| §15.713(a)(1) | 48-hour channel scheduling | Pass |
| §15.713(a)(3) | Relocation of fixed TVBD | Pass |
| §15.711(c)(2)(i) | Fixed & Mode II TVDB database update | Pass |
| §15.711(c)(2)(iii) | Low-power auxiliary device protection | Pass |
| §15.712 | Interference protection requirements (Fixed and personal/portable) | Pass |
| §15.711(c)(2)(ii) | Fixed and Mode II Power level reduction | Pass |
| §15.711(j) | Security | Pass |

# **Section 3.** Equipment under test (EUT) details

## 3.1 Sample information

| | |
|---|---|
| Receipt date | October 14, 2019 |
| Nemko sample ID number | 1 and 2 |

## 3.2 EUT information

| | |
|---|---|
| Product name | Television Band Device (TVBD) |
| Model | TVWS BS EXT (BS), TVWS SU INT (CPE) |
| Model variants | RW-5PG5-02WS (BS), RW-5HA0-0PWS (CPE) |
| Serial number | Prototypes |

## 3.3 Technical information

| | |
|---|---|
| Frequency band | 470–698 MHz (channels 14–51) |
| Channel BW | 6, 12, 24 MHz |
| Type of modulation | OFDM (BPSK to 256-QAM) |
| Power requirements | 120 $V_{AC}$ 60 Hz or 55 $V_{DC}$ via PoE |

## 3.4 Product description and theory of operation

The **TVWS base station** is a small and compact outdoor unit that transmits two independent carriers. Each carrier provides up to 150Mbps by bonding 4 contiguous TVWS channels. The base station is deployed with an external MIMO 2x2 antenna. It is connected to the network through a GbE POE or SFP with DC input. The base station includes an embedded GPS with an integrated antenna or optional external antenna. The base station main features include up to 300Mbps (2 x 150Mbps) throughput, up to 256 QAM modulation rates in 6, 12, 24 MHz channel bandwidths, support of up to 64 subscribers.

The **TVWS subscriber unit** delivers up to 150Mbps and includes a directional integrated flat panel antenna for quick and easy installation. Ruggedized and IP-67 compliant the TVWS SU is highly robust, a mandatory requirement for maintaining low operational costs in remote rural networks. The SU incorporates an embedded GPS, enabling dynamic spectrum allocation according to the regulation. The TVWS SU is easily configured and commissioned via 2.4 GHz WiFi using WINTouch smartphone application.

## 3.5 Database information

Nominet White Space Data Base and Data base sandbox were used for devices registration and testing.

# **Section 4.** Engineering considerations

## 4.1 Modifications incorporated in the EUT

There were no modifications performed to the EUT during this assessment.

## 4.2 Technical judgment

None

## 4.3 Deviations from laboratory tests procedures

No deviations were made from laboratory procedures.

# **Section 5.** Test conditions

## 5.1 Atmospheric conditions

| | |
|---|---|
| Temperature | 15–30 °C |
| Relative humidity | 20–75 % |
| Air pressure | 860–1060 mbar |

When it is impracticable to carry out tests under these conditions, a note to this effect stating the ambient temperature and relative humidity during the tests shall be recorded and stated.

## 5.2 Power supply range

The normal test voltage for equipment to be connected to the mains shall be the nominal mains voltage. For the purpose of the present document, the nominal voltage shall be the declared voltage, or any of the declared voltages ±5 %, for which the equipment was designed.

# **Section 6.** Measurement uncertainty

## 6.1 Uncertainty of measurement

UKAS Lab 34 and TIA-603-B have been used as guidance for measurement uncertainty reasonable estimations with regards to previous experience and validation of data. Nemko Canada, Inc. follows these test methods in order to satisfy ISO/IEC 17025 requirements for estimation of uncertainty of measurement for wireless products.

Measurement uncertainty budgets for the tests are detailed below. Measurement uncertainty calculations assume a coverage factor of K = 2 with 95% certainty.

***Table 6.1-1:*** *Measurement uncertainty*

| Test name | Measurement uncertainty, dB |
|---|---|
| All antenna port measurements | 0.55 |

# **Section 7.** Test equipment

## 7.1 Test equipment list

***Table 7.1-1:*** *Equipment list*

| Equipment | Manufacturer | Model no. | Asset no. | Cal cycle | Next cal. |
|---|---|---|---|---|---|
| Spectrum analyzer | Rohde & Schwarz | FSU46 | FA001877 | 1 year | October 31, 2020 |

# Section 8. Testing data

## 8.1 FCC 15.713(g)(3) Fixed white space device registration

### 8.1.1 Definitions and limits

Prior to operating for the first time or after changing location, a fixed white space device must register with the white space database by providing the information listed in paragraph (g)(3) of §15.713. Testing in accordance with KDB 416721 D01, III (2)(a)

### 8.1.2 Test summary

| | |
|---|---|
| Test date | December 2, 2019 |

### 8.1.3 Observations, settings and special notes

EUT was configured with the with proper registration information. Successful registration with all required fields and as a Fixed device type was verified by showing on the GUI page.
There were no emissions detected, on any channels, until it has successfully registered

### 8.1.4 Test data

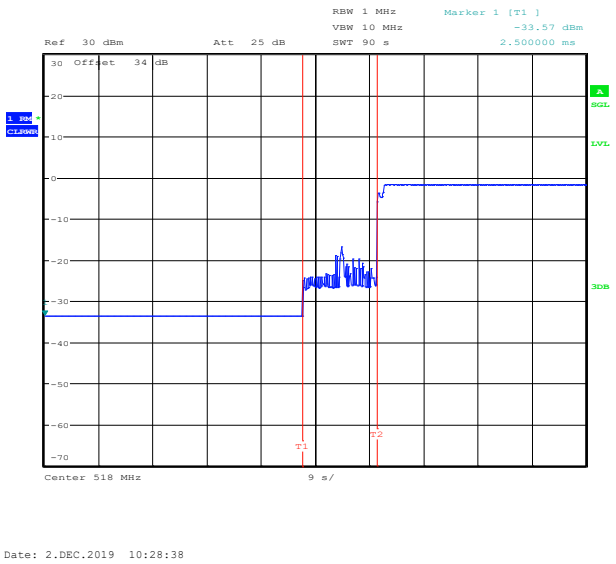


***Figure 8.1-1:*** *Successful registration and transmission begins from Base station unit (lower level signal indicates beacon signal)*

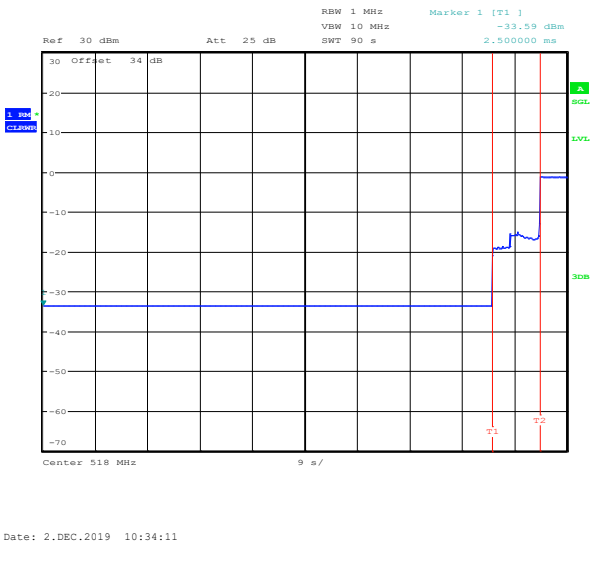


***Figure 8.1-2:*** *Successful registration and transmission begins from CPE unit (lower level signal indicates beacon signal from base station)*

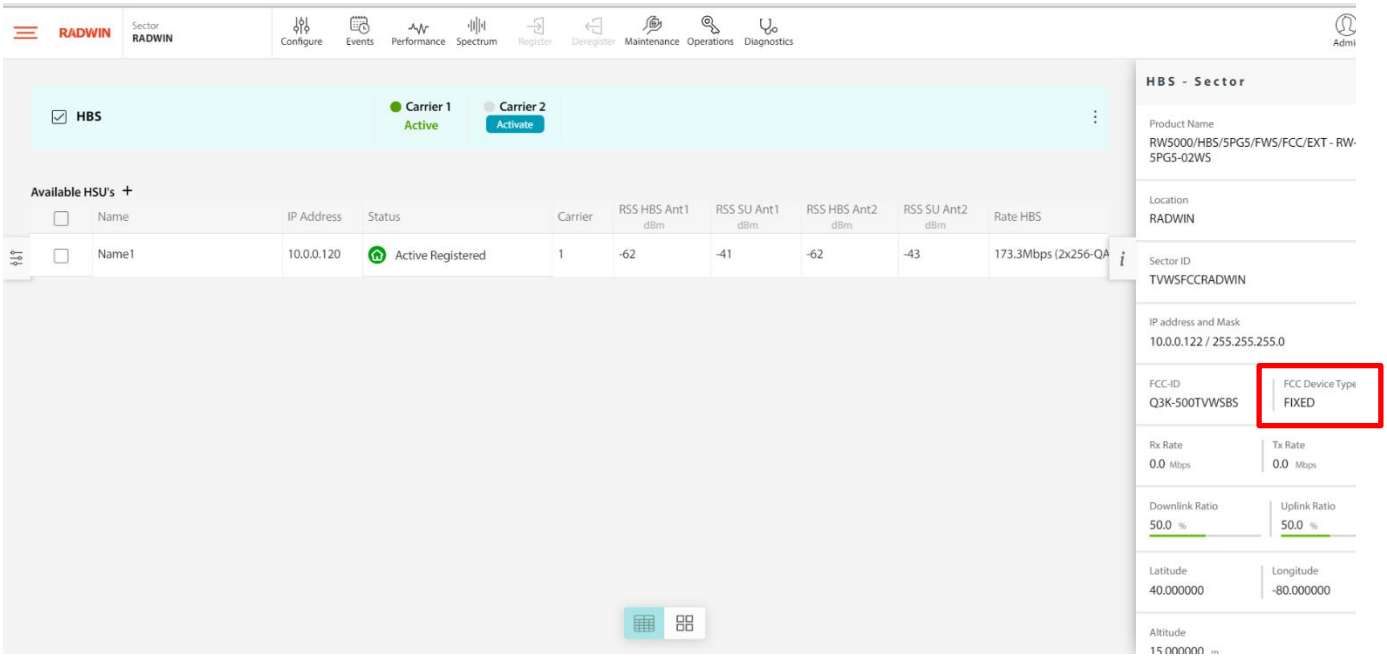


***Figure 8.1-3:*** *Successful registration and identification as Fixed Device Type device (BS)*

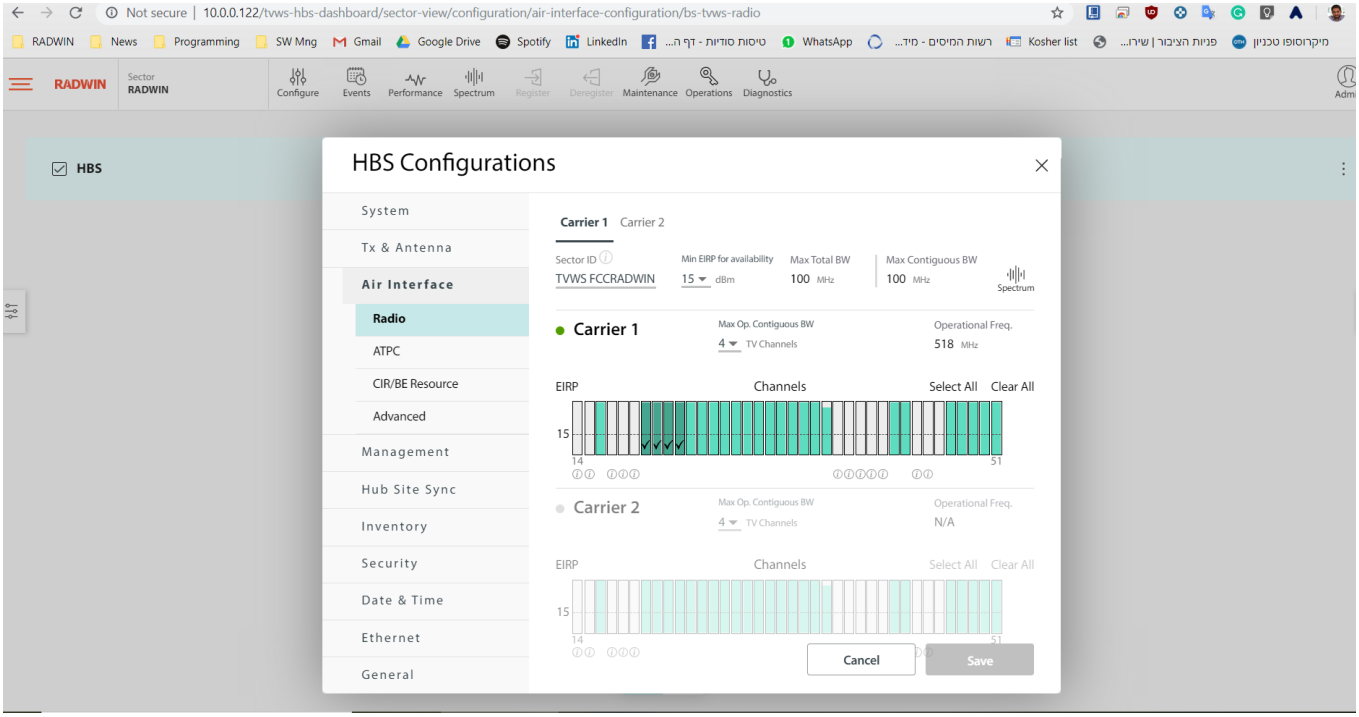


***Figure 8.1-4:*** *Successful registration with received list of available channels*

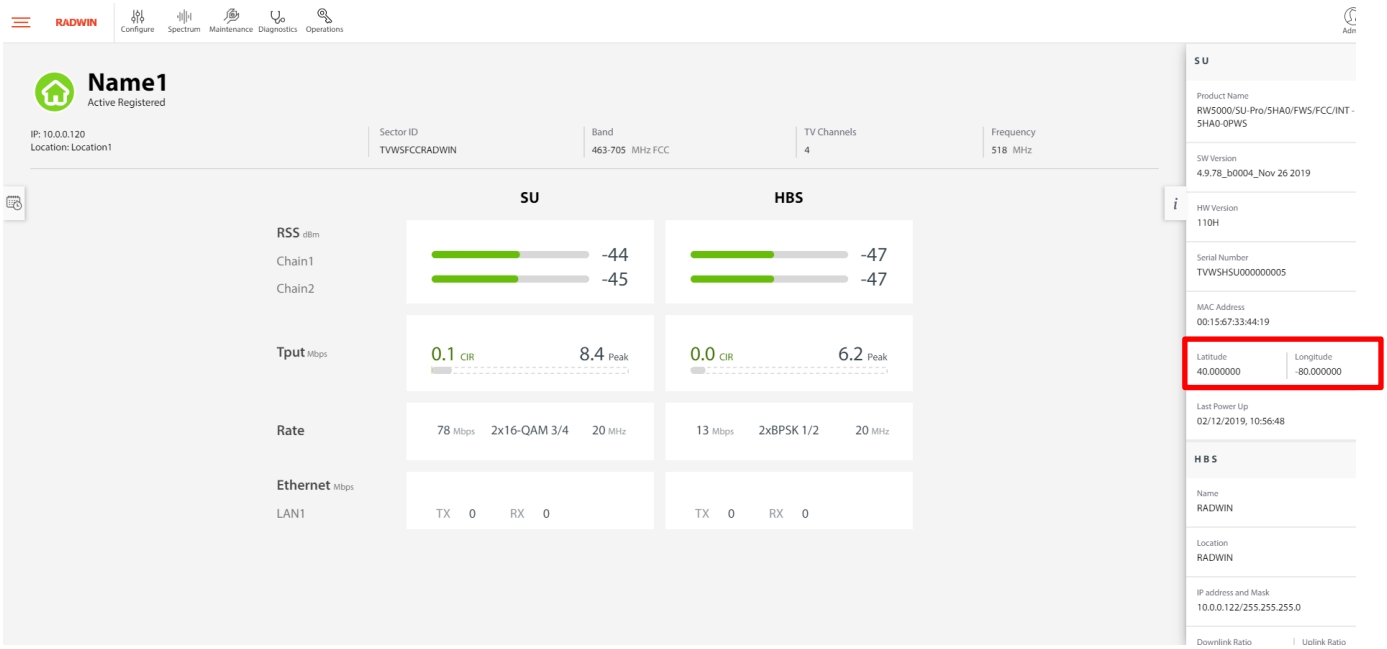


***Figure 8.1-5:*** *Successful registration of CPE*

## 8.2 FCC 15.713(a)(1), FCC 15.711(c)(2)(iii) 48-hour channel scheduling

### 8.2.1 Definitions and limits

After receiving an available channel list, register a low-power auxiliary device on the WSD operating channel to operate on an available channel and in an upcoming time period when the device will be tested. Repeat the available channel request after the update interval and in the time period when the low-power auxiliary device is scheduled to operate and confirm that the low-power device is accounted for in the schedule. Using the system management software, confirm that the device changes channels at the scheduled time. Testing in accordance with KDB 416721 D01, III (2)(h)

### 8.2.2 Test summary

| | |
|---|---|
| Test date | December 2, 2019 |

### 8.2.3 Observations, settings and special notes

EUT implements a refresh time of 24 hours instead of 48-hour push notification wait.

### 8.2.4 Test data

db-conf.json

```
{
  "NominetFCC": {
    "connection-loss-timeout": {
      "hours": 24,
      "time-of-day": "23:59"
    },
    "generic-required": false,
    "weblist": null
  },
  "NominetETSI": {
    "connection-loss-timeout": null,
    "generic-required": true,
    "weblist": {
      "provider": "Nominet UK",
      "default-refresh": 90
    }
  }
}
```

***Figure 8.2-1:*** *Refresh time (T-Update) instead of 48-hour push notification wait*

## 8.3 FCC 15.713(g)(3)(iii) Unsuccessful registration – restricted coordinates

### 8.3.1 Definitions and limits

(3) The white space device registration database shall contain the following information for fixed white space devices:
(iii) Device's geographic coordinates (latitude and longitude (NAD 83));

### 8.3.2 Test summary

| | |
|---|---|
| Test date | December 2, 2019 |

### 8.3.3 Observations, settings and special notes

The device was initially configured with a valid registration such that the device will begin to transmit on a given channel. Once the device was transmitting and the link was established, the registration data was modified to incorporate restricted coordinates. EUT was configured with restricted coordinated: outside US regulatory boundaries with latitude: 45.3° N and longitude: 75.7° W (within Canada). The registration process was re-initiated with the invalid coordinates. After database rejection, the EUT stopped the transmission.

### 8.3.4 Test data

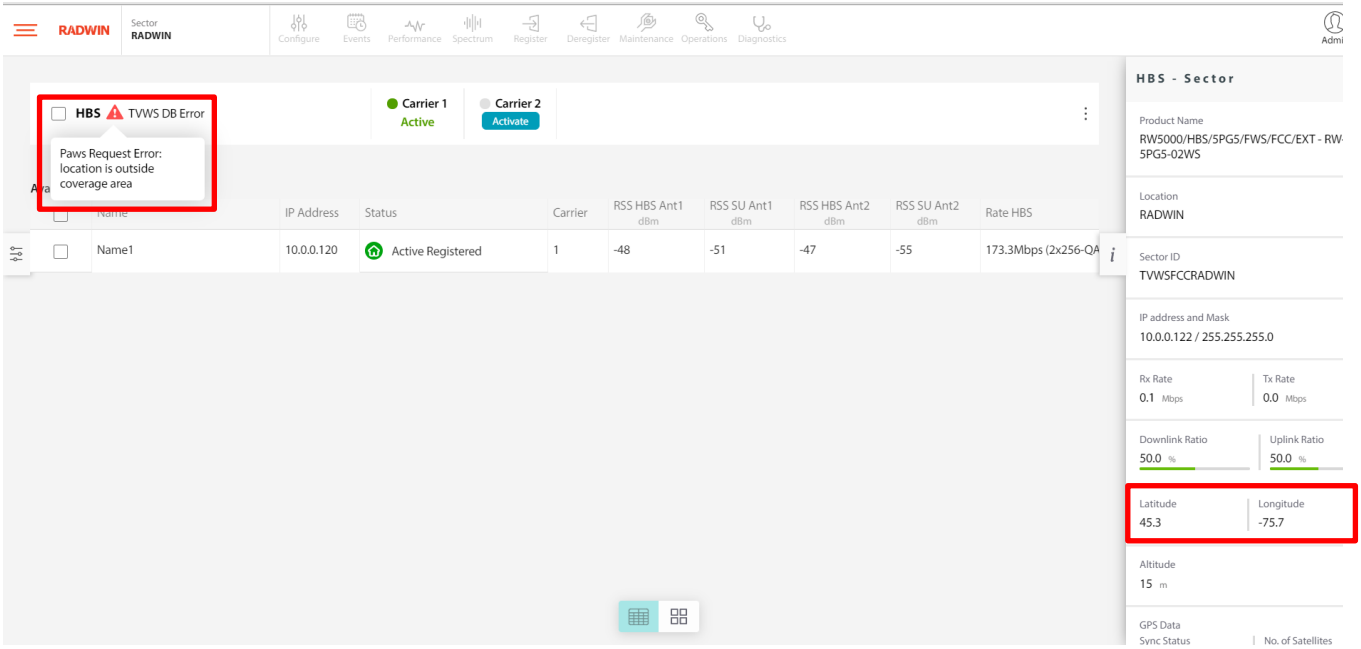


***Figure 8.3-1:*** *Unsuccessful registration with restricted coordinates (BS)*

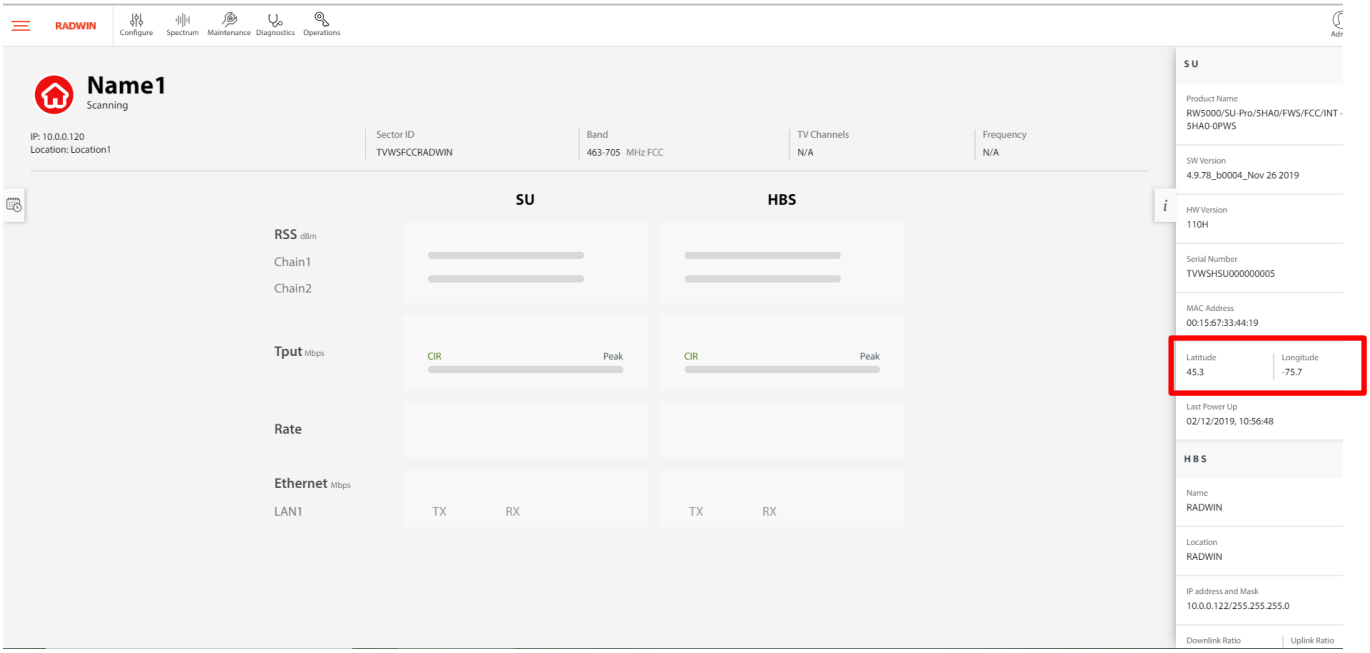


***Figure 8.3-2:*** *Unsuccessful registration with restricted coordinates (CPE)*

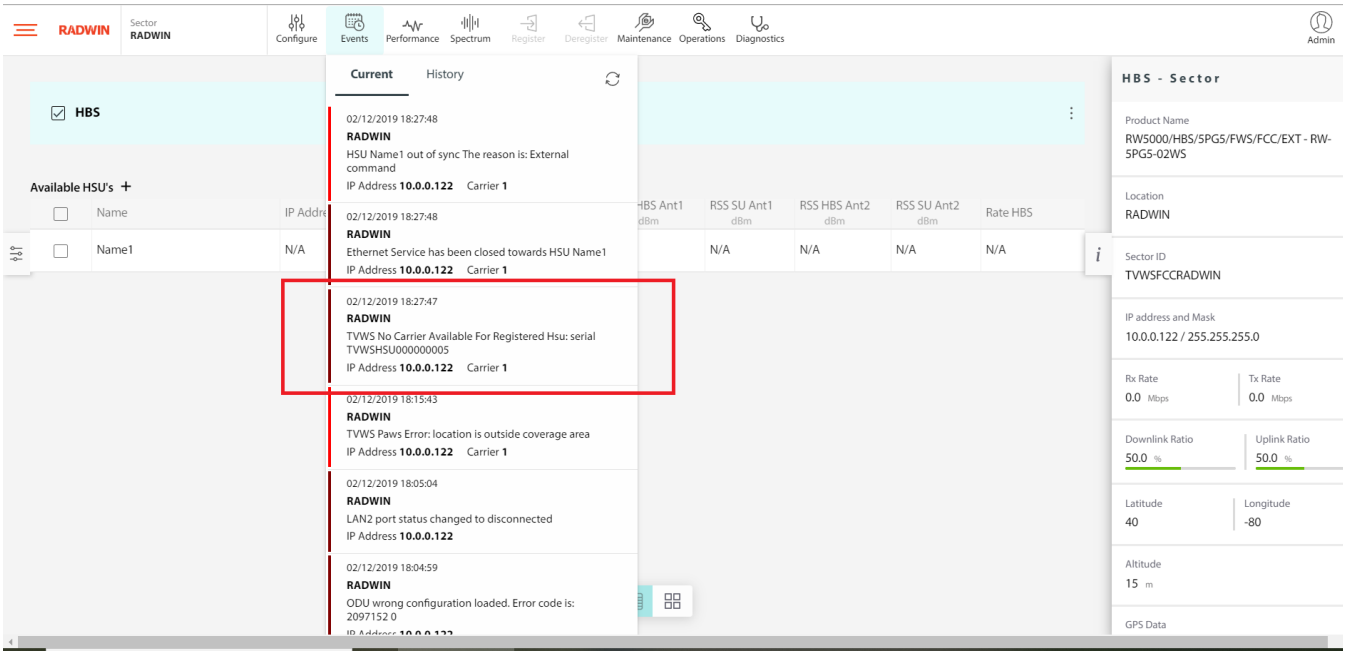


***Figure 8.3-3:*** *Unsuccessful registration with restricted coordinates (CPE)*

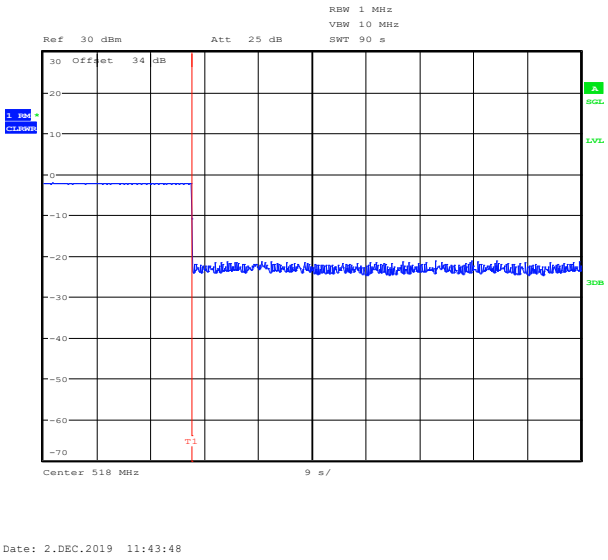


***Figure 8.3-4:*** *Unsuccessful registration and transmission stops (BS)*

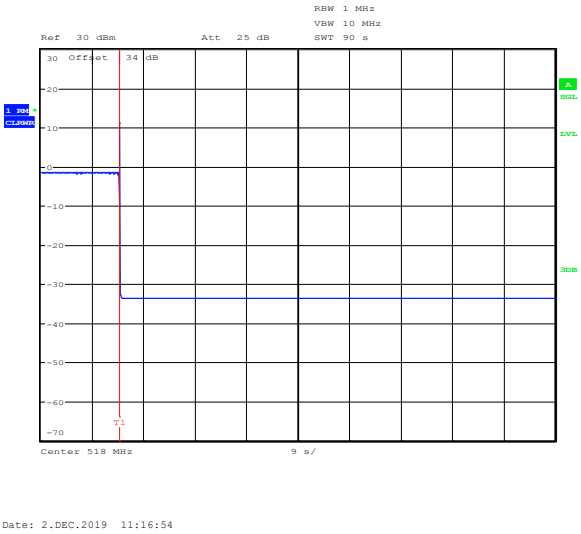


***Figure 8.3-5:*** *Unsuccessful registration and transmission stops (CPE)*

## 8.4 FCC 15.713(g)(3)(v) Unsuccessful registration due to incomplete information – missing owner

### 8.4.1 Definitions and limits

(3) The white space device registration database shall contain the following information for fixed white space devices:
(v) Name of the individual or business that owns the device

### 8.4.2 Test summary

| | |
|---|---|
| Test date | December 2, 2019 |

### 8.4.3 Observations, settings and special notes

EUT was configured with incomplete information: owner name field was left intentionally blank (instead of *John Dou*). It was verified, that after detecting missing contact information, EUT did not send any form request to database.
To test this feature the device was initially configured with valid information and allowed to transmit on the channel. The registration information was then modified to render it invalid and a registration request was not re-initiated. Once the device detects an invalid registration field, the device flagged the error in the GUI.

### 8.4.4 Test data

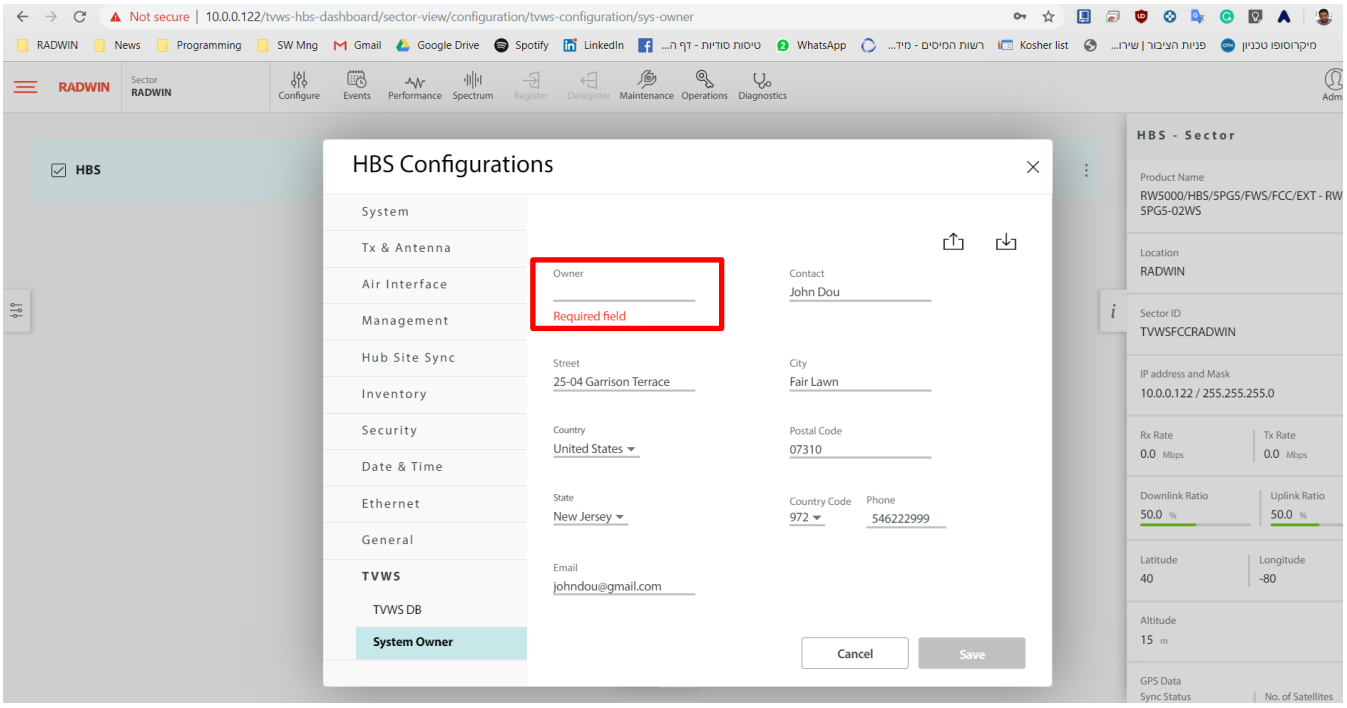


***Figure 8.4-1:*** *Unsuccessful registration with missing owner name information*

## 8.5 FCC 15.713(g)(3)(vi) Unsuccessful registration due to incomplete information – contact name

### 8.5.1 Definitions and limits

(3) The white space device registration database shall contain the following information for fixed white space devices:
(vi) Name of a contact person responsible for the device's operation

### 8.5.2 Test summary

| | |
|---|---|
| Test date | December 2, 2019 |

### 8.5.3 Observations, settings and special notes

EUT was configured with incomplete information: contact name field was left intentionally blank (instead of *John Dou*). It was verified, that after detecting missing contact information, EUT did not send any form request to database.
To test this feature the device was initially configured with valid information and allowed to transmit on the channel. The registration information was then modified to render it invalid and a registration request was not re-initiated. Once the device detects an invalid registration field, the device flagged the error in the GUI.

### 8.5.4 Test data

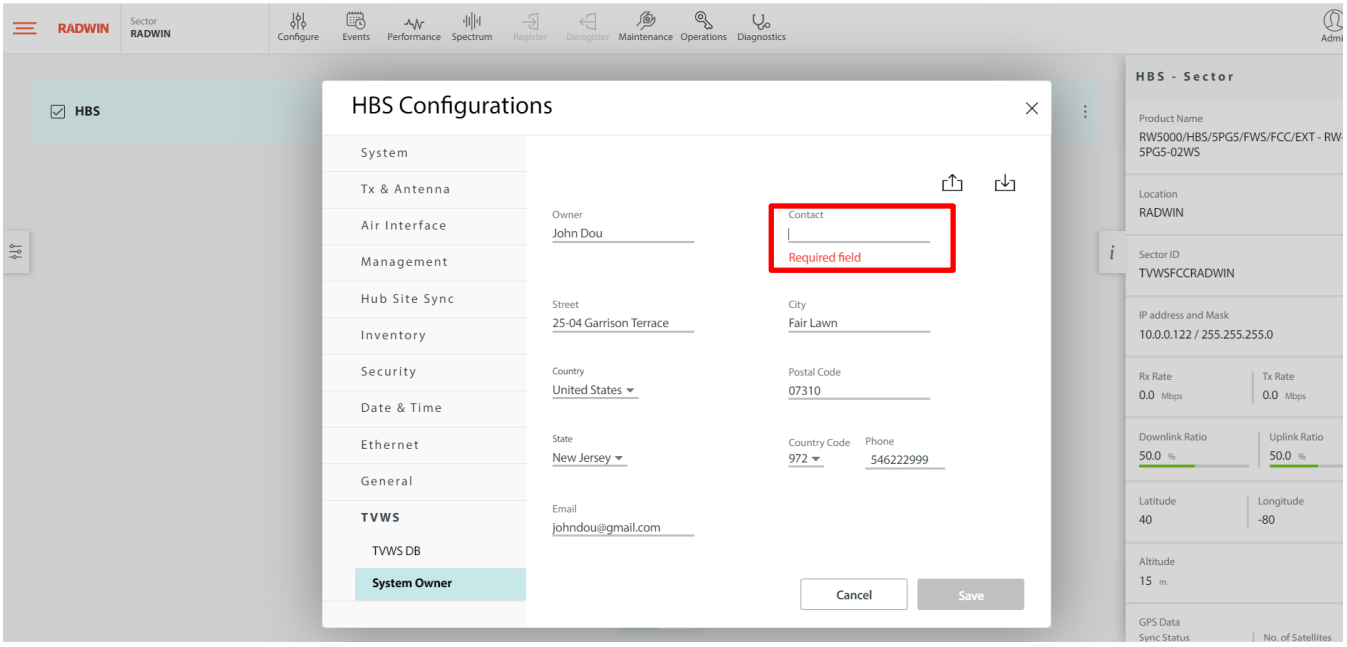


***Figure 8.5-1:*** *Unsuccessful registration with missing contact name*

## 8.6 FCC 15.713(g)(3)(vii) Unsuccessful registration due to incomplete information – contact address

### 8.6.1 Definitions and limits

(3) The white space device registration database shall contain the following information for fixed white space devices:
(vii) Address for the contact person

### 8.6.2 Test summary

| | |
|---|---|
| Test date | December 2, 2019 |

### 8.6.3 Observations, settings and special notes

EUT was configured with incomplete information: owner contact address (street) field was left intentionally blank. It was verified, that after detecting missing contact information, EUT did not send any form request to database.
To test this feature the device was initially configured with valid information and allowed to transmit on the channel. The registration information was then modified to render it invalid and a registration request was not re-initiated. Once the device detects an invalid registration field, the device flagged the error in the GUI.

### 8.6.4 Test data

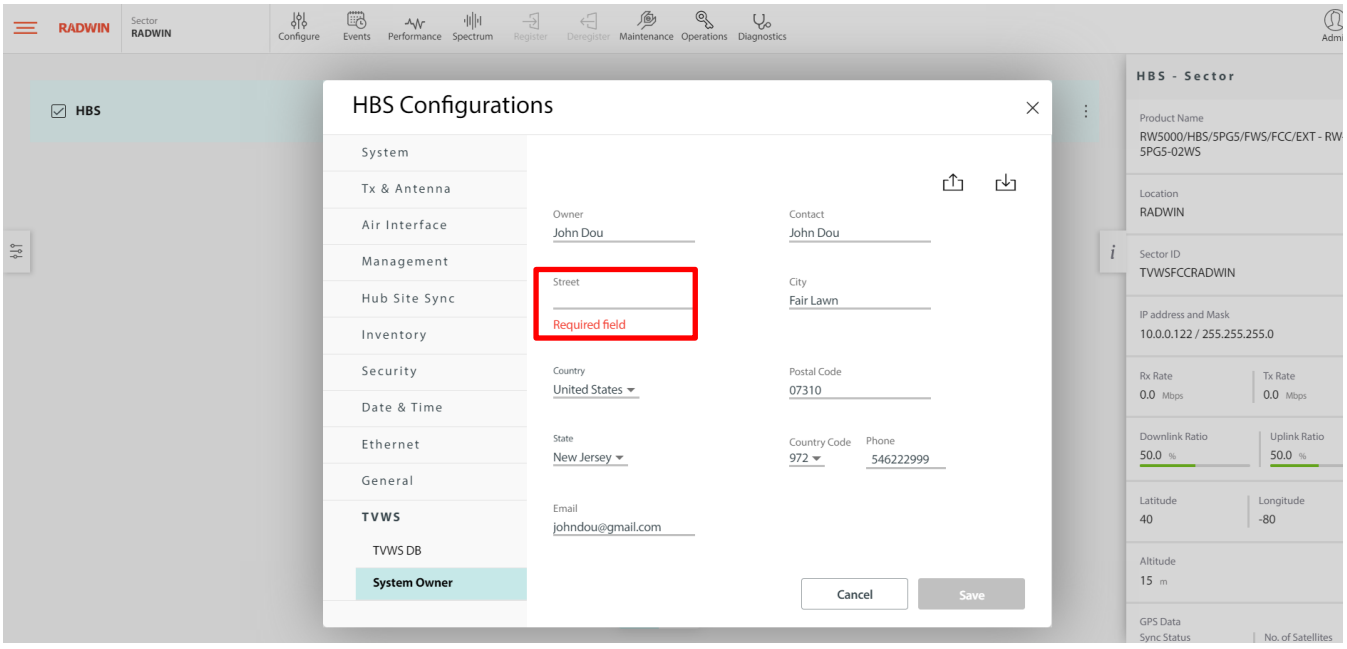


***Figure 8.6-1:*** *Unsuccessful registration with missing owner contact address*

## 8.7 FCC 15.713(g)(3)(vii) Unsuccessful registration due to incomplete information – contact state

### 8.7.1 Definitions and limits

(3) The white space device registration database shall contain the following information for fixed white space devices:
(vii) Address for the contact person

### 8.7.2 Test summary

| | |
|---|---|
| Test date | December 2, 2019 |

### 8.7.3 Observations, settings and special notes

GUI won't continue to the registration without selecting a "State" from the drop-down menu. It is impossible to leave this field blank.

### 8.7.4 Test data

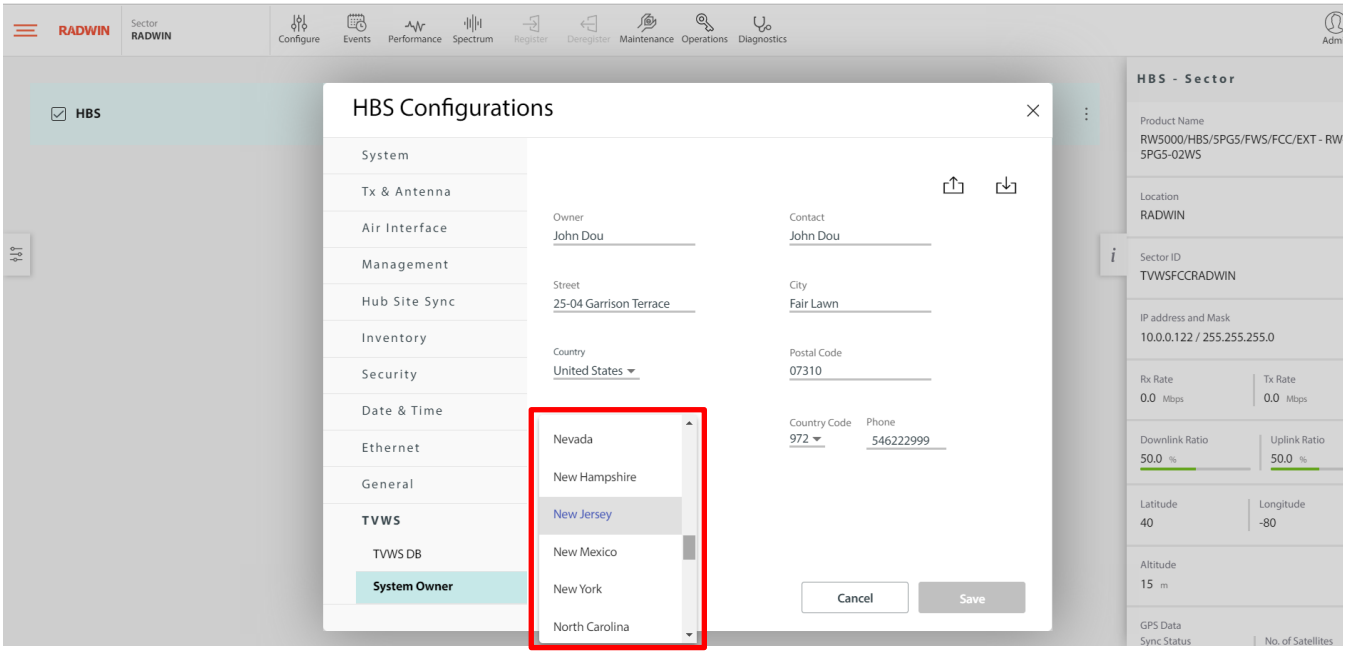


***Figure 8.7-1:*** *Unsuccessful registration with missing owner contact state*

## 8.8 FCC 15.713(g)(3)(vii) Unsuccessful registration due to incomplete information – contact postal code

### 8.8.1 Definitions and limits

(3) The white space device registration database shall contain the following information for fixed white space devices:
(vii) Address for the contact person

### 8.8.2 Test summary

| | |
|---|---|
| Test date | December 2, 2019 |

### 8.8.3 Observations, settings and special notes

EUT was configured with incomplete information: owner contact postal code field was left intentionally blank (instead of *07310*). It was verified, that after detecting missing contact information, EUT did not send any form request to database, the EUT stopped the transmission.
To test this feature the device was initially configured with valid information and allowed to transmit on the channel. The registration information was then modified to render it invalid and a registration request was not re-initiated. Once the device detects an invalid registration field, the device flagged the error in the GUI.

### 8.8.4 Test data

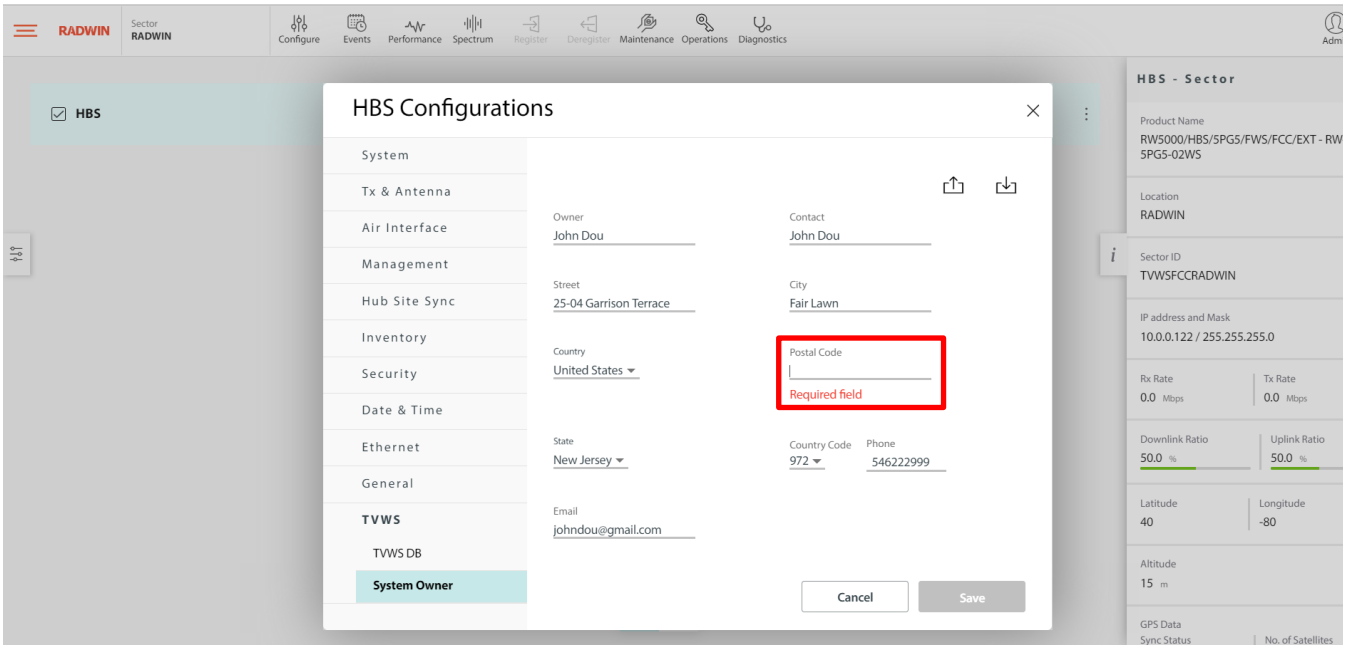


***Figure 8.8-1:*** *Unsuccessful registration with missing owner contact postal code*

## 8.9 FCC 15.713(g)(3)(vii) Unsuccessful registration due to incomplete information – contact city

### 8.9.1 Definitions and limits

(3) The white space device registration database shall contain the following information for fixed white space devices:
(vii) Address for the contact person

### 8.9.2 Test summary

| | |
|---|---|
| Test date | December 2, 2019 |

### 8.9.3 Observations, settings and special notes

EUT was configured with incomplete information: owner contact city field was left intentionally blank (instead of *Fail Lawn*). It was verified, that after detecting missing contact information, EUT did not send any form request to database.
To test this feature the device was initially configured with valid information and allowed to transmit on the channel. The registration information was then modified to render it invalid and a registration request was not re-initiated. Once the device detects an invalid registration field, the device flagged the error in the GUI.

### 8.9.4 Test data

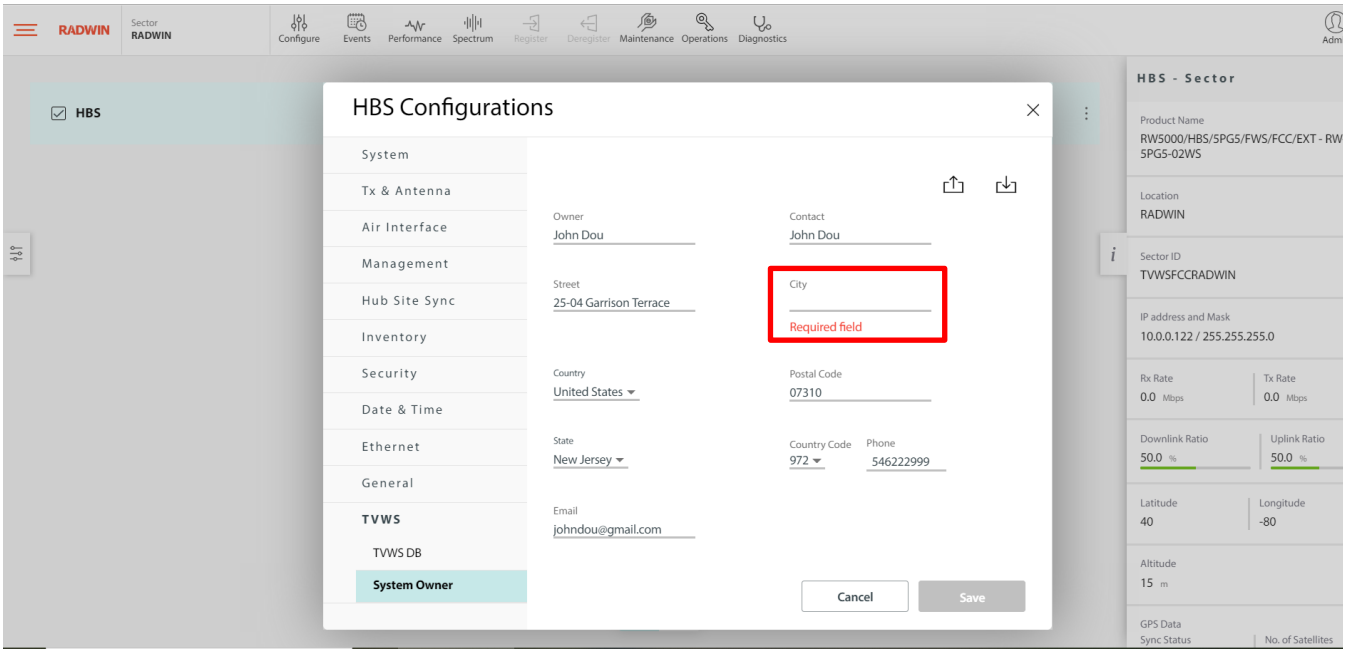


***Figure 8.9-1:*** *Unsuccessful registration with missing owner contact city*

## 8.10 FCC 15.713(g)(3)(vii) Unsuccessful registration due to incomplete information – contact country

### 8.10.1 Definitions and limits

(3) The white space device registration database shall contain the following information for fixed white space devices:
(vii) Address for the contact person

### 8.10.2 Test summary

| | |
|---|---|
| Test date | December 2, 2019 |

### 8.10.3 Observations, settings and special notes

GUI won't continue to the registration without selecting a "Country" from the drop-down menu. It is impossible to leave this field blank.

### 8.10.4 Test data

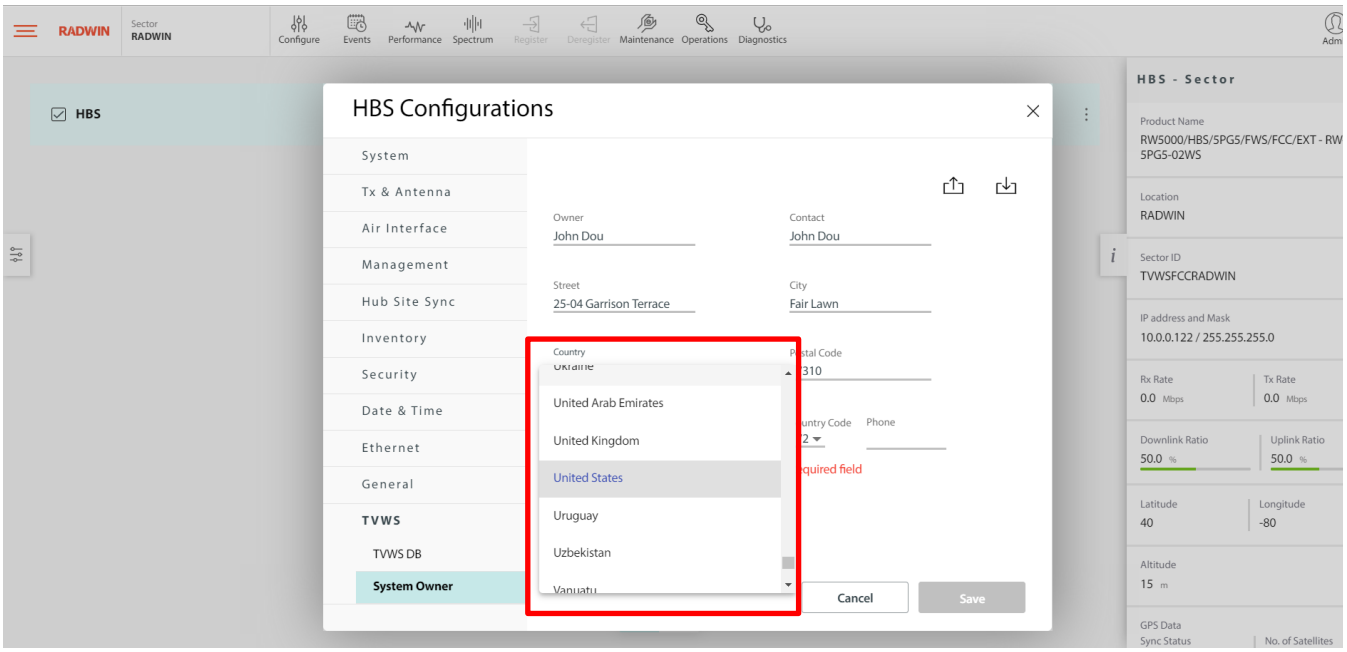


***Figure 8.10-1:*** *Unsuccessful registration with missing owner contact country*

## 8.11 FCC 15.713(g)(3)(viii) Unsuccessful registration due to incomplete information – contact email

### 8.11.1 Definitions and limits

(3) The white space device registration database shall contain the following information for fixed white space devices:
(viii) Email address for the contact person

### 8.11.2 Test summary

| | |
|---|---|
| Test date | December 2, 2019 |

### 8.11.3 Observations, settings and special notes

EUT was configured with incomplete information: owner contact email field was left intentionally blank (instead of *johndou@gmail.com*). It was verified, that after detecting missing contact information, EUT did not send any form request to database.
To test this feature the device was initially configured with valid information and allowed to transmit on the channel. The registration information was then modified to render it invalid and a registration request was not re-initiated. Once the device detects an invalid registration field, the device flagged the error in the GUI.

### 8.11.4 Test data

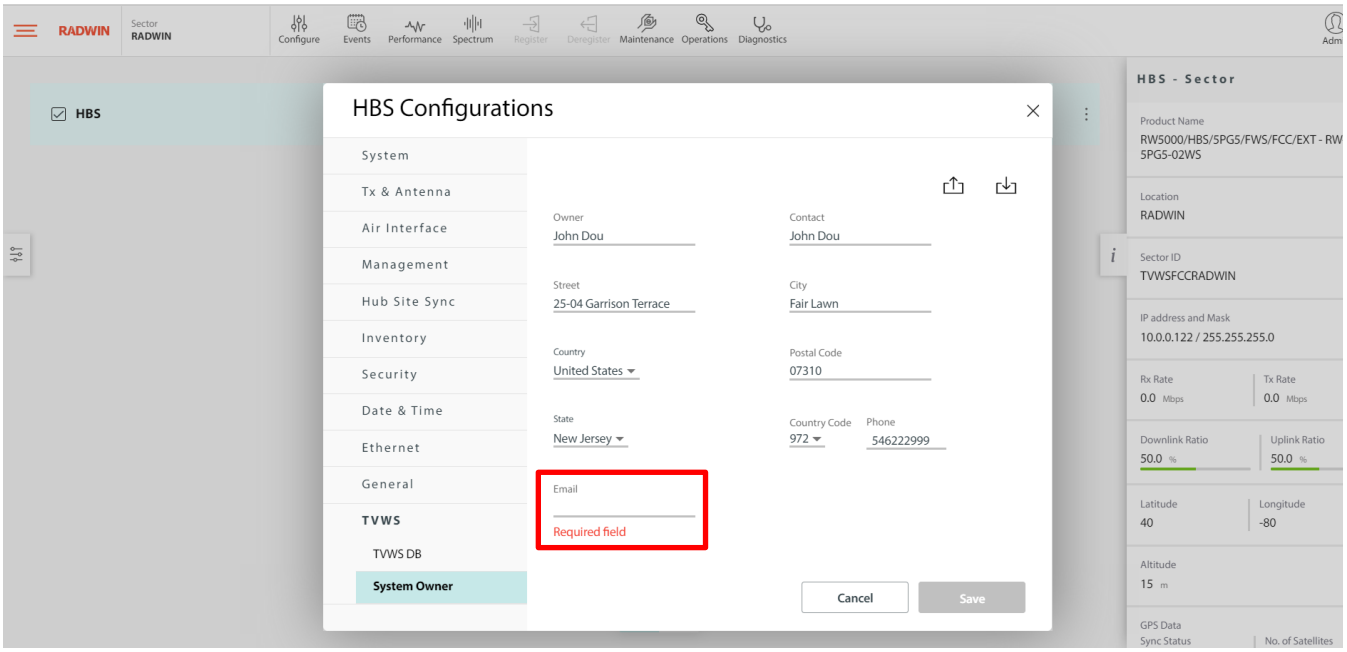


***Figure 8.11-1:*** *Unsuccessful registration with missing owner contact email*

## 8.12 FCC 15.713(g)(3)(ix) Unsuccessful registration due to incomplete information – contact telephone

### 8.12.1 Definitions and limits

(3) The white space device registration database shall contain the following information for fixed white space devices:
(xi) Phone number for the contact person

### 8.12.2 Test summary

| | |
|---|---|
| Test date | December 2, 2019 |

### 8.12.3 Observations, settings and special notes

EUT was configured with incomplete information: owner/operator contact telephone field was left intentionally blank (instead of *546222999*). It was verified, that after detecting missing contact information, EUT did not send any form request to database.
To test this feature the device was initially configured with valid information and allowed to transmit on the channel. The registration information was then modified to render it invalid and a registration request was not re-initiated. Once the device detects an invalid registration field, the device flagged the error in the GUI.

### 8.12.4 Test data

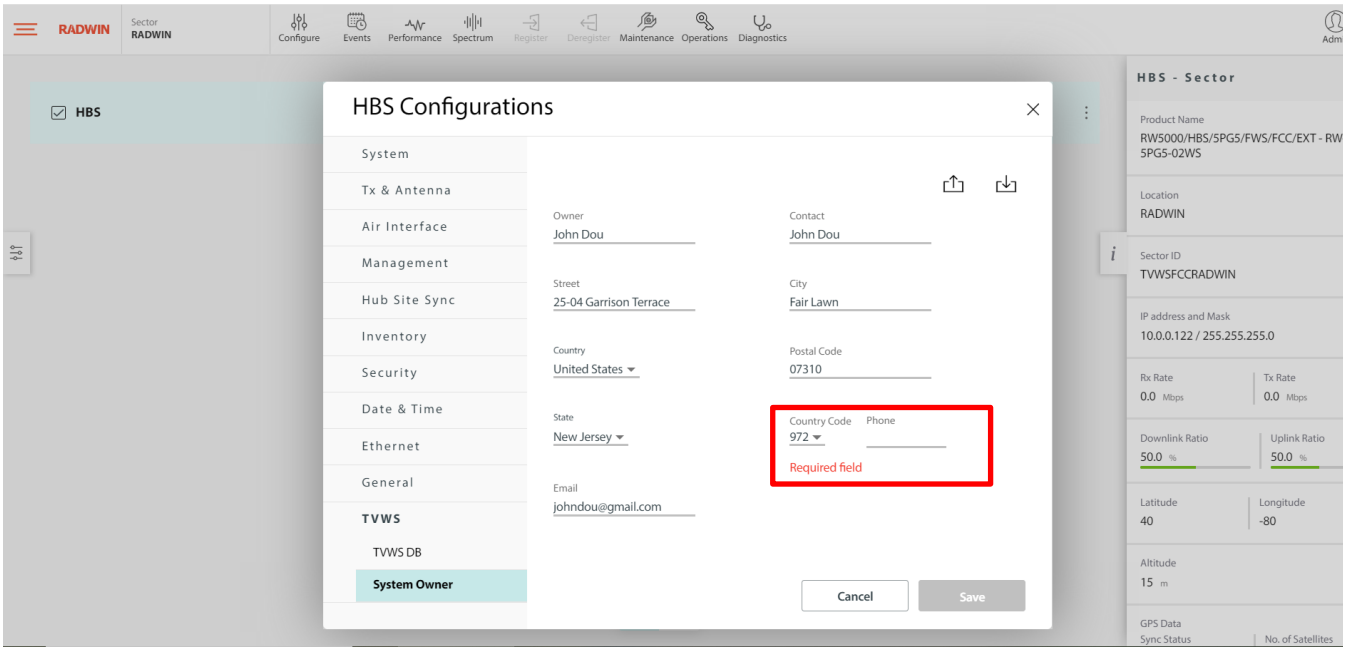


***Figure 8.12-1:*** *Unsuccessful registration with missing owner contact telephone*

## 8.13 FCC 15.713(e)(6) Unsuccessful registration due to HAAT > 250 m

### 8.13.1 Definitions and limits

A fixed device with an antenna height above ground that exceeds 30 meters or an antenna height above average terrain (HAAT) that exceeds 250 meters shall not be provided a list of available channels.

### 8.13.2 Test summary

| | |
|---|---|
| Test date | December 2, 2019 |

### 8.13.3 Observations, settings and special notes

EUT was configured with information that included a location with HAAT of more than 250 m (at latitude 37.88° N and longitude 114.575° W). It was verified, that after database rejection, the EUT didn't start the transmission.
To test this feature the device was configured with invalid information and requested to transmit on the channel. Once the database responded with an empty channel list as a result of the antenna height above ground, or excessive HAAT, the EUT didn't start to transmit. Subscriber unit was waiting for the information from Base station and didn't start transmission as well.

### 8.13.4 Test data

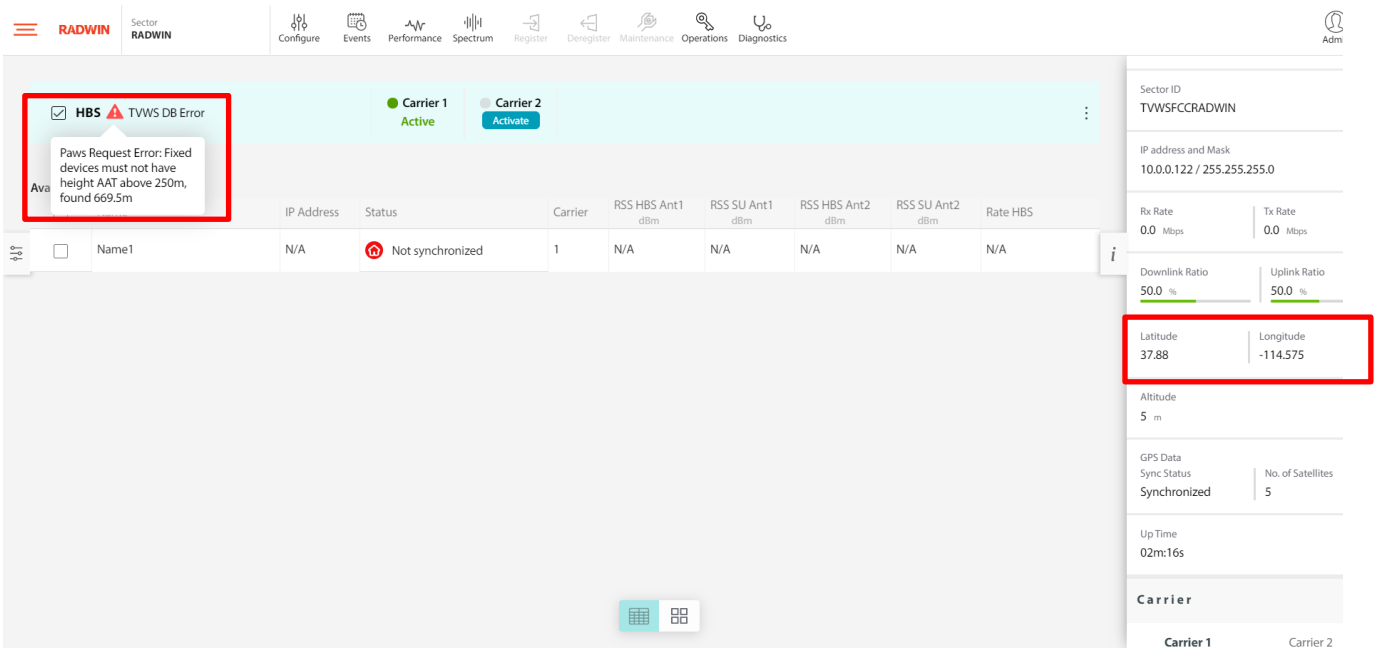


***Figure 8.13-1:*** *Unsuccessful registration with restricted HAAT location*

## 8.14 FCC 15.713(e)(6) Unsuccessful registration due to antenna height that exceeds 30 m

### 8.14.1 Definitions and limits

A fixed device with an antenna height above ground that exceeds 30 meters or an antenna height above average terrain (HAAT) that exceeds 250 meters shall not be provided a list of available channels.

### 8.14.2 Test summary

| | |
|---|---|
| Test date | October 17, 2018 |

### 8.14.3 Observations, settings and special notes

EUT was configured with information that included an antenna height that exceeded 30 m limit in congested areas and 100 m in less congested areas (the limit is set by the database). It was verified, that after database rejection, the EUT stopped the transmission.
To test this feature the device was initially configured with valid information and allowed to transmit on the channel. The registration information was then modified to render it invalid and a registration request was re-initiated. Once the database responded with an empty channel list as a result of the antenna height above ground, the EUT stopped to transmit. For the Base station device, during the initial power up and registration, if the database returns an empty channel list, it will not turn on the transmitter. For the Subscriber device, the EUT will perform a passive scan and will attempt to connect to a Base station device on a channel where it detects a beacon. If the database responds with an empty channel list, or the device is unable to connect to the database, it will cease to transmit on the channel.

### 8.14.4 Test data

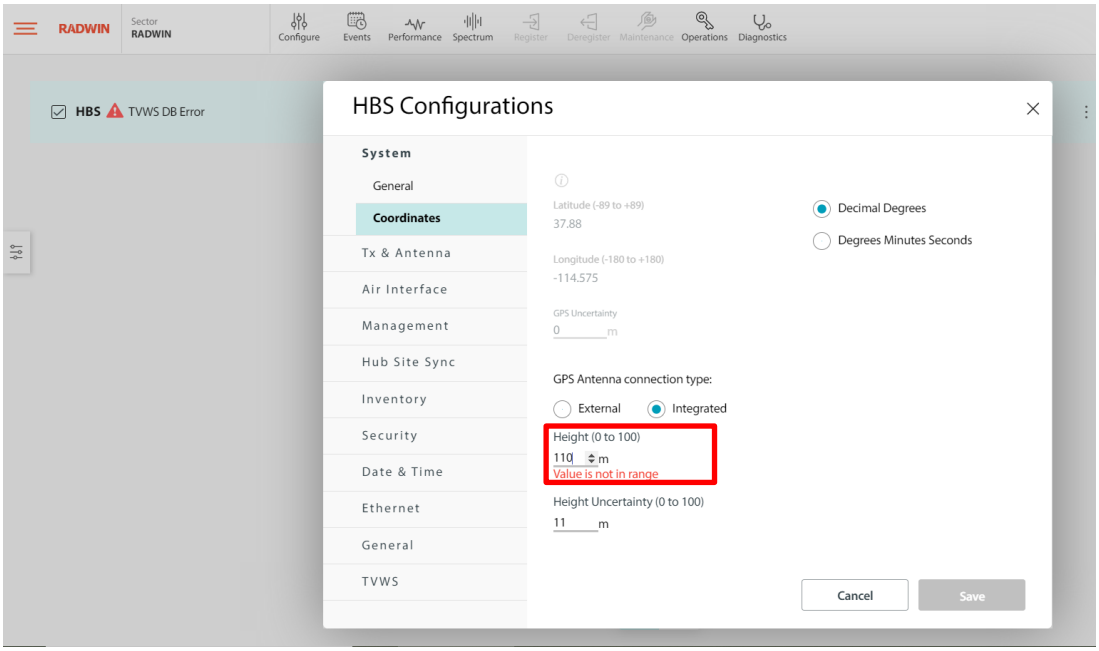


***Figure 8.14-1:*** *Unsuccessful registration with restricted antenna height in the less congested area*

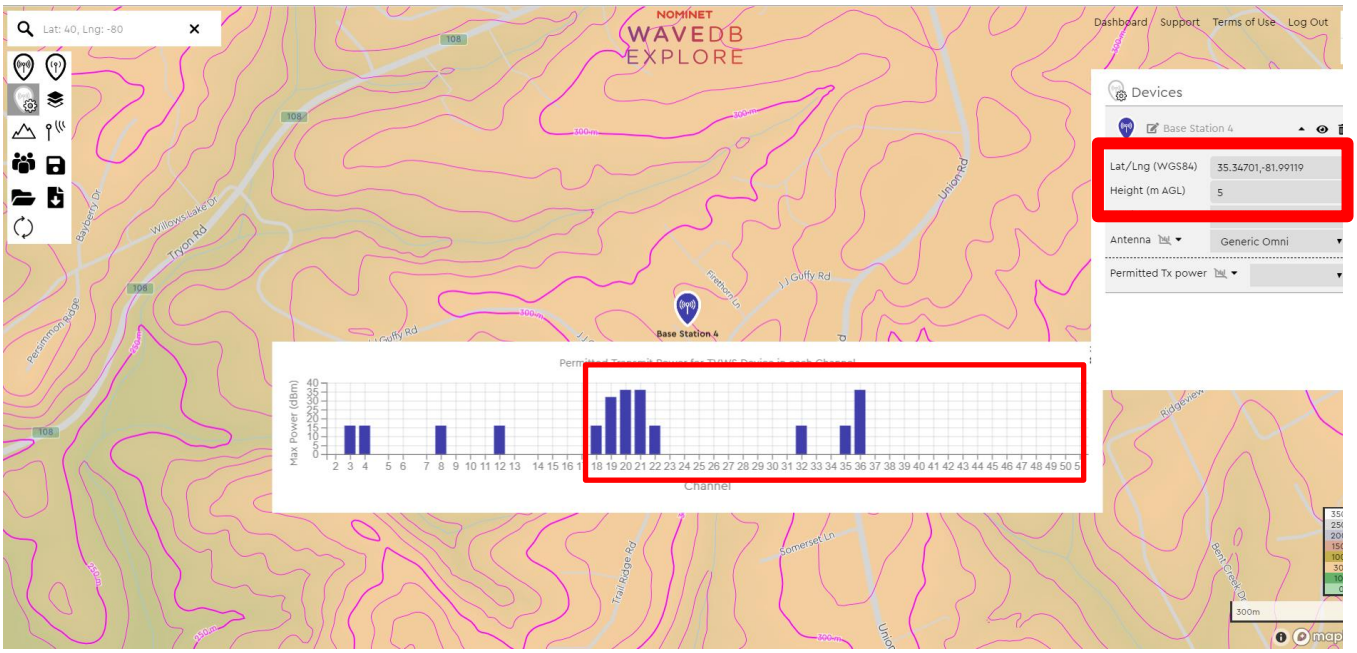


***Figure 8.14-2:*** *Example of congested area location with available channels for antenna height of 5 m (from Nominet)*

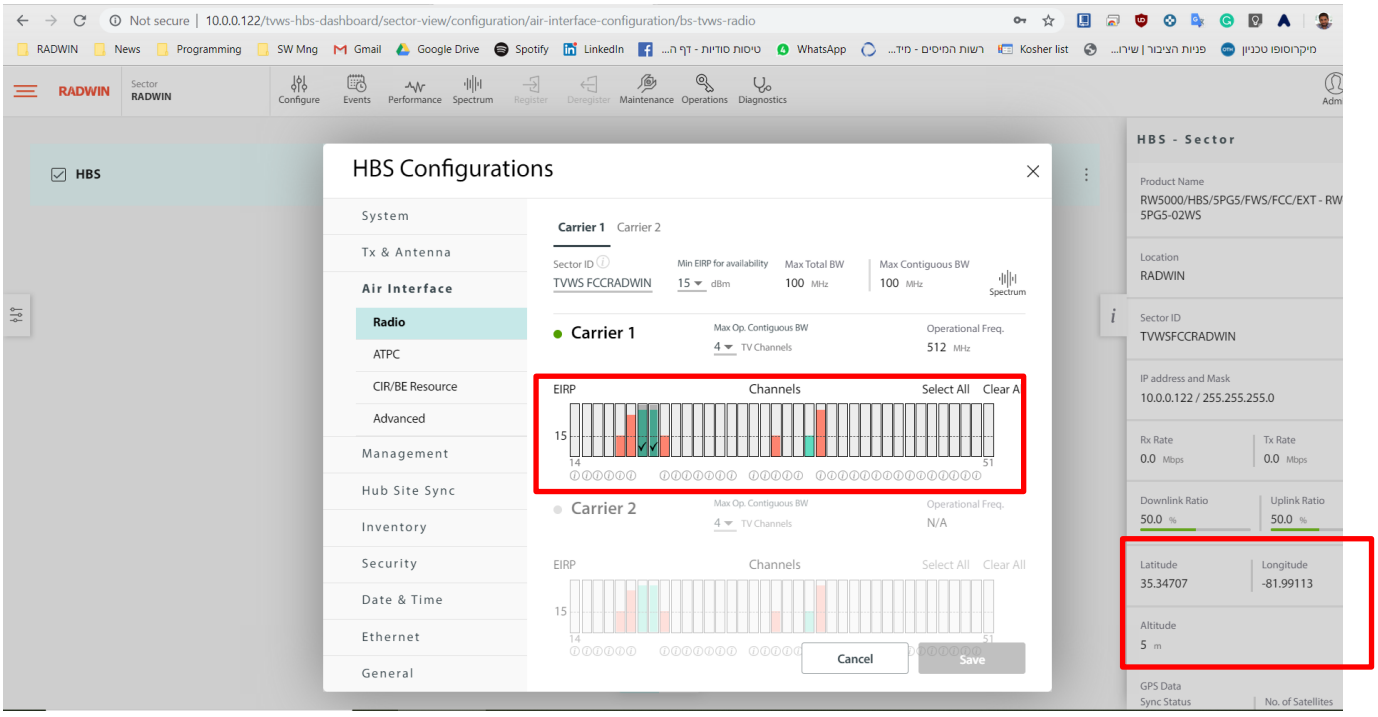


***Figure 8.14-3:*** *Antenna height adjusted to the specific height and available channels*

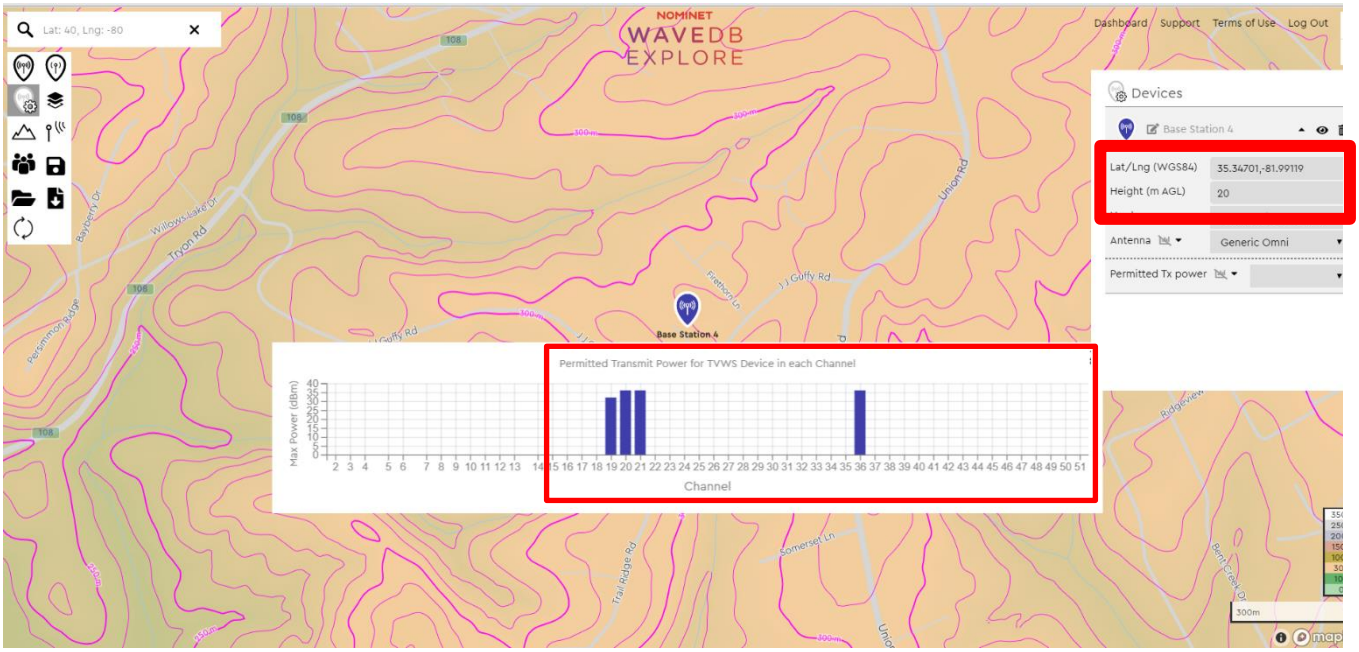


***Figure 8.14-4:*** *Example of congested area location with available channels for antenna height of 20 m (from Nominet)*

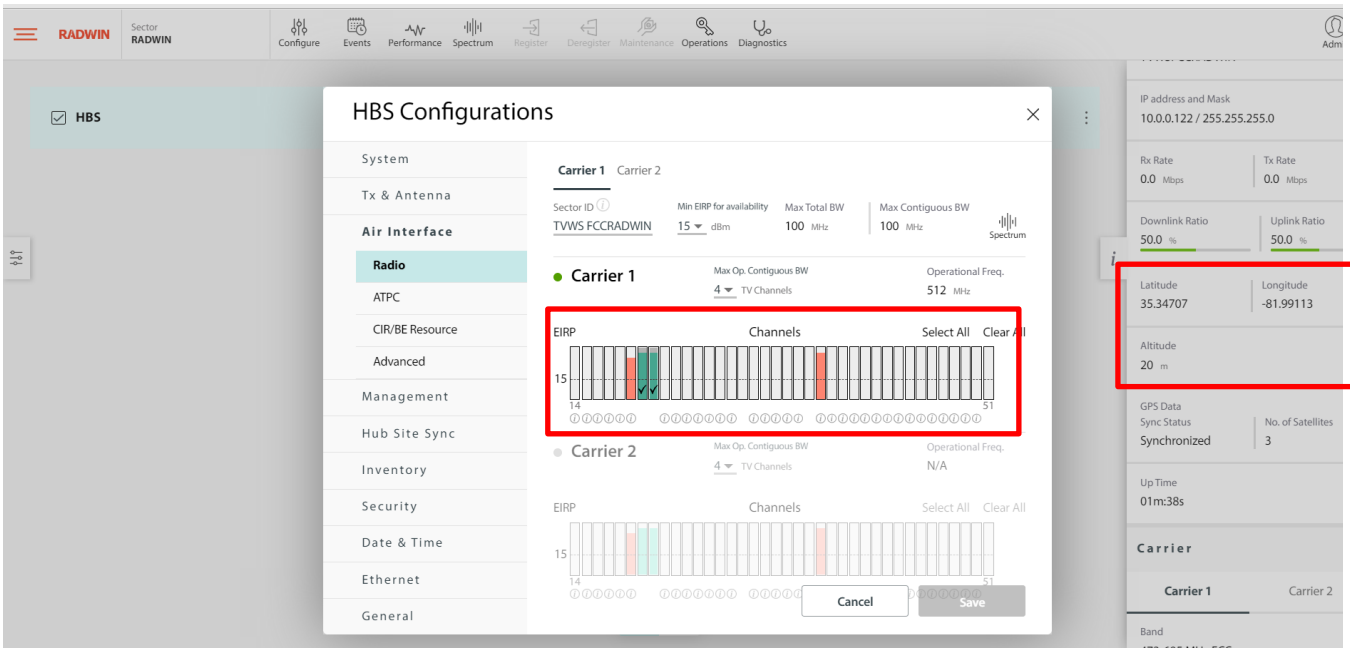


***Figure 8.14-5:*** *Antenna height adjusted to the specific height and available channels*

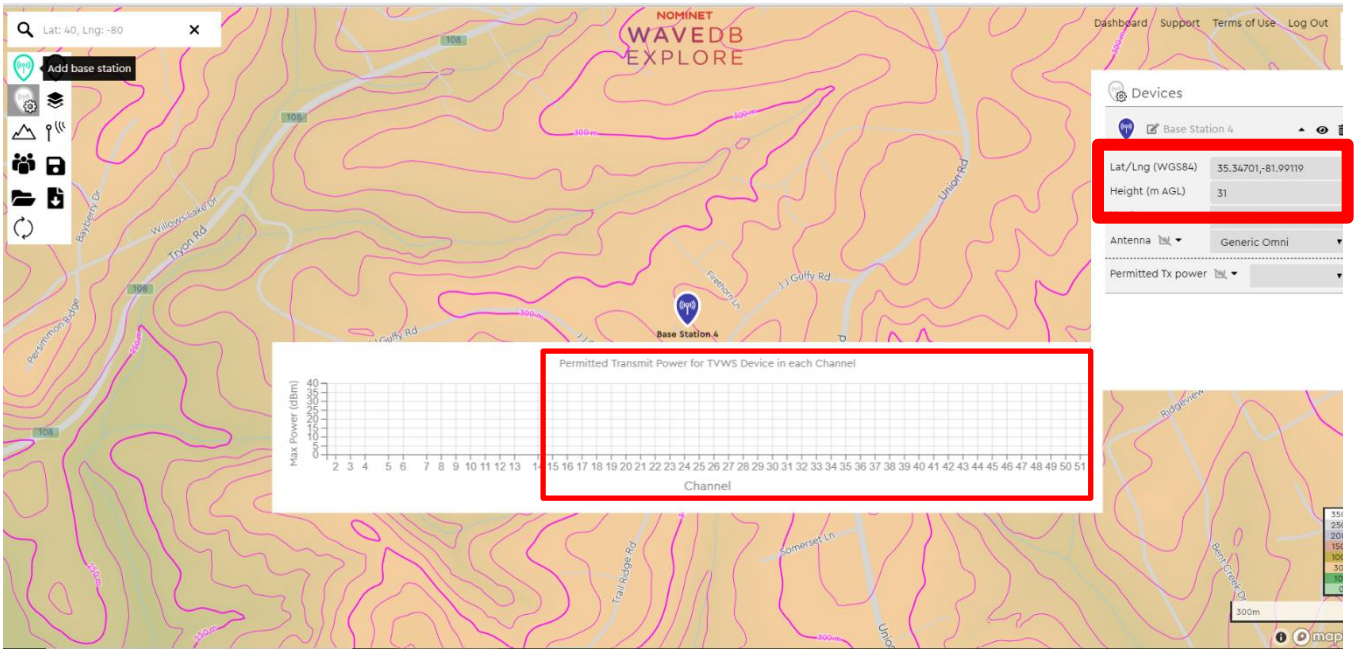


***Figure 8.14-6:*** *Example of congested area location with no available channels for antenna height of 31 m (from Nominet)*

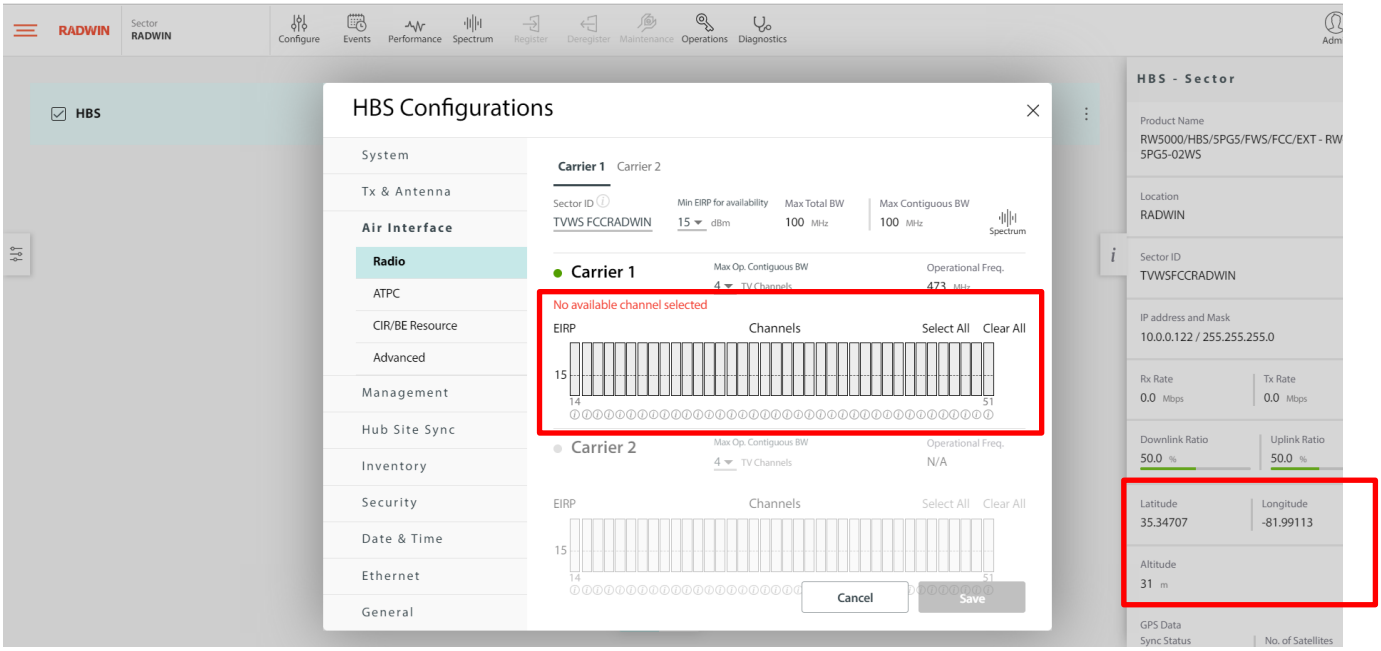


***Figure 8.14-7:*** *System location settings and Database error due to antenna height, that exceeded the limit*

## 8.15 FCC 15.713(g)(3)(i) and (ii) Unsuccessful registration due to incomplete information – FCC ID and Serial number

### 8.15.1 Definitions and limits

(3) The white space device registration database shall contain the following information for fixed white space devices:
(i) FCC identifier (FCC ID) of the device;
(ii) Manufacturer's serial number of the device

### 8.15.2 Test summary

| | |
|---|---|
| Test date | December 2, 2019 |

### 8.15.3 Observations, settings and special notes

The registration interface does not contain a mechanism by which the serial number or the FCC ID of the radio can be changed. The FCC ID and serial number are flash-programmed during the manufacturing process and could not be changed without being returned to the manufacturer.

## 8.16 FCC 15.713(a)(3) Relocation of fixed TVBD

### 8.16.1 Definitions and limits

The white space database serves the following function:
(3) To register the identification information and location of fixed white space devices and unlicensed wireless microphone users.
The Data base will not provide a channel list for a fixed TVBD at a location other than that registered.

### 8.16.2 Test summary

| | |
|---|---|
| Test date | December 2, 2019 |

### 8.16.3 Observations, settings and special notes

The implementation of the location input prevents the radio from requesting channels from another location other than the last successful registration. It is not possible for the user to input location information into the radio that would result in a channel request from a different location other than the current registration location. In the event of a change in the input location information, a new registration and channel request are sent using the same entered registration location information.

## 8.17 FCC 15.711(c)(2)(i), FCC 15.711(h) Fixed & Mode II TVDB database update

### 8.17.1 Definitions and limits

Each fixed white space device must access a white space database over the Internet to determine the available channels and the corresponding maximum permitted power for each available channel that is available at its geographic coordinates, taking into consideration the fixed device's antenna height above ground level and geo-location uncertainty, prior to its initial service transmission at a given location. Testing in accordance with KDB 416721 D01, III (2)(e)

### 8.17.2 Test summary

| | |
|---|---|
| Test date | June 27, 2019 |

### 8.17.3 Observations, settings and special notes

EUT was configured with proper registration information and the successful registration was verified. Database URL was modified from *paws-usa.wavedb.**com*** to *paws-usa.wavedb.**ca***. After the time of channel allocation has passed it was verified that without the proper database access the EUT received empty channel list and stopped the transmission. Then the URL was changed back to and it was verified that with the proper database access the EUT received a channel list and started the transmission. Testing was repeated with Base station disconnected from the internet and it was verified, that after refresh time both EUTs ceased transmission.

### 8.17.4 Test data

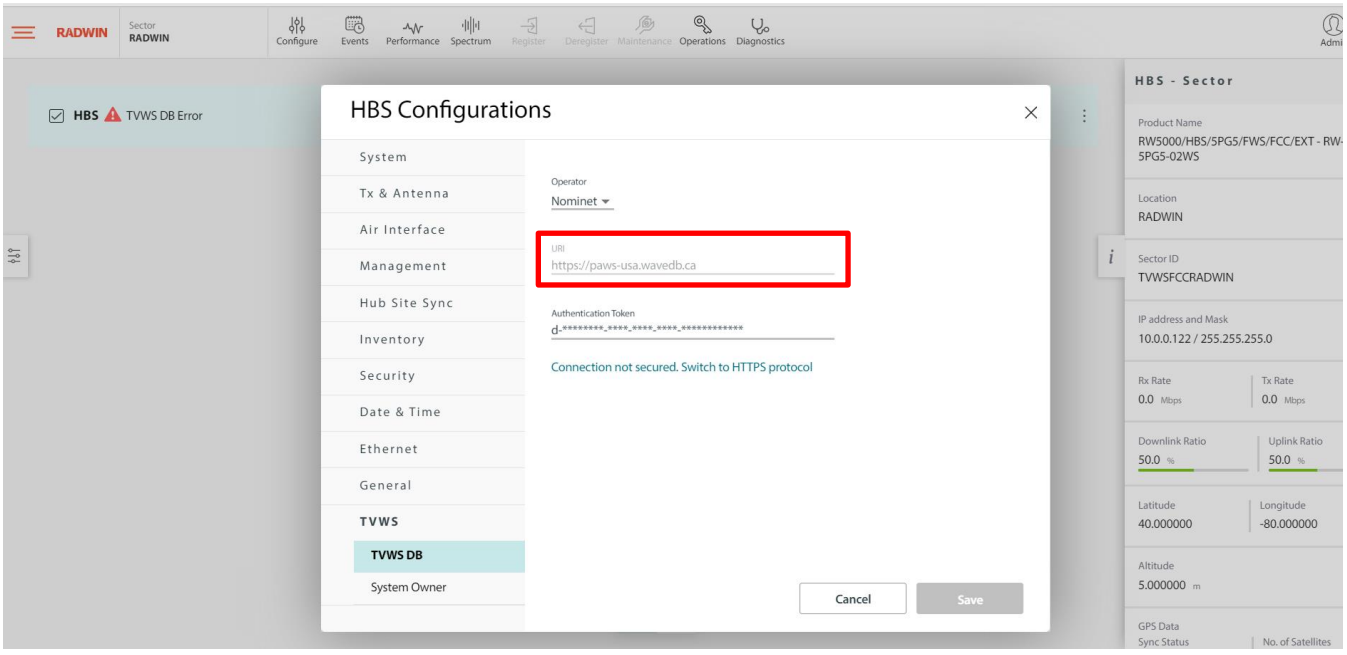


***Figure 8.17-1:*** *Wrong database URL setting*

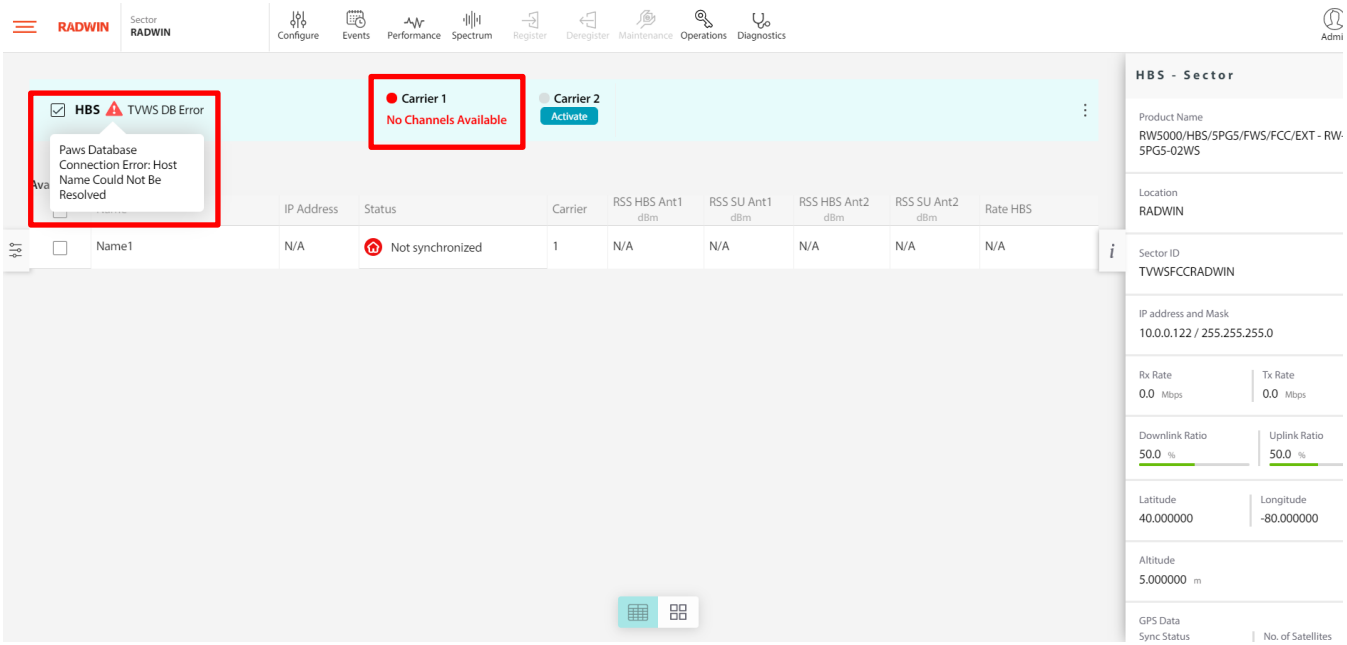


***Figure 8.17-2:*** *Unsuccessful registration due to wrong database URL*

## 8.18 FCC 15.711(c)(2)(iii) Low-power auxiliary device protection

### 8.18.1 Definitions and limits

Each fixed white space devices shall access the database at least once a day to verify that the operating channels continue to remain available. Each fixed white space device must adjust its use of channels in accordance with channel availability schedule information provided by its database for the 48-hour period beginning at the time the device last accessed the database for a list of available channels.

Use of database protected entity interface to register protection for a low-power auxiliary device in the same location and channel which EUT has selected and operating. The registered protection for the low-power auxiliary device should be scheduled within the next 48-hour period. Testing in accordance with KDB 416721 D01, III (2)(I).

### 8.18.2 Test summary

| | |
|---|---|
| Test date | December 2, 2019 |

### 8.18.3 Observations, settings and special notes

EUT was configured with proper registration information and the successful registration was verified. The channel expiration time for testing purposes was reduced to 5 minutes. Meantime it was scheduled with WSDB that channel 30 would be registered for low-power device. After the time of channel allocation of the EUT has passed it was verified that the EUT stopped the transmission on the temporary restricted and removed from the channel list. Since EUT is not waiting 48 hours for the push notification but rather following refresh rate of 20 minues.

### 8.18.4 Test data

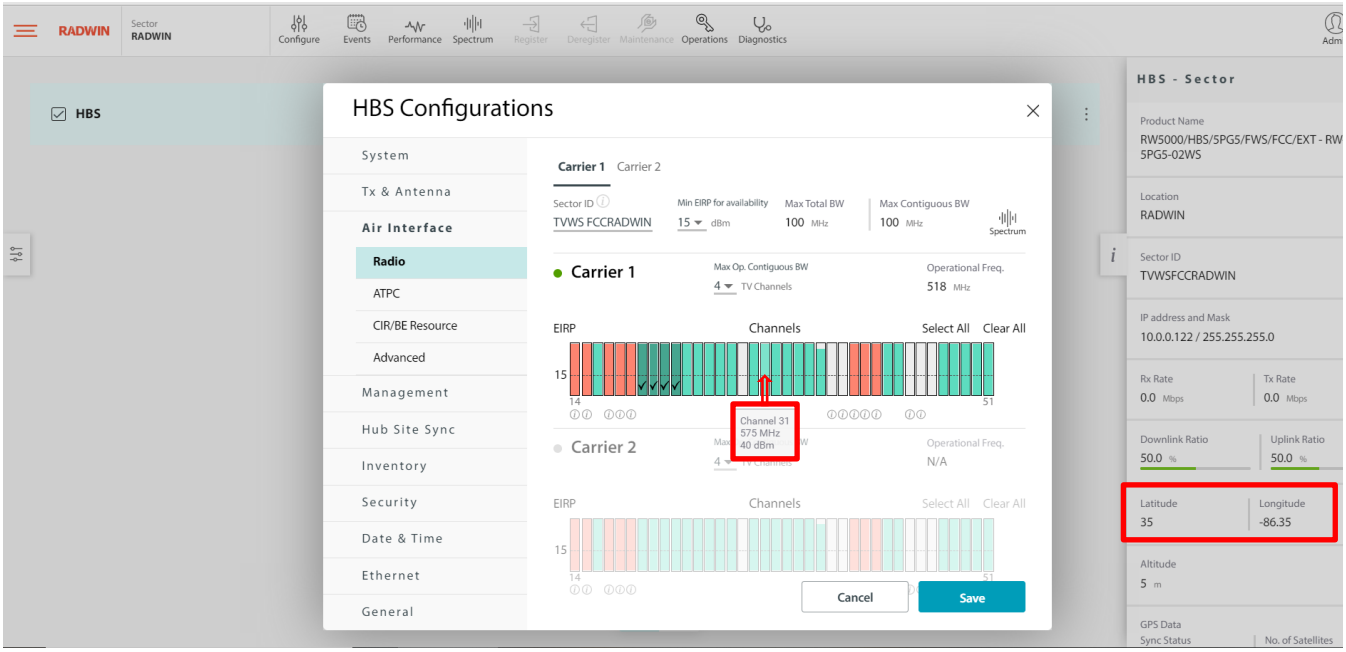


***Figure 8.18-1:*** *Successful registration before the registration of LP device on the channel 31 at 35N 86.35W*

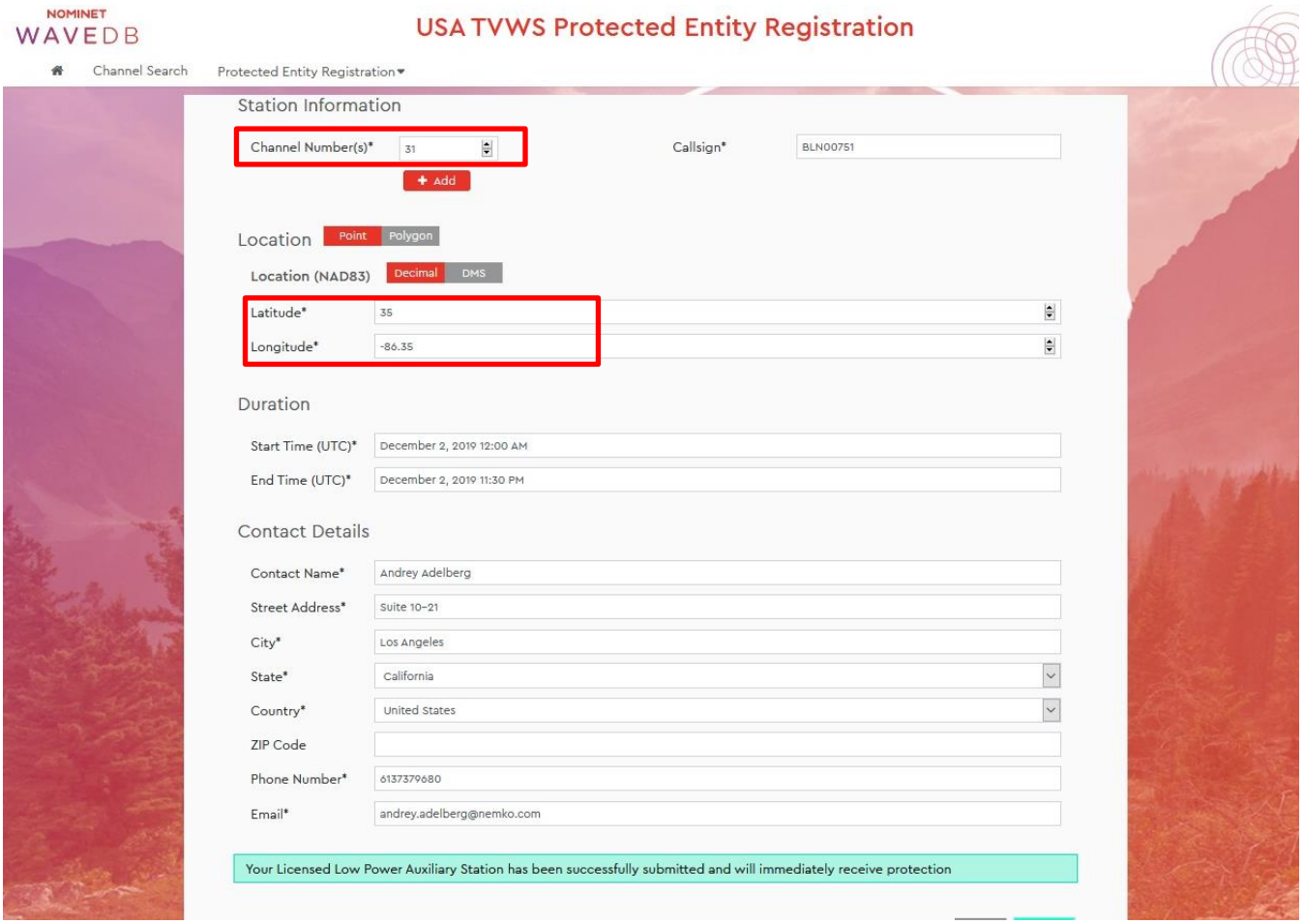


***Figure 8.18-2:*** *Registration of LP device on the channel 31 at the same location at 35N 86.35W*

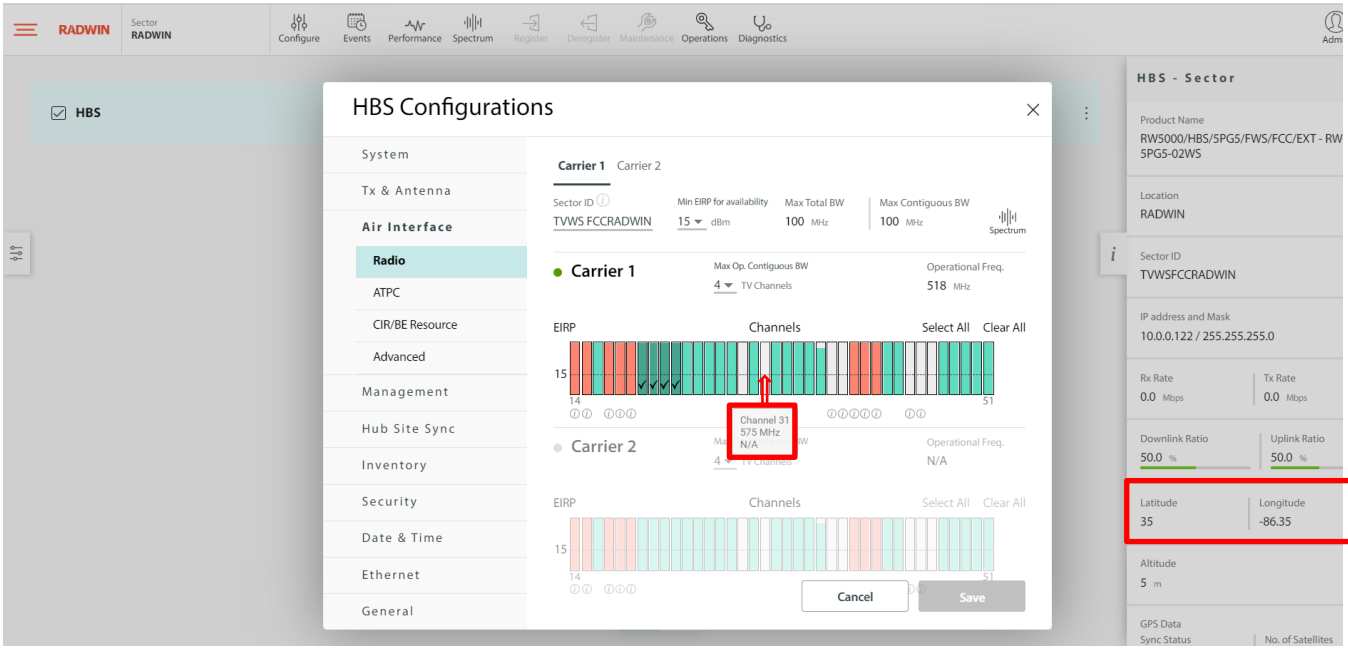


***Figure 8.18-3:*** *Unsuccessful registration after the registration of LP device on the channel 31.*

## 8.19 FCC 15.712 Interference protection requirements (Fixed and personal/portable)

### 8.19.1 Definitions and limits

Using system management software or database, provide different location (coordinates) so that compliance with operating channel and power level is shown under each of the scenarios outlined in §15.712. Include a sample scan showing the total channel power and adjacent channel emission settings for test coordinates.

### 8.19.2 Test summary

| | |
|---|---|
| Test date | December 2, 2019 |

### 8.19.3 Observations, settings and special notes

EUT was configured with proper registration information and the successful registration was verified. The coordinates then were changed in accordance with FCC 15.712 test scenarios. Updated channel list with unavailable channels was verified. Once the device gets updated channel list, the device flagged the error in the GUI when trying to set the restricted channel.
Test scenarios were as follows:
(a) Digital television stations, and digital and analog Class A TV, low power TV, TV translator and TV booster stations.
(b) TV translator, Low Power TV (including Class A) and Multi-Channel Video Programming Distributor (MVPD) receive sites.
(c) Fixed Broadcast Auxiliary Service (BAS) links.
(d) PLMRS/CMRS operations.
(e) Offshore Radiotelephone Service.
(f) Low power auxiliary services, including wireless microphones - Duplicate of earlier tests
(g) Border areas near Canada and Mexico.
(h) Radio astronomy services.
(i) 600 MHz service band.
(j) Wireless Medical Telemetry Service. - No existing examples
(k) 488-494 MHz band in Hawaii.