8.8 FCC15.713(g)(3)(vii) Unsuccessful registration due to incomplete information – contact city

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	February 29, 2016	Temperature	22 °C
Test engineer	Andrey Adelberg	Air pressure	1004 mbar
Verdict	Pass	Relative humidity	32 %

8.8.3 Observations, settings and special notes

EUT was configured with incomplete information: contact city field was left intentionally blank (instead of *Ottawa*). 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 re-initiated. Once the device detects an invalid registration field, the device ceased to transmit and flagged the error in the GUI. The test was repeated when the device is configured as a Master as well as a Slave. If incomplete registration information is detected during the initial power up the device will not attempt to register and will flag the error to the user.

8.8.4 Test data

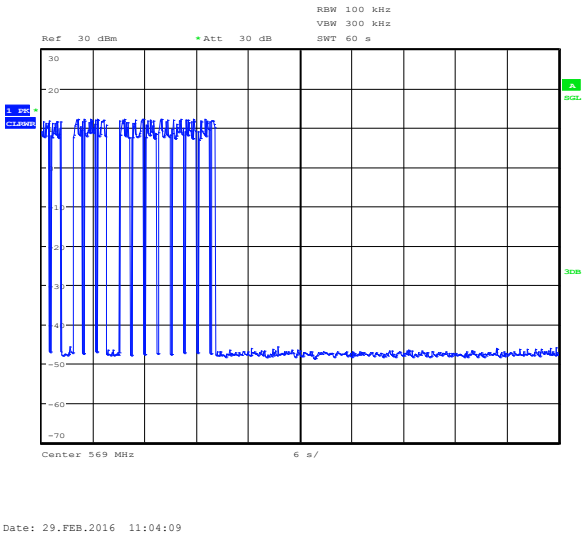


Figure8.8-1: *Unsuccessful registration with missing contact city of master device. Spectrum plot shows that prior to the unsuccessful registration the EUT had been configured with valid information and was transmitting. Subsequently when a registration request was initiated with invalid data the transmission stopped right after the EUT detected missing contact city in the registration form. If the EUT detects a missing contact city during initial power up, the device will not attempt to register with the database, will not transmit and will flag the error to the user.*

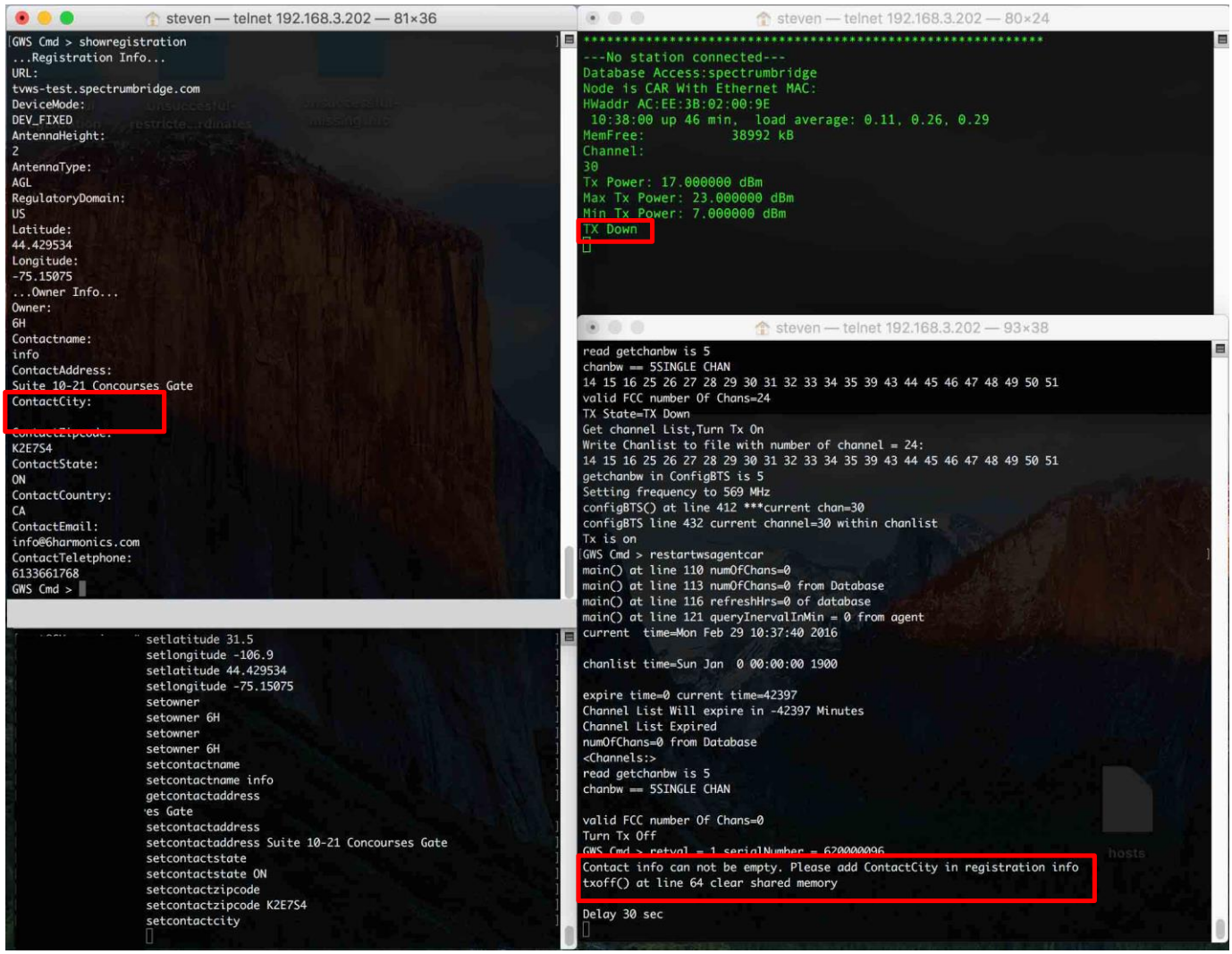


Figure8.8-2: *Data log of unsuccessful registration with missing contact city of master device*

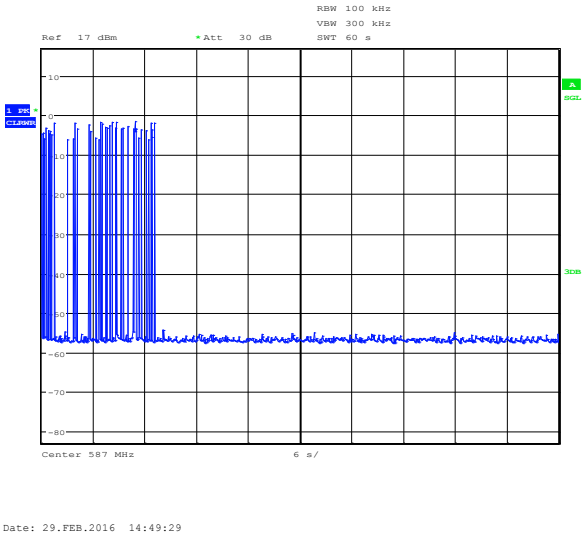


Figure8.8-3: *Unsuccessful registration with missing contact city of slave device. Spectrum plot shows that prior to the unsuccessful registration the EUT had been configured with valid information and was transmitting. Subsequently when a registration request was initiated with invalid data the transmission stopped right after the EUT detected missing contact city in the registration form. If the EUT detects a missing contact city during initial power up, the device will not attempt to register with the database, will not transmit and will flag the error to the user.*

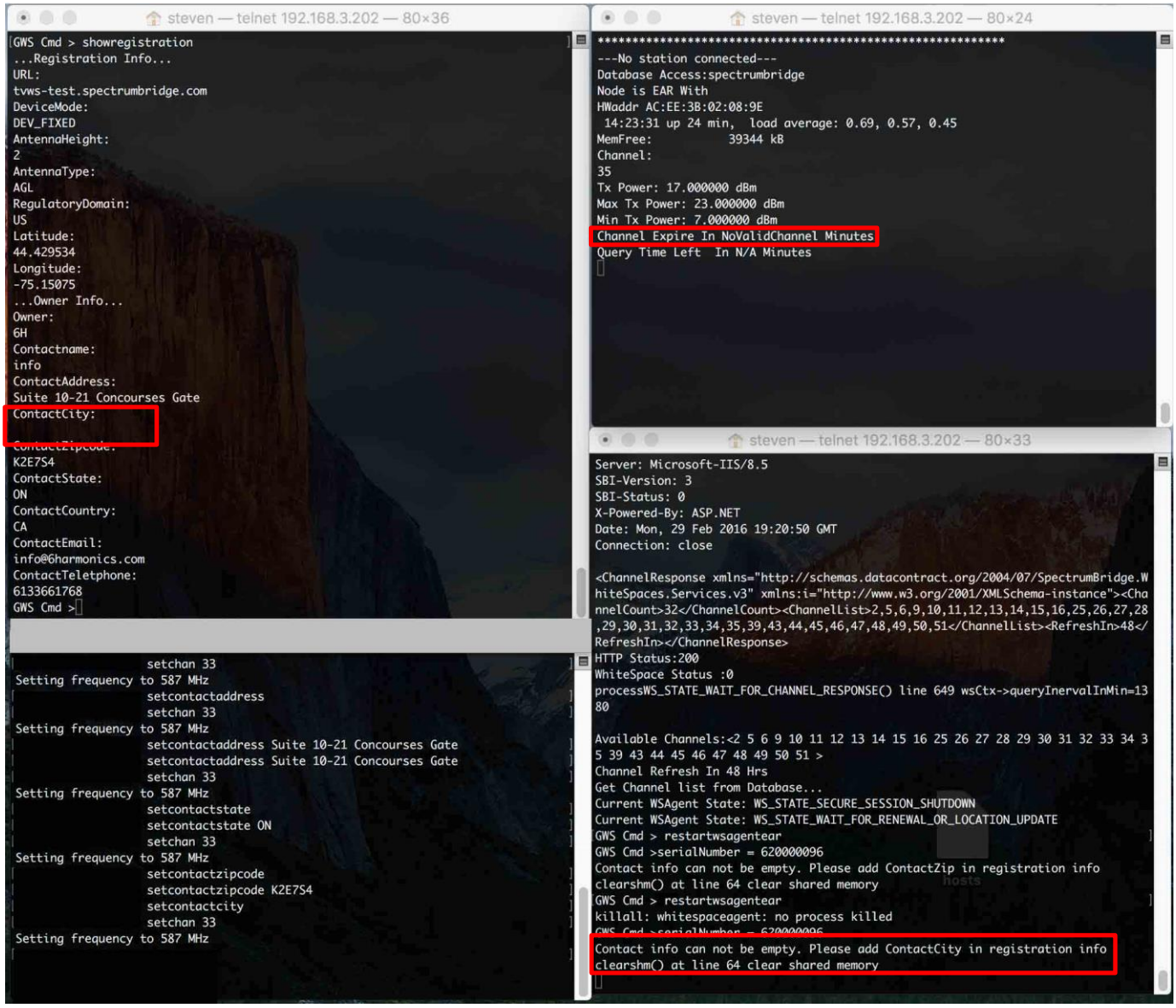


Figure8.8-4: *Data log of unsuccessful registration with missing contact city of slave device*

8.9 FCC15.713(g)(3)(vii) Unsuccessful registration due to incomplete information – contact country

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	February 29, 2016	Temperature	22 °C
Test engineer	Andrey Adelberg	Air pressure	1004 mbar
Verdict	Pass	Relative humidity	32 %

8.9.3 Observations, settings and special notes

EUT was configured with incomplete information: contact country field was left intentionally blank (instead of *CA*). 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 re-initiated. Once the device detects an invalid registration field, the device ceased to transmit and flagged the error in the GUI. The test was repeated when the device is configured as a Master as well as a Slave. If incomplete registration information is detected during the initial power up the device will not attempt to register and will flag the error to the user.

8.9.4 Test data

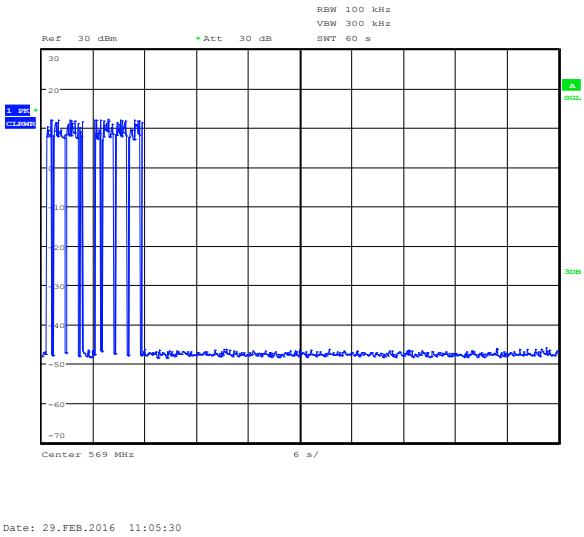


Figure8.9-1: *Unsuccessful registration with missing contact country of master device. Spectrum plot shows that prior to the unsuccessful registration the EUT had been configured with valid information and was transmitting. Subsequently when a registration request was initiated with invalid data the transmission stopped right after the EUT detected missing information in the registration form. If the EUT detects a missing contact country during initial power up, the device will not attempt to register with the database, will not transmit and will flag the error to the user.*

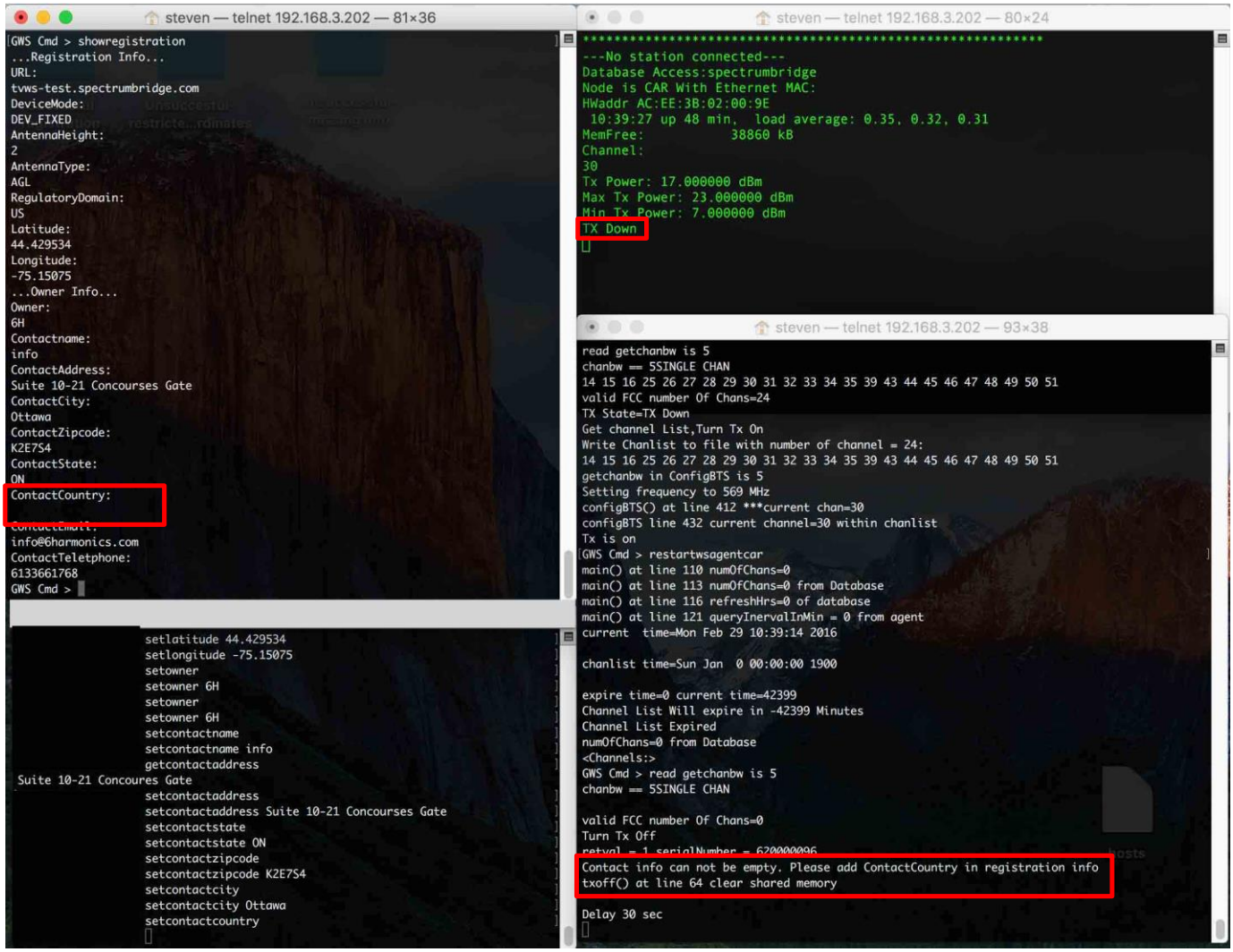


Figure8.9-2: *Data log of unsuccessful registration with missing contact country of master device*

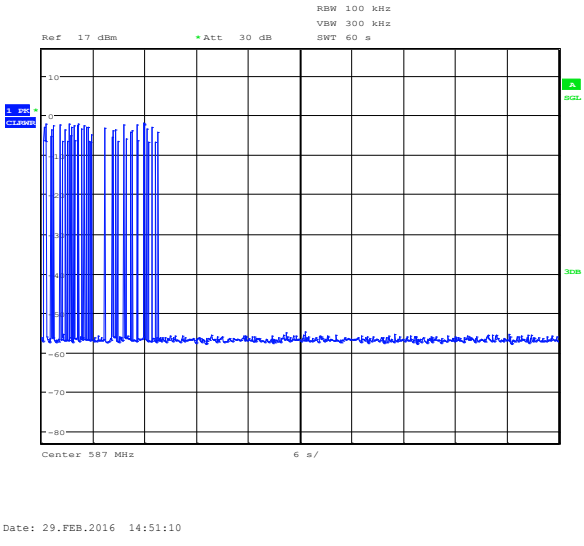


Figure8.9-3: *Unsuccessful registration with missing contact country of slave device. Spectrum plot shows that prior to the unsuccessful registration the EUT had been configured with valid information and was transmitting. Subsequently when a registration request was initiated with invalid data the transmission stopped right after the EUT detected missing contact country in the registration form. If the EUT detects a missing contact country during initial power up, the device will not attempt to register with the database, will not transmit and will flag the error to the user.*

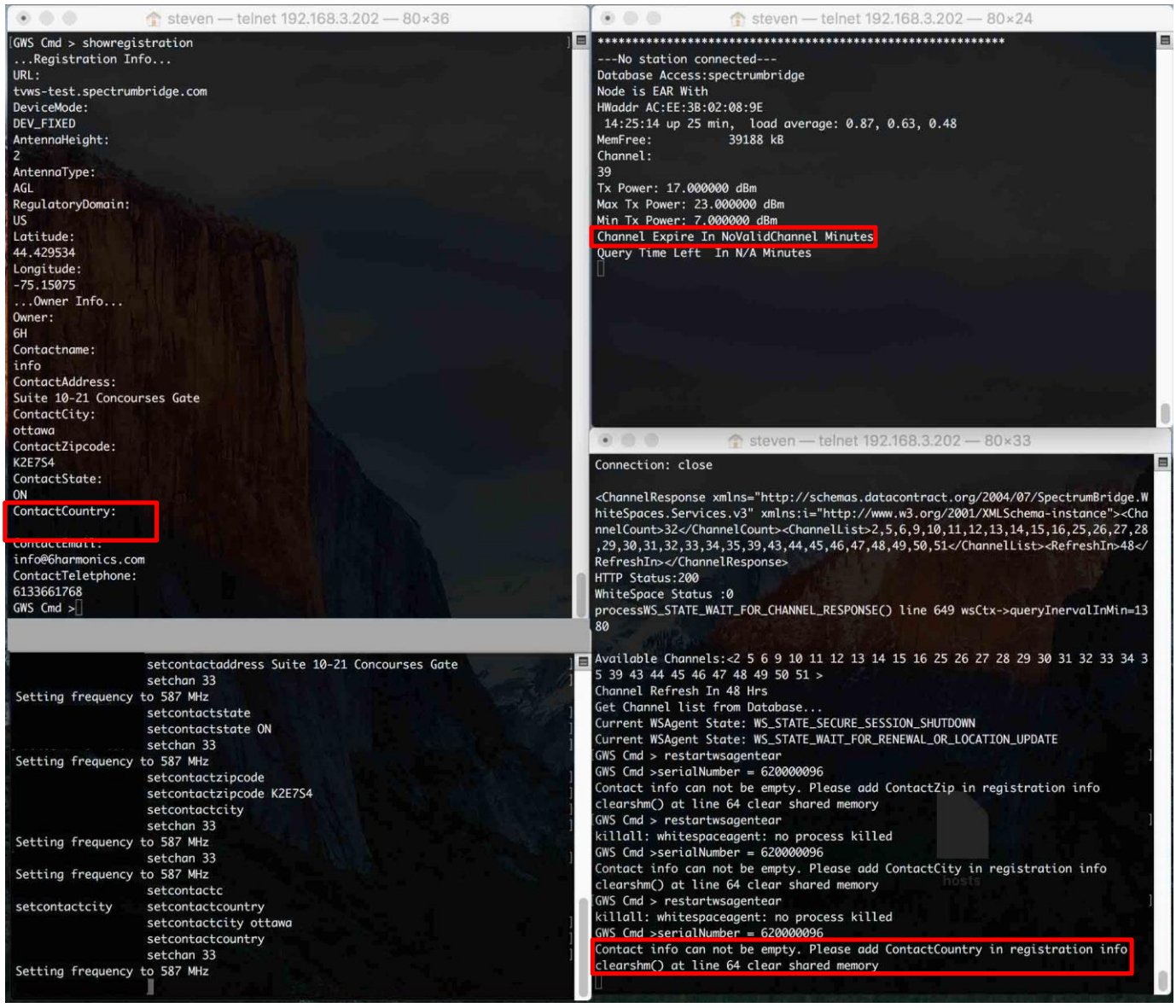


Figure8.9-4: *Data log of unsuccessful registration with missing contact country of slave device*

8.10 FCC15.713(g)(3)(viii) Unsuccessful registration due to incomplete information – contact email

8.10.1 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

8.10.2 Test summary

Test date	February 29, 2016	Temperature	22 °C
Test engineer	Andrey Adelberg	Air pressure	1004 mbar
Verdict	Pass	Relative humidity	32 %

8.10.3 Observations, settings and special notes

EUT was configured with incomplete information: contact email field was left intentionally blank (instead of *info@6harmonics.com*). 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 re-initiated. Once the device detects an invalid registration field, the device ceased to transmit and flagged the error in the GUI. The test was repeated when the device is configured as a Master as well as a Slave. If incomplete registration information is detected during the initial power up the device will not attempt to register and will flag the error to the user.

8.10.4 Test data

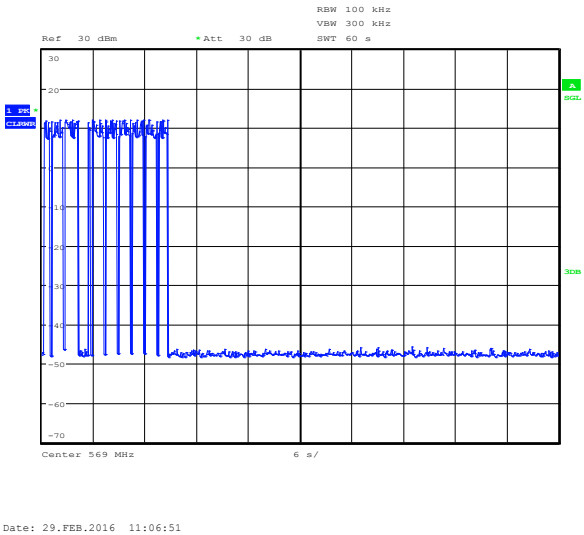


Figure8.10-1: *Unsuccessful registration with missing contact email of master device. Spectrum plot shows that prior to the unsuccessful registration the EUT had been configured with valid information and was transmitting. Subsequently when a registration request was initiated with invalid data the transmission stopped right after the EUT detected missing contact email in the registration form. If the EUT detects a missing contact email during initial power up, the device will not attempt to register with the database, will not transmit and will flag the error to the user.*

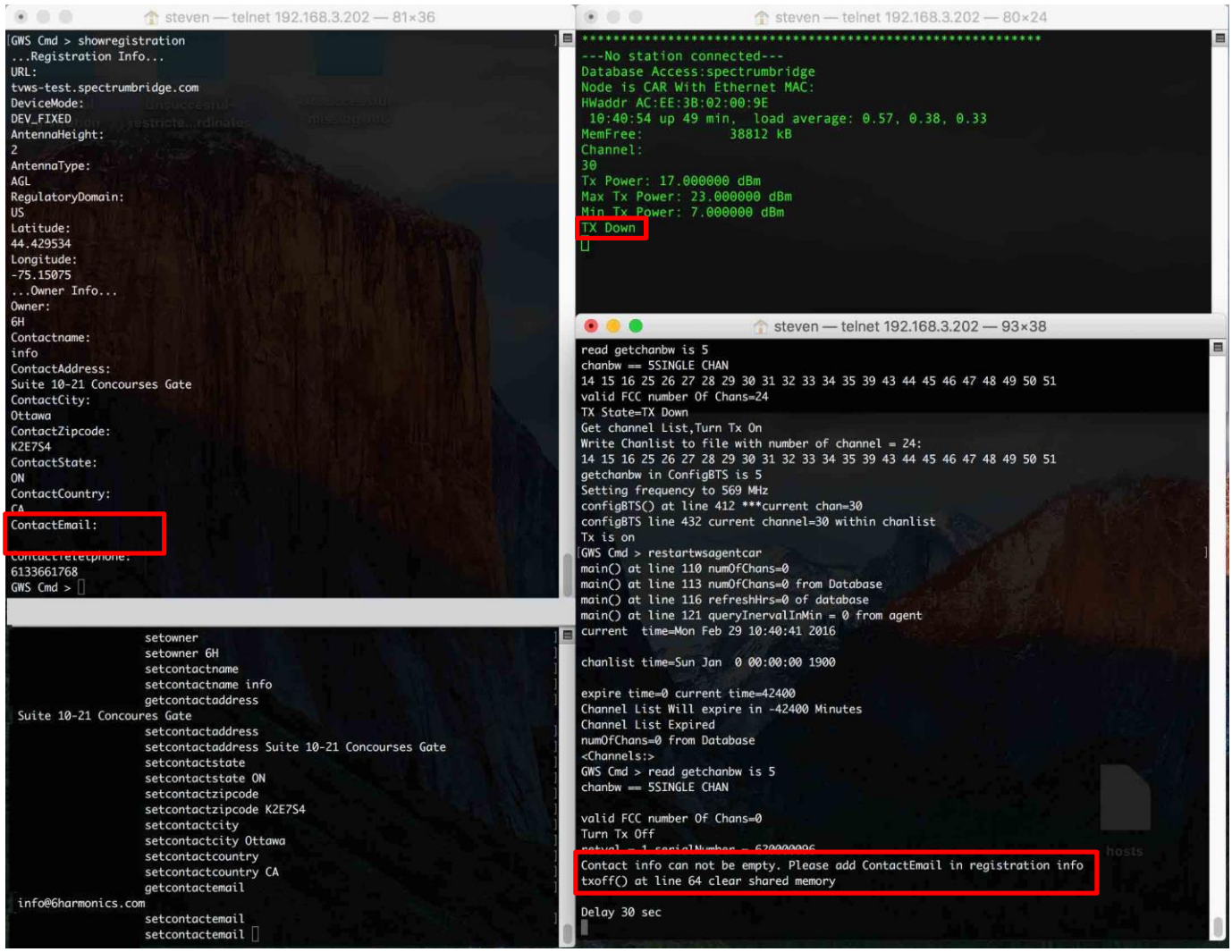


Figure8.10-2: *Data log of unsuccessful registration with missing contact email of master device*

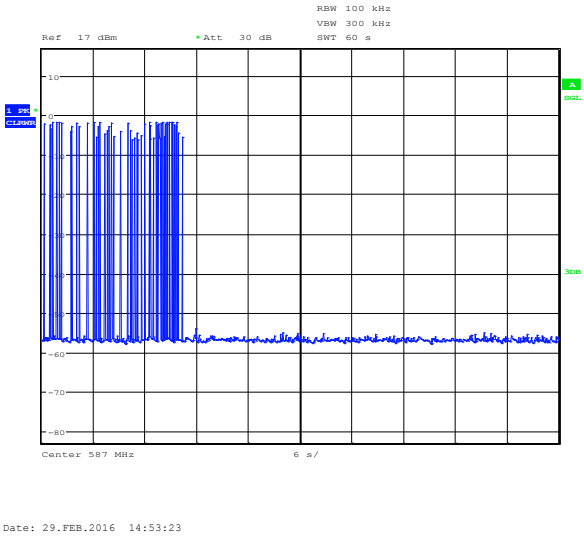


Figure8.10-3: *Unsuccessful registration with missing contact email of slave device. Spectrum plot shows that prior to the unsuccessful registration the EUT had been configured with valid information and was transmitting. Subsequently when a registration request was initiated with invalid data the transmission stopped right after the EUT detected missing contact email in the registration form. If the EUT detects a missing contact email during initial power up, the device will not attempt to register with the database, will not transmit and will flag the error to the user.*

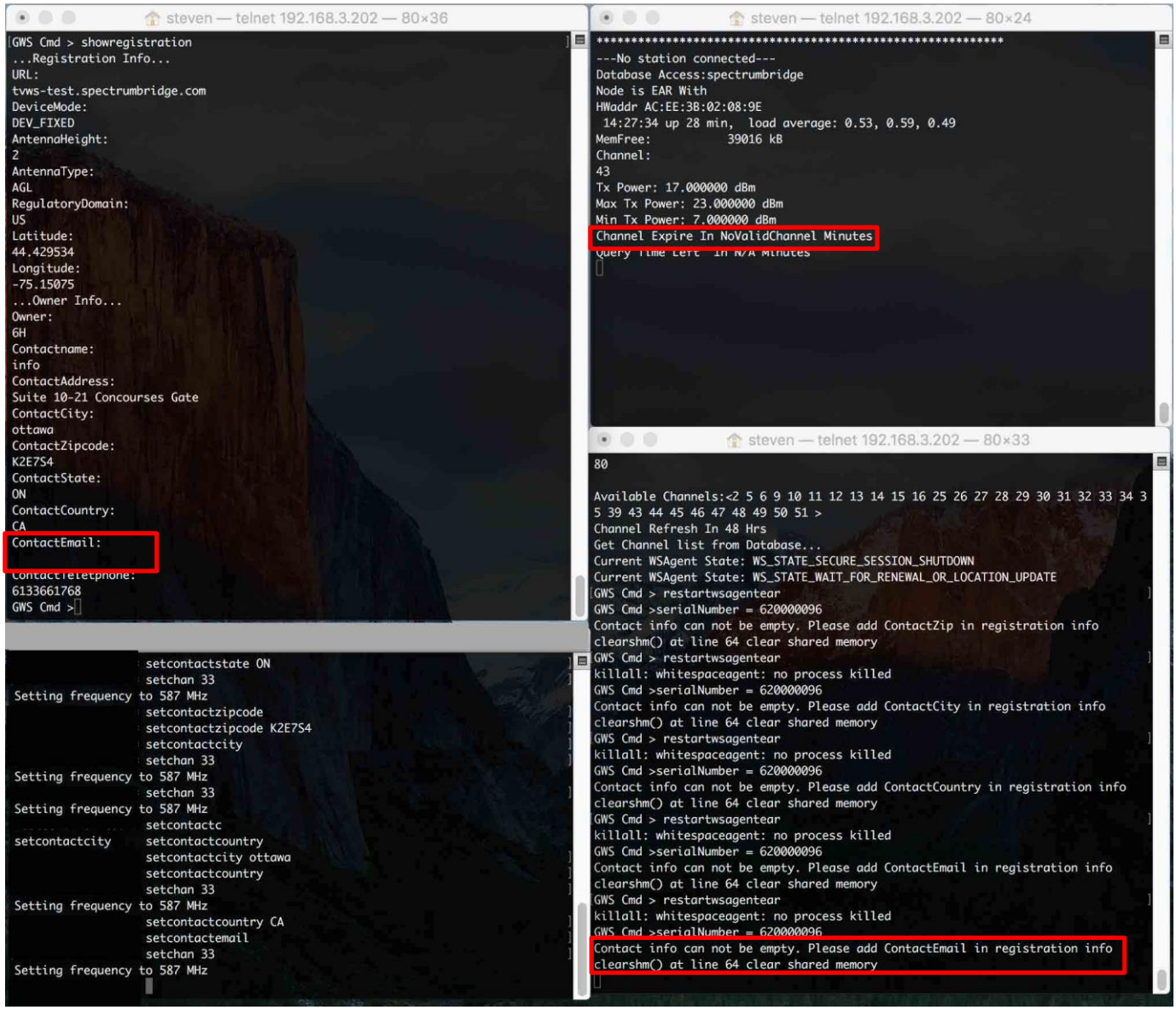


Figure8.10-4: *Data log of unsuccessful registration with missing contact email of slave device*

8.11 FCC15.713(g)(3)(ix) Unsuccessful registration due to incomplete information – contact telephone

8.11.1 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

8.11.2 Test summary

Test date	February 29, 2016	Temperature	22 °C
Test engineer	Andrey Adelberg	Air pressure	1004 mbar
Verdict	Pass	Relative humidity	32 %

8.11.3 Observations, settings and special notes

EUT was configured with incomplete information: contact telephone field was left intentionally blank (instead of *6133661768*). 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 re-initiated. Once the device detects an invalid registration field, the device ceased to transmit and flagged the error in the GUI. The test was repeated when the device is configured as a Master as well as a Slave. If incomplete registration information is detected during the initial power up the device will not attempt to register and will flag the error to the user.

8.11.4 Test data

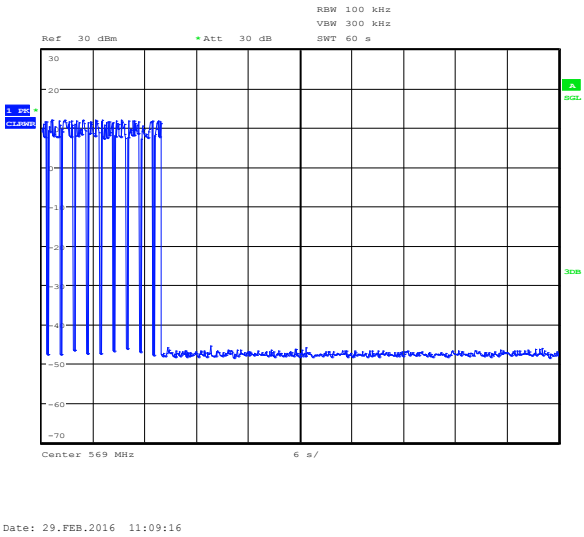


Figure8.11-1: *Unsuccessful registration with missing contact telephone number of master device. Spectrum plot shows that prior to the unsuccessful registration the EUT had been configured with valid information and was transmitting. Subsequently when a registration request was initiated with invalid data the transmission stopped right after the EUT detected missing information in the registration form. If the EUT detects a missing contact telephone number during initial power up, the device will not attempt to register with the database, will not transmit and will flag the error to the user.*

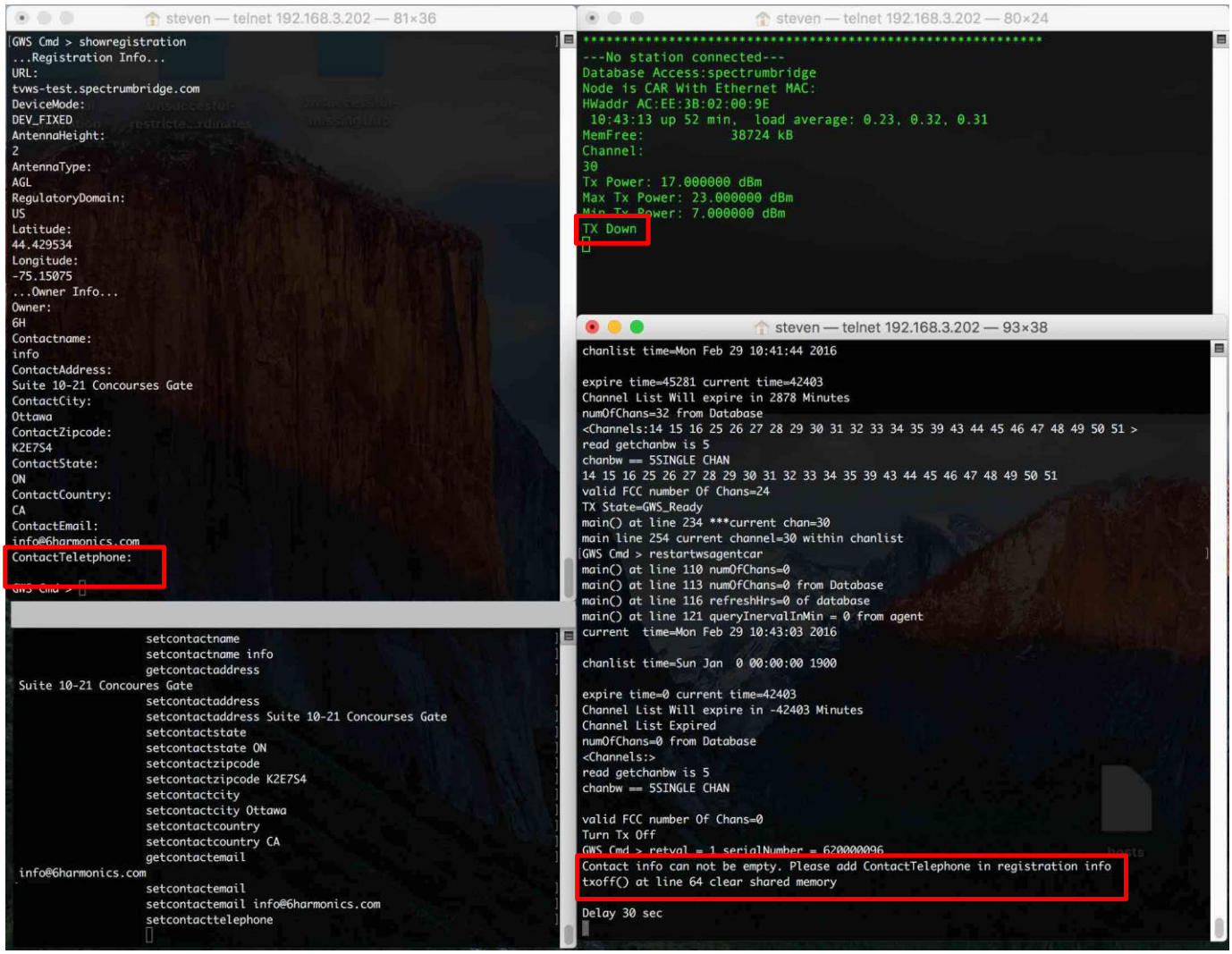


Figure8.11-2: *Data log of unsuccessful registration with missing contact telephone of master device*

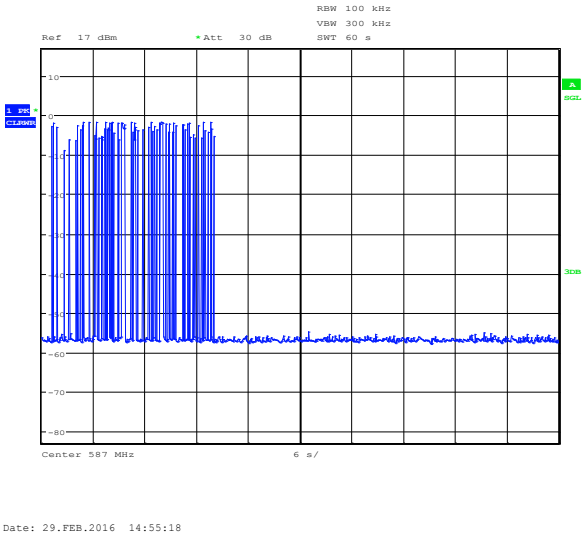


Figure8.11-3: *Unsuccessful registration with missing contact telephone number of slave device. Spectrum plot shows that prior to the unsuccessful registration the EUT had been configured with valid information and was transmitting. Subsequently when a registration request was initiated with invalid data the transmission stopped right after the EUT detected missing information in the registration form. If the EUT detects a missing contact telephone number during initial power up, the device will not attempt to register with the database, will not transmit and will flag the error to the user.*

8.12 FCC15.713(e)(6) Unsuccessful registration due to HAAT >250 m

8.12.1 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.

8.12.2 Test summary

Test date	February 29, 2016	Temperature	22 °C
Test engineer	Andrey Adelberg	Air pressure	1004 mbar
Verdict	Pass	Relative humidity	32 %

8.12.3 Observations, settings and special notes

EUT was configured with information that included a location with HAAT of more than 250 m (Mt. Hood at latitude45.3648 and longitude −121.6732). 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 responsed with an empty channel list as a result of the antennna height above ground, or excessive HAAT, the EUT stopped to transmit. For the master 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 slave device, the EUT will perform a passive scan and will attempt to connect to a master device on a channel where it detects a beacon. Once connected it will attept to register with the database for up to 1 minute. 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 channnel.

8.12.4 Test data

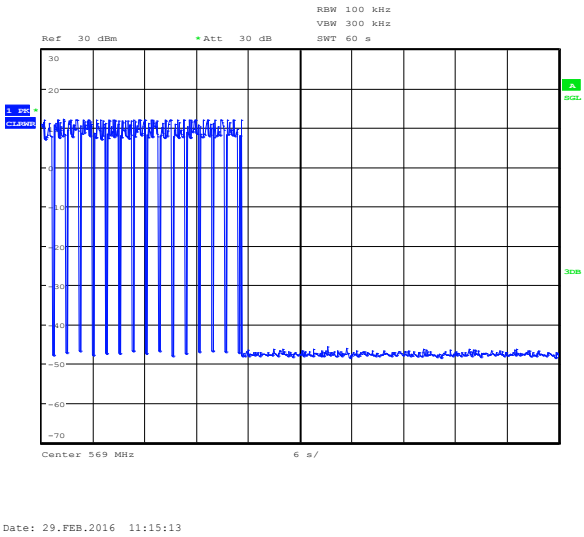


Figure8.12-1: *Unsuccessful registration with restricted HAAT location of master device. Spectrum plot shows that prior to the unsuccessful registration the EUT had been configured with valid information and was transmitting. Subsequently when a registration request was initiated with geolocation which coincides with a restrict HAAT, the transmission stopped once the database responded with no valid channels for the given location. For the convenience of the installer, the 6Harmonics GUI displays the error message "HAAT Above 250m".*

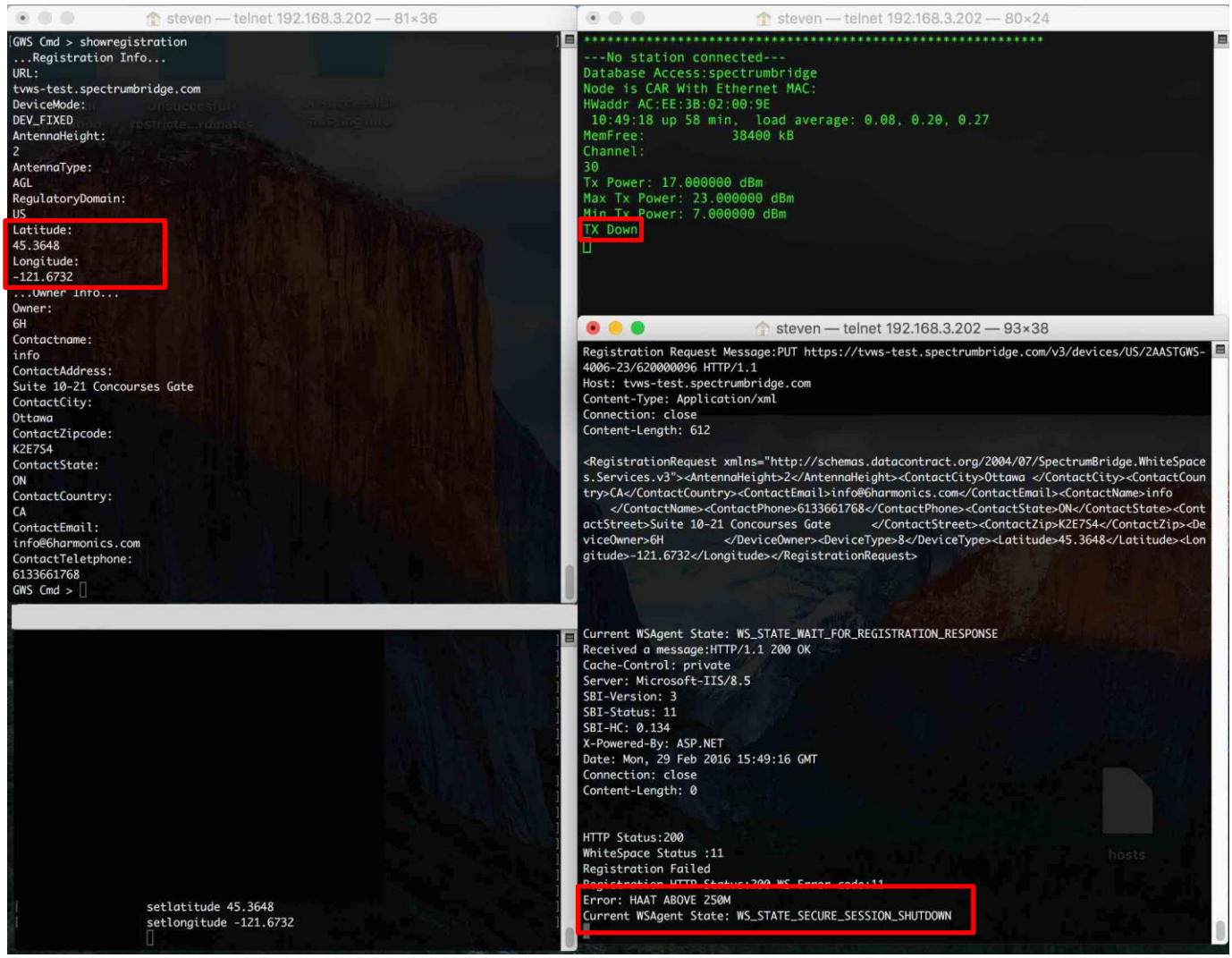


Figure8.12-2: *Data log of unsuccessful registration with restricted HAAT location of master device*

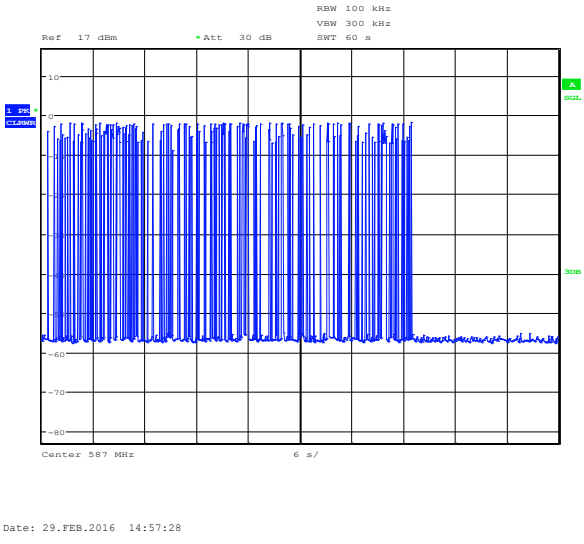


Figure8.12-3: *Unsuccessful registration with restricted HAAT location of slave device. Spectrum plot shows that prior to the unsuccessful registration the EUT was transmitting to connect to the master device and perform the initial registration request. Subsequently the transmission stopped once the database responded with no valid channels for the given location. For the convenience of the installer, the 6Harmonics GUI displays the error message "HAAT Above 250m".*

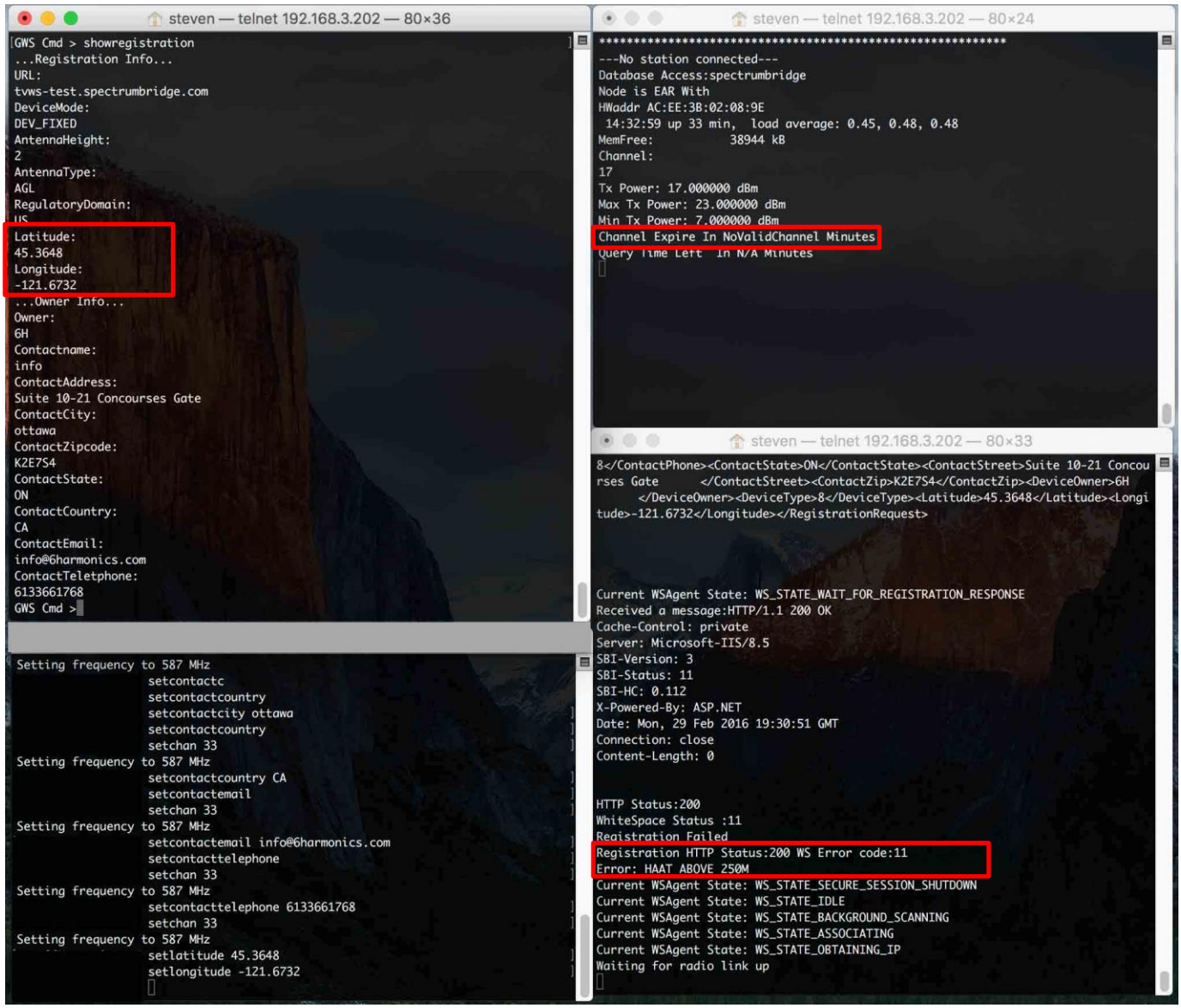


Figure8.12-4: *Data log of unsuccessful registration with restricted HAAT location of slave device*

8.13 FCC15.713(e)(6) Unsuccessful registration due to antenna height that exceeds 30 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	February 29, 2016	Temperature	22 °C
Test engineer	Andrey Adelberg	Air pressure	1004 mbar
Verdict	Pass	Relative humidity	32 %

8.13.3 Observations, settings and special notes

EUT was configured with information that included an antenna height that exceeded 30 m limit (input was 31 m). 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 master 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 slave device, the EUT will perform a passive scan and will attempt to connect to a master device on a channel where it detects a beacon. Once connected it will attempt to register with the database for up to 1 minute. 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.

8.13.4 Test data

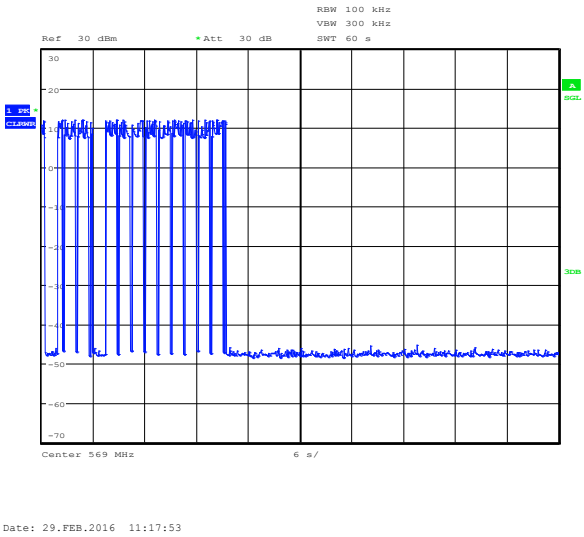


Figure8.13-1: *Unsuccessful registration with restricted antenna height of master device. Spectrum plot shows that prior to the unsuccessful registration the EUT had been configured with valid information and was transmitting. Subsequently when a registration request was initiated with an invalid antenna height, the transmission stopped once the database responded with no valid channels. For the convenience of the installer, the 6Harmonics GUI displays the error message "Antenna Height Above 30m".*

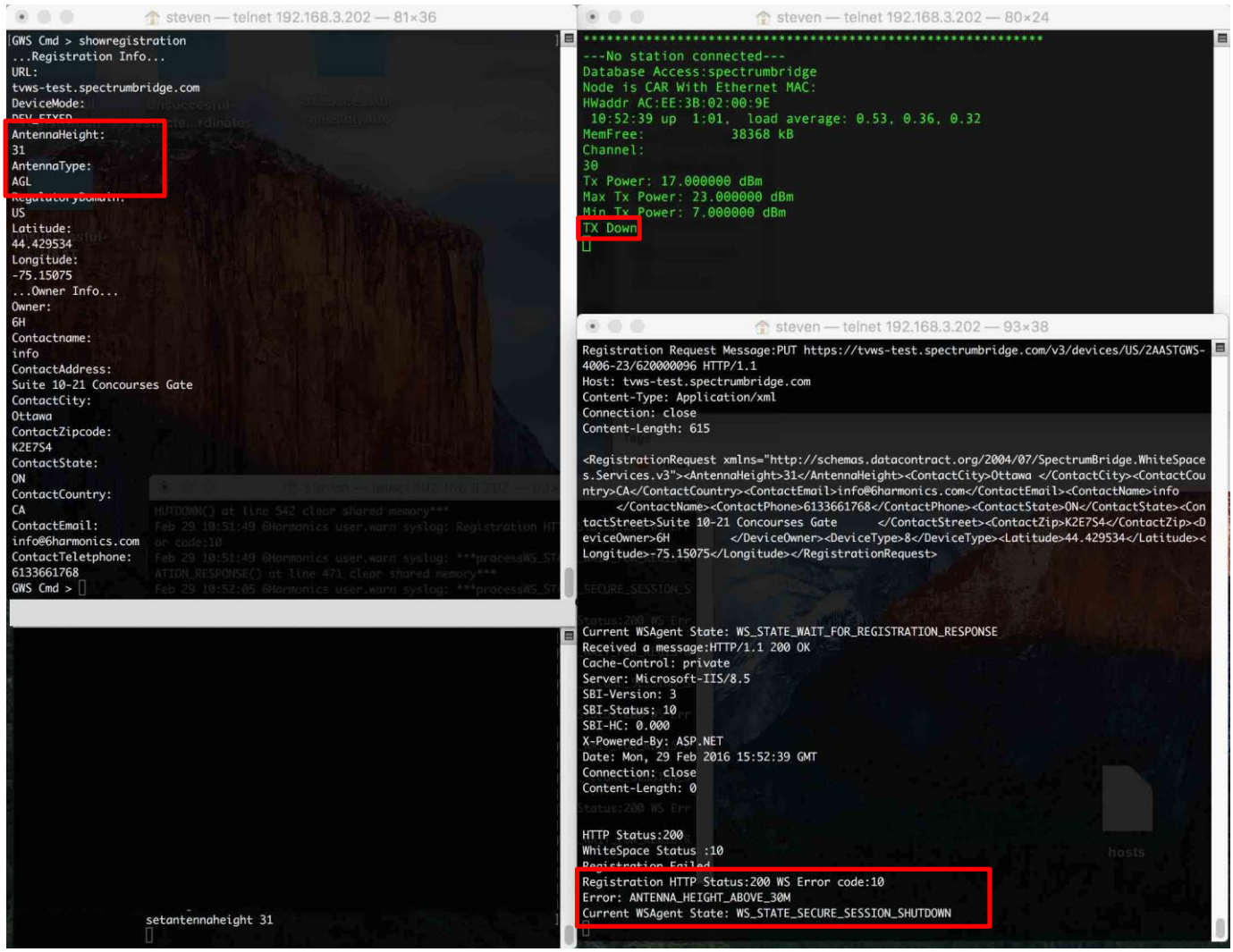


Figure8.13-2: *Data log of unsuccessful registration with restricted antenna height of master device*

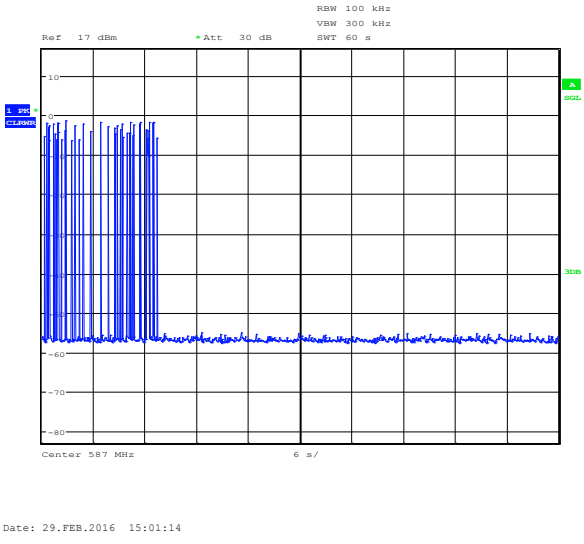


Figure8.13-3: *Unsuccessful registration with antenna height of slave device. Spectrum plot shows that prior to the unsuccessful registration the EUT was transmitting to connect to the master device and perform the initial registration request. Subsequently the transmission stopped once the database responded with no valid channels as a result of the antenna height being above 30m. For the convenience of the installer, the 6Harmonics GUI displays the error message "Antenna Height Above 30m".*

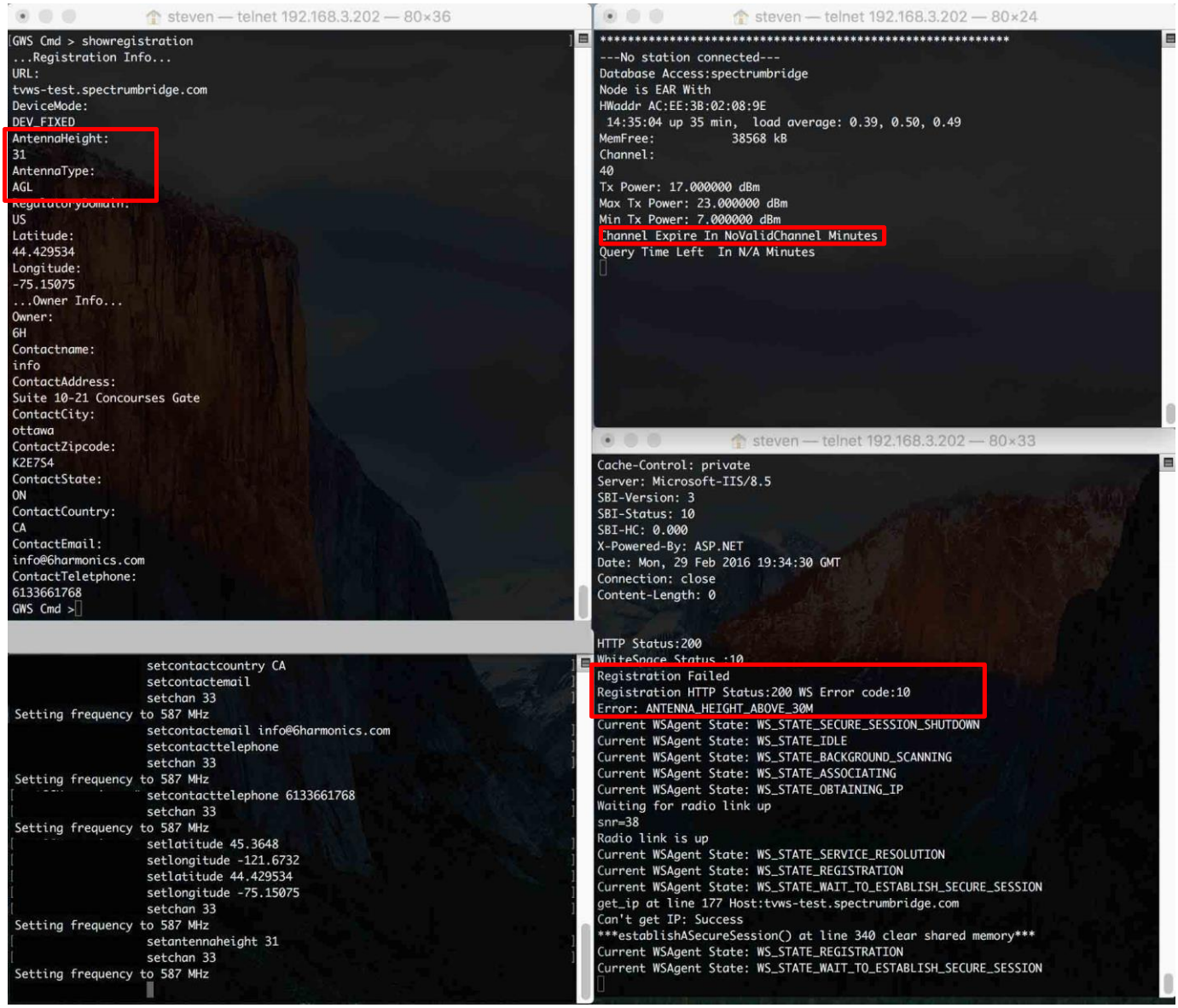


Figure8.13-4: *Data log of unsuccessful registration with restricted antenna height of slave device*

8.14 FCC15.713(g)(3)(i) and (ii) Unsuccessful registration due to incomplete information – FCC ID and Serial number

8.14.1 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

8.14.2 Test summary

Test date	February 29, 2016	Temperature	22 °C
Test engineer	Andrey Adelberg	Air pressure	1004 mbar
Verdict	Pass	Relative humidity	32 %

8.14.3 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.

8.15 FCC15.713(a)(3) Relocation of fixed TVBD

8.15.1 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.

8.15.2 Test summary

Test date	February 29, 2016	Temperature	22 °C
Test engineer	Andrey Adelberg	Air pressure	1004 mbar
Verdict	Pass	Relative humidity	32 %

8.15.3 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.

8.16 FCC15.711(c)(2)(iii) Fixed & Mode II TVDB database update

8.16.1 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.

8.16.2 Test summary

Test date	March 1, 2016	Temperature	23 °C
Test engineer	Andrey Adelberg	Air pressure	1008 mbar
Verdict	Pass	Relative humidity	34 %

8.16.3 Observations, settings and special notes

EUT was configured with proper registration information and the successful registration was verified. The channel allocation was valid for 45 minutes. Then internet connection was blocked to EUT. After the time of channel allocation has passed it was verified that without database access the EUT stopped the transmission.

8.16.4 Test data

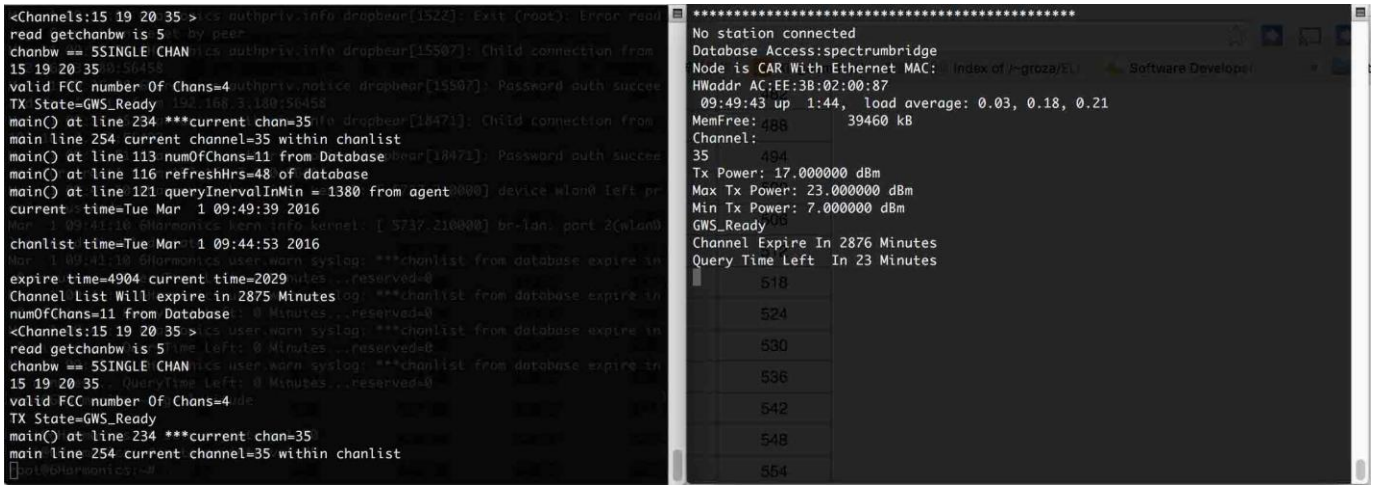


Figure8.16-1: *Data log of successful registration and transmission within the allocated time with internet access of master device*

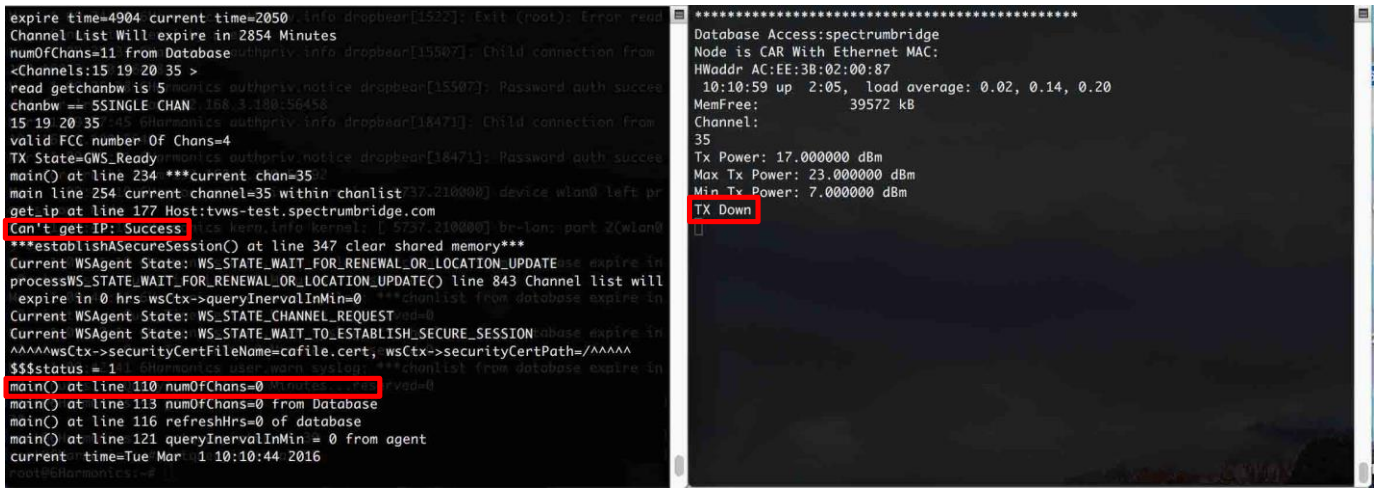


Figure8.16-2: *Data log of unsuccessful registration and transmission down after the allocated time with blocked internet access of master device*

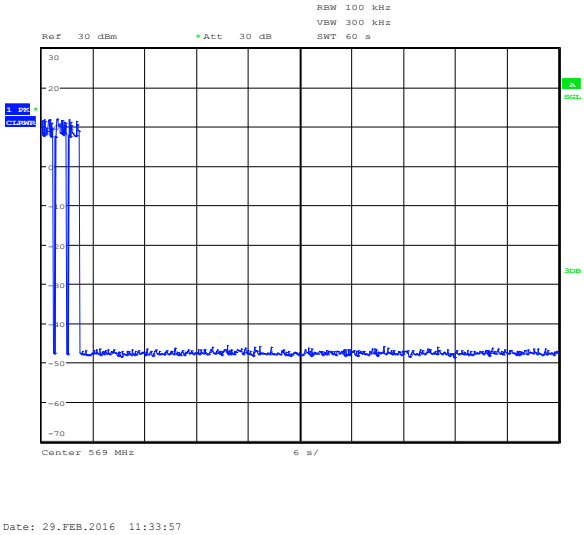


Figure8.16-3: *Transmission termination after the expiration of the allocated channel availability time of master device*

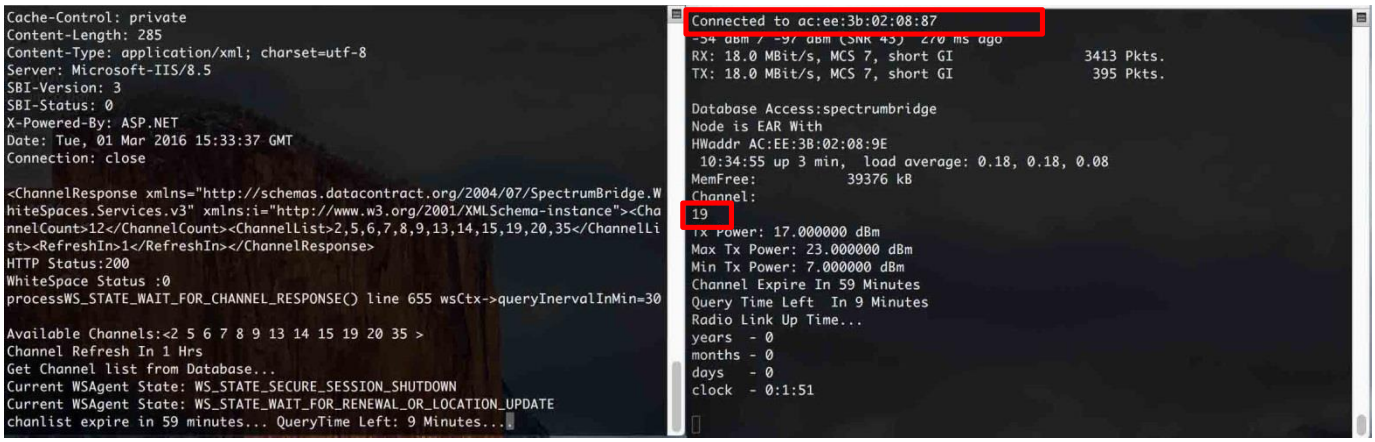


Figure8.16-4: *Data log of successful registration and transmission within the allocated time with internet access of master device*

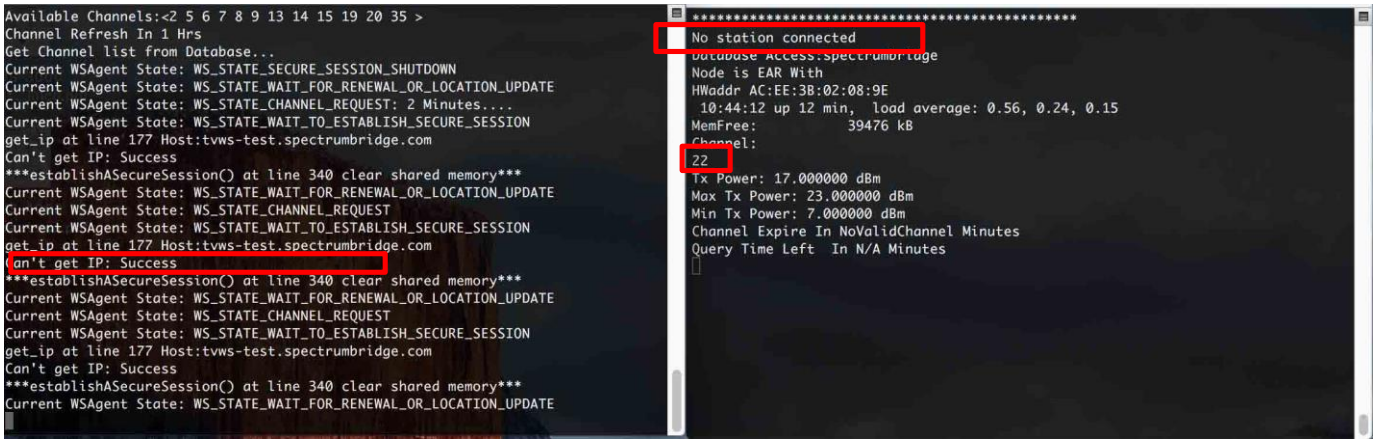


Figure8.16-5: *Data log of unsuccessful registration and transmission down of slave device after the allocated time with blocked internet access of the master*

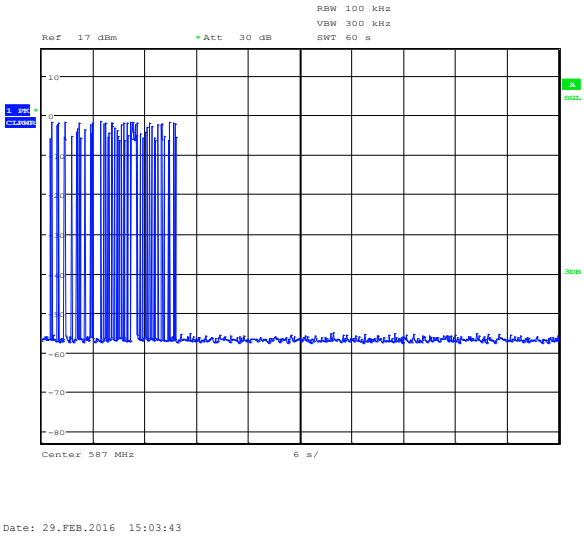


Figure8.16-5: *Transmission termination after the expiration of the allocated channel availability time of slave device*

8.17 FCC15.711(c)(2)(iii) Low-power auxiliary device protection

8.17.1 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.

8.17.2 Test summary

Test date	March 1, 2016	Temperature	23 °C
Test engineer	Andrey Adelberg	Air pressure	1008 mbar
Verdict	Pass	Relative humidity	34 %

8.17.3 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 60 minutes. Meantime it was scheduled with the WSDB that channel 35 would be registered for a 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 temporarily restricted channel and removed this channel from the list channel.

8.17.4 Test data

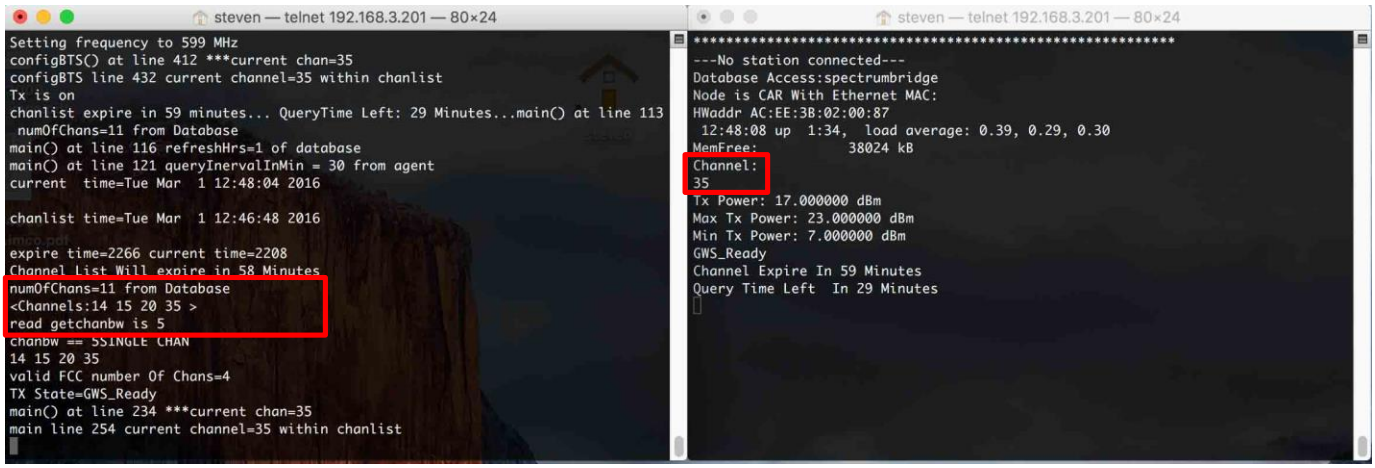


Figure8.17-1: *Data log of successful registration and transmission of master device within the allocated time at the channel 35. Allotted channel list includes these channels. Low-power device reserved channel 35 at 1:00 pm.*

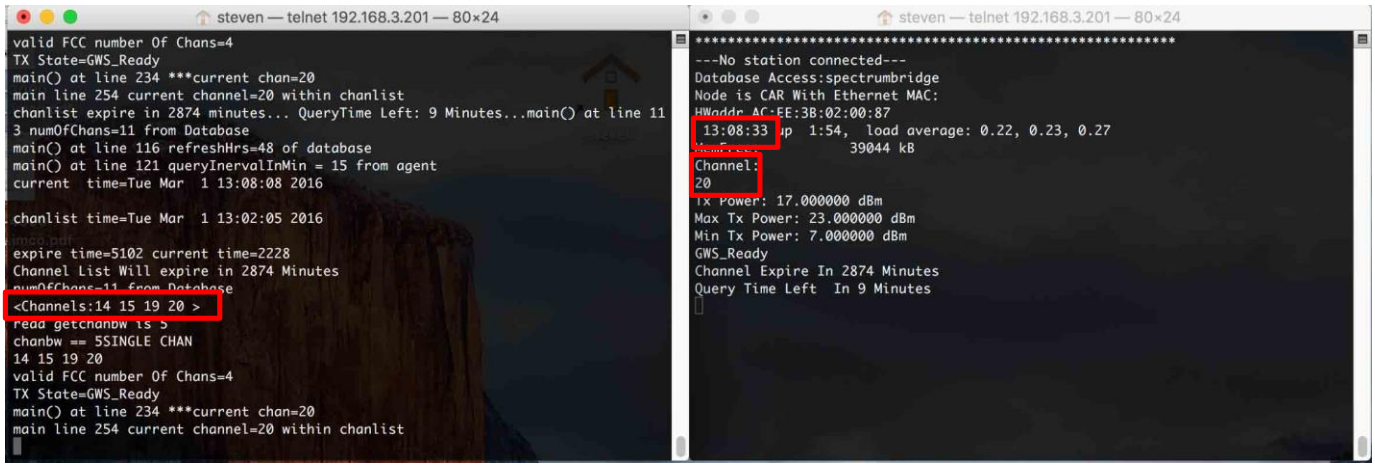


Figure8.17-2: *Data log of successful registration and transmission of master device now configured to transmit on channels 20 after registration of the low power device on channel 35. Channel 35 was excluded from the newly accepted channel list after 1:00 pm.*

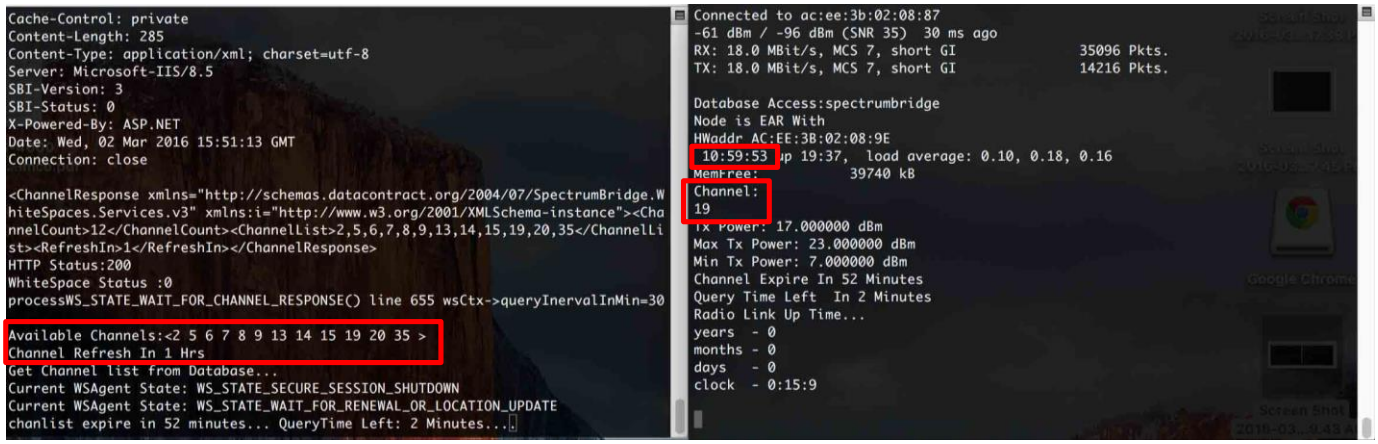


Figure8.17-3: *Data log of successful registration and transmission of slave device within the allocated time at the channel 19. Allotted channel list includes these channels. Low-power device reserved channel 19 at 11:00 am.*

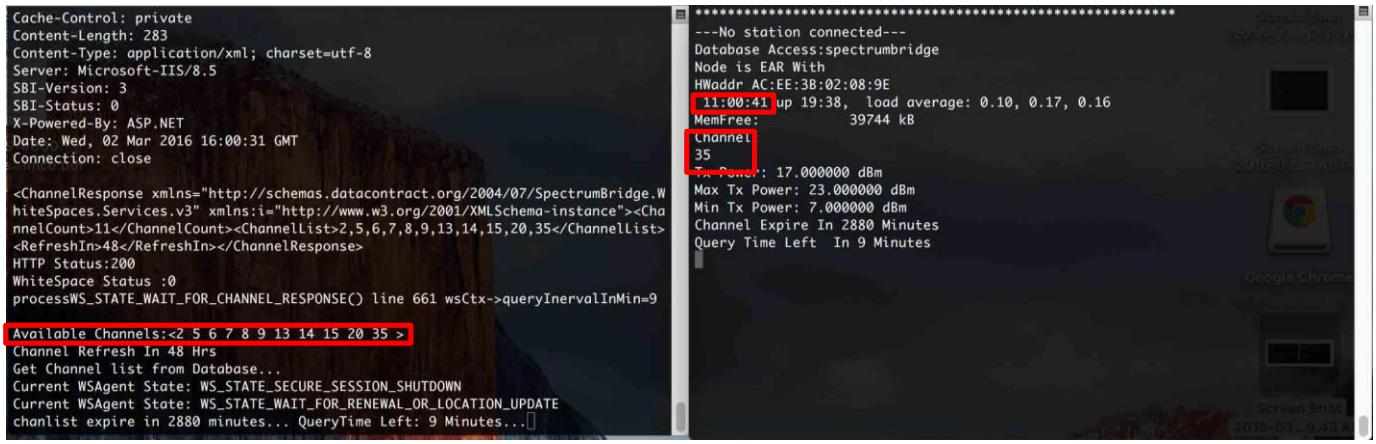


Figure8.17-4: *Data log of successful registration and slave device start transmission on channel 35 after registration of the channel 19 for low-power device. Channel 19 was excluded from the newly accepted channel list after 11:00 am*

8.18 FCC15.711(j) Security

8.18.1 Definitions and limits

White space devices shall incorporate adequate security measures to ensure that they are capable of communicating for purposes of obtaining lists of available channels only with databases operated by administrators authorized by the Commission, and to ensure that communications between white space devices and databases are secure to prevent corruption or unauthorized interception of data. This requirement includes implementing security for communications between Mode I personal portable devices and fixed or Mode II devices for purposes of providing lists of available channels. This requirement applies to communications of channel availability and other spectrum access information between the databases and fixed and Mode II devices (it is not necessary for white space devices to apply security coding to channel availability and channel access information where they are not the originating or terminating device and that they simply pass through).

8.18.2 Test summary

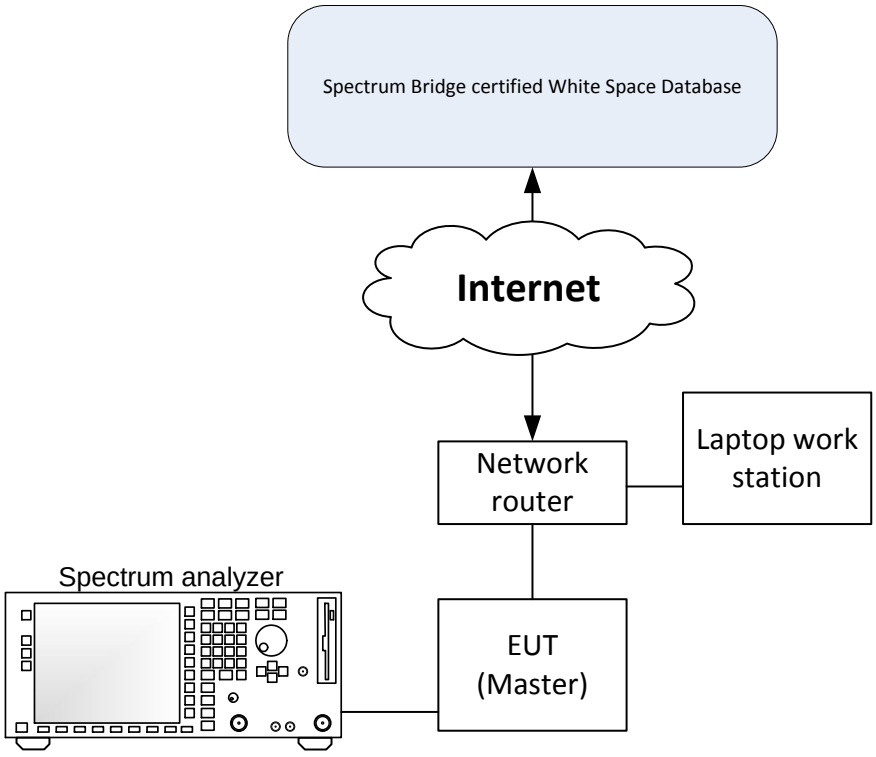
Test date	March 1, 2016	Temperature	23 °C
Test engineer	Andrey Adelberg	Air pressure	1008 mbar
Verdict	Pass	Relative humidity	34 %

8.18.3 Observations, settings and special notes

Please see the attached document:6H SBI Secure Communications Cert-4006-23.pdf

Section 9. Block diagrams of test set-ups

9.1 Master test setup diagram



9.2 Slave test setup diagram