SPECTRUM BRIDGE

White Spaces System Test Report

Fixed TVBD Test Report Part 2

04/30/2011

Contents

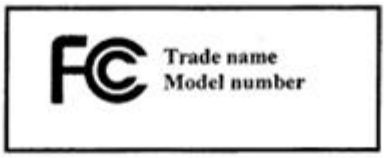
3. Test procedures and results

3.1 Cross Reference

Test Scope:	Labeling Requirements
Compliance:	**47 CFR, Part 15, Subpart H, Section §15.705** **(a)** The provisions of Subparts A, B, and C of this part apply to TVBDs, except where specific provisions are contained in subpart H. **(b)** The requirements of subpart H apply only to the radio transmitter contained in the TVBD……., a TVBD that includes a receiver that tunes within the frequency range specified in §15.101(b) contains digital circuitry not directly associated with the radio transmitter is also subject to the requirements for unintentional radiators in subpart B.
Test Procedure:	1. Verify compliance with subparts A, B, C
Test Results:	1. Attached exhibits from previous part 15 and part 90 compliance tests are provided for reference (Part 15 - JA-2615 RPT-EMI-01-A.pdf; KTS radio IQ5-VOY1-2 Test report.pdf)
Test Status:	N/A

3.2 Compliant Labeling

Test Scope:	Labeling Requirements
Compliance:	**47 CFR, Part 15, Subpart H, Section §15.706** Information to the User (a) In addition to the labeling requirements contained in §15.19, the instructions furnished to the user of a TVBD shall include the following statement……..
Test Procedure:	1. Verify compliant labeling of the device
	2. Verify compliant labeling in the Agility White Space Radio User Manual

Test Results:	1. Compliant label and logo will be permanently affixed at the manufacturing site on each radio at a location on the back as described in the User manual. 2. Reference the attached file: TVBDLabelInformation031111.pdf; ADR_FCC.jpg.
	 This equipment has been tested and found to comply with the rules for TV band devices, pursuant to Part 15 of the FCC Rules. These rules are designed to provide reasonable protection against harmful interference. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures: 1. Reorient or relocate the receiving antenna. 2. Increase the separation between the equipment and receiver. 3. Connect the equipment into an outlet on a circuit different from that to which the receiver is connected. 4. Consult the manufacturer, dealer or an experienced radio/TV technician for help.

3.3 Fixed Device Transmitter Tests

3.3.1 Permissible Channels of Operation

Test Scope:	Permissible Channels of Operation
Compliance:	**47 CFR, Chapter I, Part 15, Subpart H, Section §15.707(a)(b)(c); §15.712(f)(2); §15.713(e)(2)**
Test Procedure:	*Operational Channels* 1. Connect the equipment under test per the setup in Figure 2.
	2. Refer to paragraph 1.5.2 for device control instructions
	3. Tune the device to Low channel (Ch 7) and observe the modulated spectrum.
	4. Tune the device to Mid channel (Ch 10) and observe the modulated spectrum.
	5. Tune the device to High channel (Ch 13) and observe the modulated spectrum.

	6. Repeat steps 1-5 for EUT2.
Test Results:	Figure 1 – SN332 3.125 Mbps SOQPSK on Channel 7. Transmit Power 25dBm

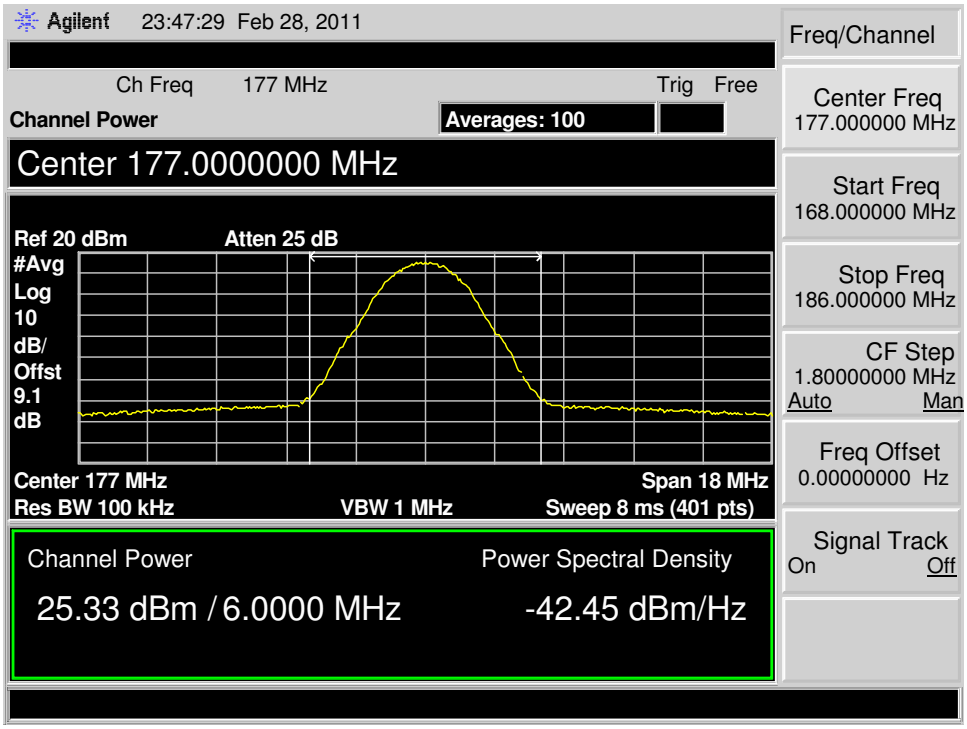


Figure 2 – SN332 3.125 Mbps SOQPSK on Channel 10. Transmit Power 25dBm

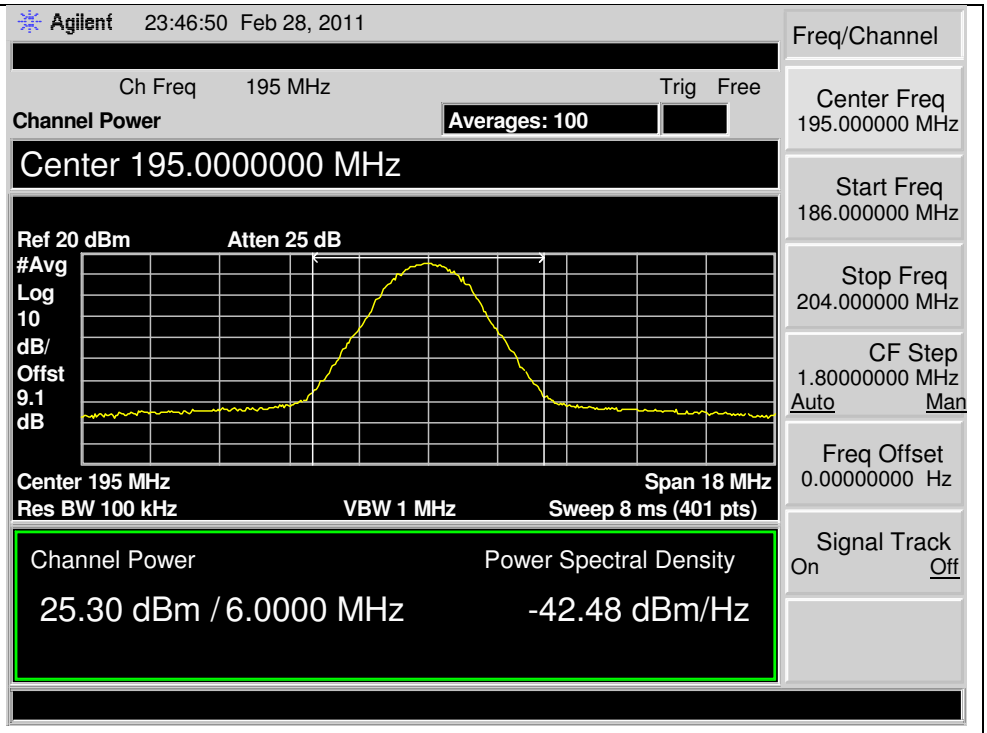
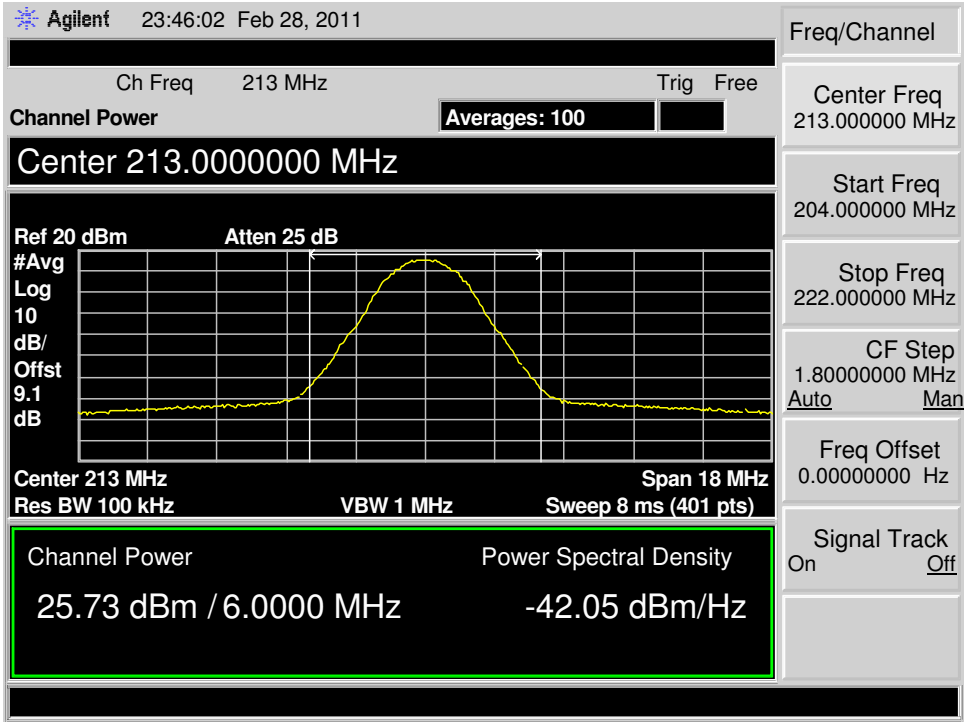


Figure 3 – SN332 3.125 Mbps SOQPSK on Channel 13. Transmit Power 25dBm



Test Status:	EUTs operate in the frequency bands 145-225 MHz. EUT subject to application for certification are fixed TVBDs only as defined in §15.703(c). EUTs operate in the frequency band 145-225 MHz only when communicate with other fixed TVBDs.

3.3.2 Adjacent channel emissions at antenna connector

Test Scope:	Adjacent channel emissions at antenna connector
Compliance:	**47 CFR, Chapter I, Part 15, Subpart H, Section §15.709(c)(1)(2)**
Test Procedure:	1. Connect the equipment under test per the setup in Figure 2.
	2. Refer to paragraph 1.5.2 for device control instructions
	3. Tune EUT1 to the Low channel and observe the modulated spectrum.
	4. Adjust the output power of the transmitter while measuring the upper and lower adjacent channel emissions until the limits are met. Record the transmit power.
	5. Tune EUT1 to the Mid channel and observe the modulated spectrum.
	6. Adjust the output power of the transmitter while measuring the upper and lower adjacent channel emissions until the limits are met. Record the transmit power.
	7. Tune EUT1 to the High channel and observe the modulated spectrum.
	8. Adjust the output power of the transmitter while measuring the upper and lower adjacent channel emissions until the limits are met. Record the transmit power.
	9. Repeat steps 1-8 for EUT2.
Test Results:	See SA plots in Test 3.3.4.
Test Status:	In the 6 MHz channels adjacent to the operating channel emissions from EUTs are at least 55 dB below the highest average power in the band in which the device is operating. The above emission measurements are performed using a minimum resolution bandwidth of 100 kHz.

3.3.3 Beyond adjacent channel emissions at antenna connector

Test Scope:	Beyond adjacent channel emissions at antenna connector

Compliance:	**47 CFR, Chapter I, Part 15, Subpart H, Section §15.709(c)(3)(4)**
Test Procedure:	In the EMS, logged in as Administrator, change the preset configuration to 6 (3.125 Mbps SOQPSK modulation). Perform the test for low, middle and high frequency within the operational range. Measure and monitor the radiated emissions with spectrum analyzer.
Test Results:	See Exhibits F and G.
Test Status:	At frequencies beyond 6 MHz from the edge of the operating channel, radiated emissions from the EUT meet the requirements of §15.109.

3.3.4 Power Spectral Density at antenna connector

Test Scope:	Power Spectral Density at antenna connector
Compliance:	**47 CFR, Chapter I, Part 15, Subpart H, Section §15.709(a)(5)**
Test Procedure:	1. Connect the equipment under test per the setup in Figure 2.
	2. Refer to paragraph 1.5.2 for device control instructions
	3. Tune EUT1 to the Low channel, adjust the transmit power to the level determined in 3.2.2, and observe the modulated spectrum.
	4. Tune EUT1 to the Mid channel, adjust the transmit power to the level determined in 3.2.2, and observe the modulated spectrum.
	5. Tune EUT1 to the High channel, adjust the transmit power to the level determined in 3.2.2, and observe the modulated spectrum.
	6. Repeat steps 1-5 for EUT2.
Test Results:	Figure 1 – SN332 3.125 Mbps SOQPSK on Channel 7. Transmit Power 25dBm

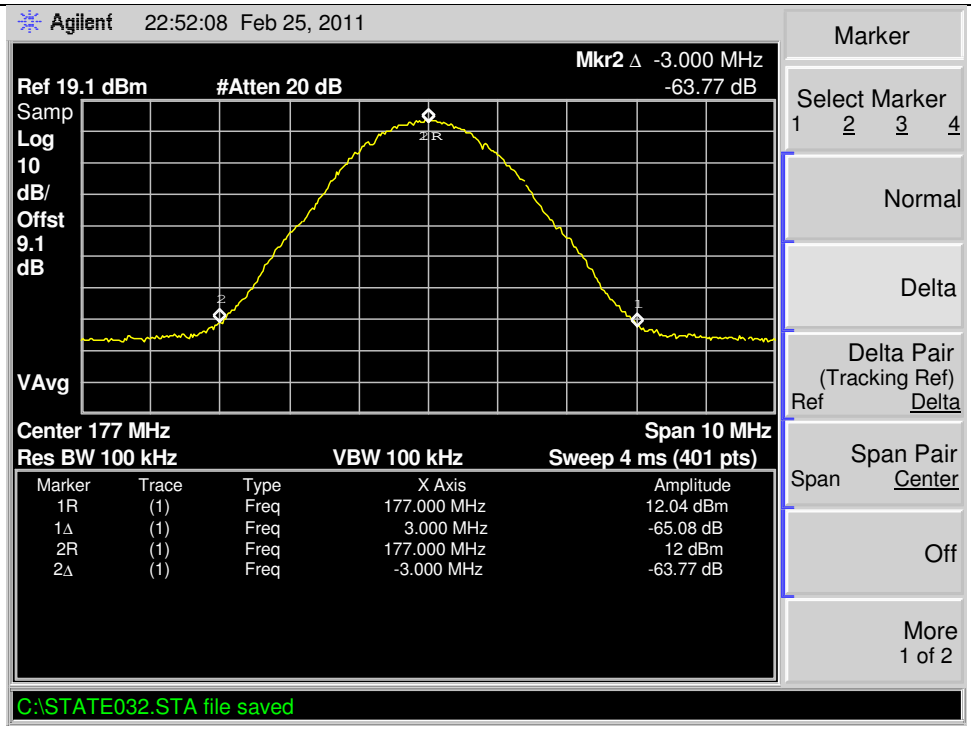


Figure 2 – SN332 3.125 Mbps SOQPSK on Channel 10. Transmit Power 25dBm

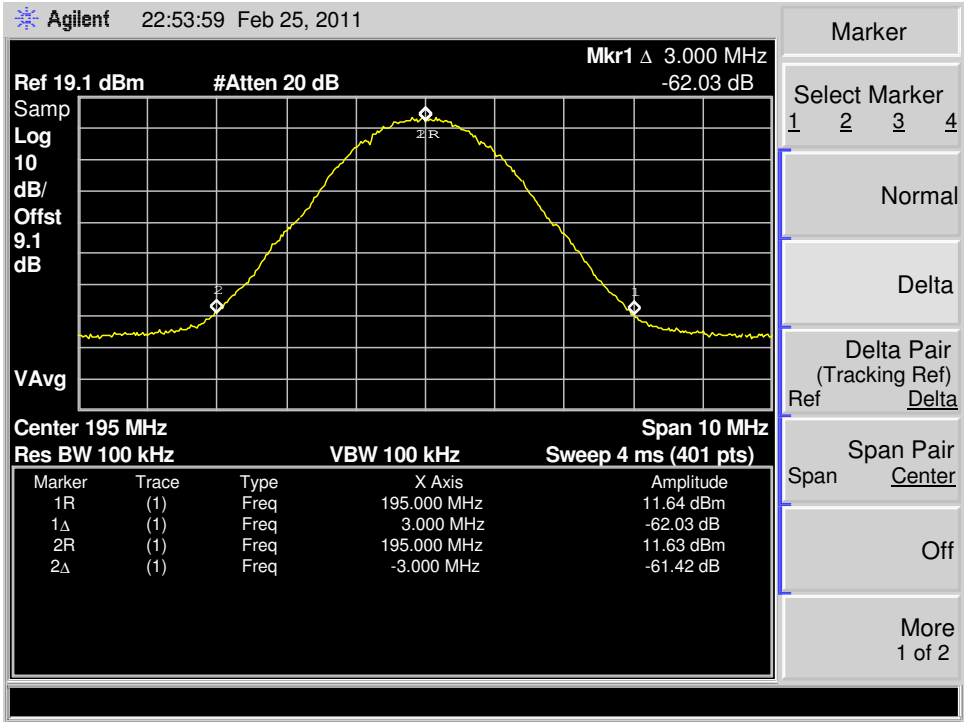
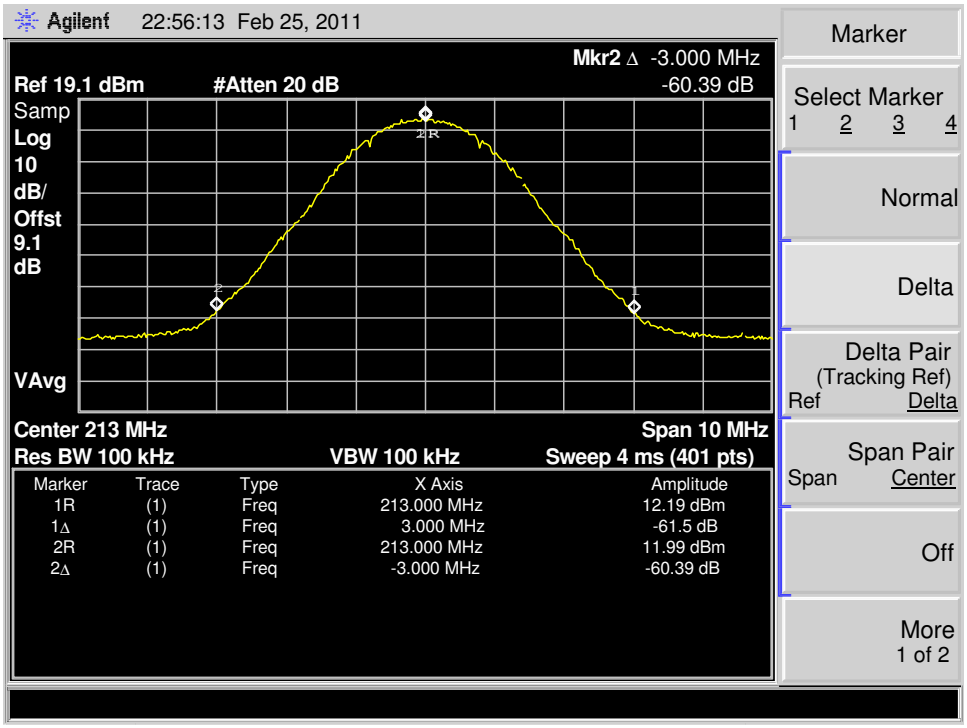


Figure 3 – SN332 3.125 Mbps SOQPSK on Channel 13. Transmit Power 25dBm

	
Test Status:	The power spectral density conducted from the EUTs to the antenna is less than 12.2 dBm when measured in any 100 kHz band during any time interval of continuous transmission.

3.3.5 Maximum output power at antenna connector

Test Scope:	Maximum output power at antenna connector
Compliance:	**47 CFR, Chapter I, Part 15, Subpart H, Section §15.709(a)(1)**
Test Procedure:	1. Connect the equipment under test per the setup in Figure 2.
	2. Refer to paragraph 1.5.2 for device control instructions
	3. Tune EUT1 to the Low channel, adjust the transmit power to the level determined in 3.2.2, and record the total transmit power.
	4. Tune EUT1 to the Mid channel, adjust the transmit power to the level determined in 3.2.2, and record the total transmit power.
	5. Tune EUT1 to the High channel, adjust the transmit power to the level determined in 3.2.2, and record the total transmit power.
	6. Repeat steps 1-5 for EUT2.

Test Results:	Refer to spectrum analyzer results shown in 3.3.1.
Test Status:	EUT's maximum conducted output power over the TV channel of operation does not exceed one watt.

3.3.6 Transmit power control

Test Scope:	Transmit power control
Compliance:	**47 CFR, Chapter I, Part 15, Subpart H, Section §15.709(a)(3)**
Test Procedure:	1. Connect the equipment under test per the setup in Figure 4.
	2. It is assumed that the equipment has been previously provisioned and registered with the Spectrum Bridge WSDB. The test location is randomly chosen at latitude 28.0 / longitude -81.0. Valid antenna height is input.
	3. Use the TVBD Element Manager to enable normal WS authorization and make sure EUT2 has joined a network with EUT1.
	4. Set Hub's (EUT1) target RSSI, maximum transmit power and enable transmit power control.
	5. Set the Spoke's (EUT2) maximum transmit power and enable transmit power control. Observe and log debug messages on EUT2.
Test Results:	Via terminal emulator, the transmit commands were observed being automatically lowered while simultaneously observing the RSSI on EUT1 settle in the target RSSI range. For Transmit Power Control Mechanism description, refer to Exhibit C. Example: Power Up: 220 Power Down: 210 Power Down: 200 Power Down: 190 Power Down: 180 Power Down: 170 Power Down: 170
Test Status:	EUTs have incorporated transmit power control to limit their operating power to the minimum necessary for successful communication.

3.3.7 RF Exposure

Test Scope:	RF Exposure
Compliance:	**47 CFR, Chapter I, Part 15, Subpart H, Section §15.709(d)**
Test Procedure:	N/A
Test Results:	See Exhibit A: AWR White Space User Manual-1 for instructions on measures to take to ensure that persons maintain a distance of at least 40 cm from the device. Additionally see Exhibit G: "KTS Radio RF Exposure Report"
Test Status:	Satisfied by the AWR White Space User Manual-1 and previous RF exposure report.

3.3.8 Conducted emissions at AC power input

Test Scope:	Conducted emissions at AC power input
Compliance:	**47 CFR, Chapter I, Part 15, Subpart C, Section §15.207; Subpart H, Section §15.709(c)(5)**
Test Procedure:	N/A- the EUT is powered by 12VDC and not directly connected to the AC public mains.
Test Results:	See Exhibit F: "KTS Radio IQ5-VOY1-2 Test Report".
Test Status:	N/A

3.3.9 Radiated emissions

Test Scope:	Radiated emissions
Compliance:	**47 CFR, Chapter I, Part 15, Subpart B, Section §15.109; Subpart C, Section §15.207**
Test Procedure:	N/A
Test Results:	See Exhibit F: "KTS Radio IQ5-VOY1-2 Test Report".

3.3.10 Conducted emissions at antenna port

Test Scope:	Radiated emissions
Compliance:	**47 CFR, Chapter I, Part 15, Subpart B, Section §15.111**
Test Procedure:	N/A
Test Results:	See Exhibit F: "KTS Radio IQ5-VOY1-2 Test Report".

3.4 Fixed Device System Tests

3.4.1 TVBD initialization

Test Scope:	TVBD initialization
Compliance:	**47 CFR, Chapter I, Part 15, Subpart H, Section §15.713(e)(1)(2)(3)(6)**
Test Procedure:	*Fixed TVBDs must provide their location and required identifying information to the TV bands database.* Connect the equipment under test per the setup in Figure 3.
	1. It is assumed that the equipment has been previously enrolled with the Spectrum Bridge WSDB. The test location is randomly chosen at latitude 40.0, longitude -94.3. A valid antenna height is input.
	2. Use the TVBD Element Manager to enable normal WS authorization.
	3. Prepare a telnet Terminal Emulator and Network Protocol Analyzer (WireShark) to capture and record communication between TVBD and Spectrum Bridge TV White Spaces Database.
	4. On the TVBD Element Manager, populate the Registration tab and click the register button on the bottom of the page. This will cause the information to be written into flash and trigger a registration transaction to the database.
	5. Resetting the device will cause an additional registration transaction with the same information.
Test Results:	Observe Terminal Emulator and Network Protocol Analyzer Readings.
Test Status:	EUTs provide their location and required identifying information to the TV bands database in accordance with the provisions of paragraph §15.713(b). EUTs register with the database by connecting directly to the Internet.

Test Procedure:	*Fixed TVBDs must provide their location and required identifying information to the TV bands database. Testing EUT2* 6. Connect the equipment under test per the setup in Figure 4.
	7. It is assumed that the equipment has been previously provisioned and registered with the Spectrum Bridge WSDB. The test location is randomly chosen at latitude 28.0 / longitude -81.0. Valid antenna height is input.
	8. Use the TVBD Element Manager to enable normal WS authorization. Make sure EUT2 has joint the network.
	9. Prepare Terminal Emulator and Network Protocol Analyzer to capture and record communication between TVBD and Spectrum Bridge TV White Spaces Database.
	10. Reboot EUT2.
Test Results:	Observe Terminal Emulator and Network Protocol Analyzer Readings.
Test Status:	EUTs provide their location and required identifying information to the TV bands database in accordance with the provisions of paragraph §15.713(b). EUT2 register with the database by connecting to the Internet through EUT1 (another fixed TVBD).
Test Procedure:	*Fixed TVBDs shall not transmit unless they receive, from the TV bands database, a list of available channels.* 11. Connect the equipment under test per the setup in Figure 4.
	12. It is assumed that the equipment has been previously provisioned and registered with the Spectrum Bridge WSDB. The test location is randomly chosen at latitude 28.0 / longitude -81.0. Valid antenna height is input.
	13. Use the TVBD Element Manager to enable normal WS authorization.
	14. To test EUT2 compliance, terminate the radio link between EUT1 and EUT2 by disconnecting the Antenna/Antenna Attenuator from the EUT1's BNC port.
	15. Connect EUT2 to SA
	16. Reboot EUT2.
	17. Restore the radio link and monitor EUT2's transmitter output
	18. Testing EUT1 - Terminate the connection between EUT1 and the database by disconnecting the Ethernet cable from EUT1's Ethernet port.
	19. While monitoring EUT1's on the SA, Reboot EUT1.
	20. Reconnect the Ethernet connection from EUT1 to the database while monitoring the transmitter output.
Test Results:	
	Monitor transmitter activity.

Test Status:	By terminating the radio link between EUT1 and EUT2, EUT2 loses connection with the database and switches back to scanning mode when rebooted. EUT2 does not transmit unless it receives, from the TV bands database, a list of available channels. By terminating EUT1's network connection, EUT1 cannot establish a connection with the database to register and request an available channel list and does not enable its transmitter. EUT1 does not transmit unless it receives, from the TV bands database, a list of available channels.
Test Procedure:	*Fixed TVBDs may only transmit on the available channels on the list provided by the database* 1. Connect the equipment under test per the setup in Figure 4.
	2. It is assumed that the equipment has been previously provisioned and registered with the Spectrum Bridge WSDB. The test location is randomly chosen at latitude 28.0 / longitude -81.0. Valid antenna height is input.
	3. Use the TVBD Element Manager to enable normal WS authorization.
	4. Reboot EUT1.
	5. Once the TVBDs receive available channel maps and start operating on a valid channel, via the White Space tab, select channels that are not are not available in the available channel list and save.
Test Results:	Monitor transmitter activity.
Test Status:	Even when commanded to switch on an unavailable channel, EUTs do not transmit on channels not included in the list provided by the TV bands database. EUTs only transmit on the available channels on the list provided by the Database.
Test Procedure:	*A fixed device located at a site where the ground level height above average terrain (HAAT) is greater than 76 meters shall not be provided a list of available channels* 6. Connect the equipment under test per the setup in Figure 3.
	7. It is assumed that the equipment has been previously provisioned with the Spectrum Bridge WSDB. The test location is randomly chosen at latitude 46.0 / longitude -121.0. HAAT > 76 m.
	8. Use the TVBD Element Manager to enable normal WS authorization.
	9. In the TVBD Element Manager, under the 'Registration' tab, enter latitude 46.0 / longitude -121.0, fill in the registration information and click 'Register'.
	10. Reboot EUT1.

	11. Test EUT2.
Test Results:	Terminal Emulator reading shows 'Registration Info Status Not Good'.
Test Status:	EUTs located at a site where the ground level height above average terrain (HAAT) is greater than 76 meters is not provided a list of available channels.

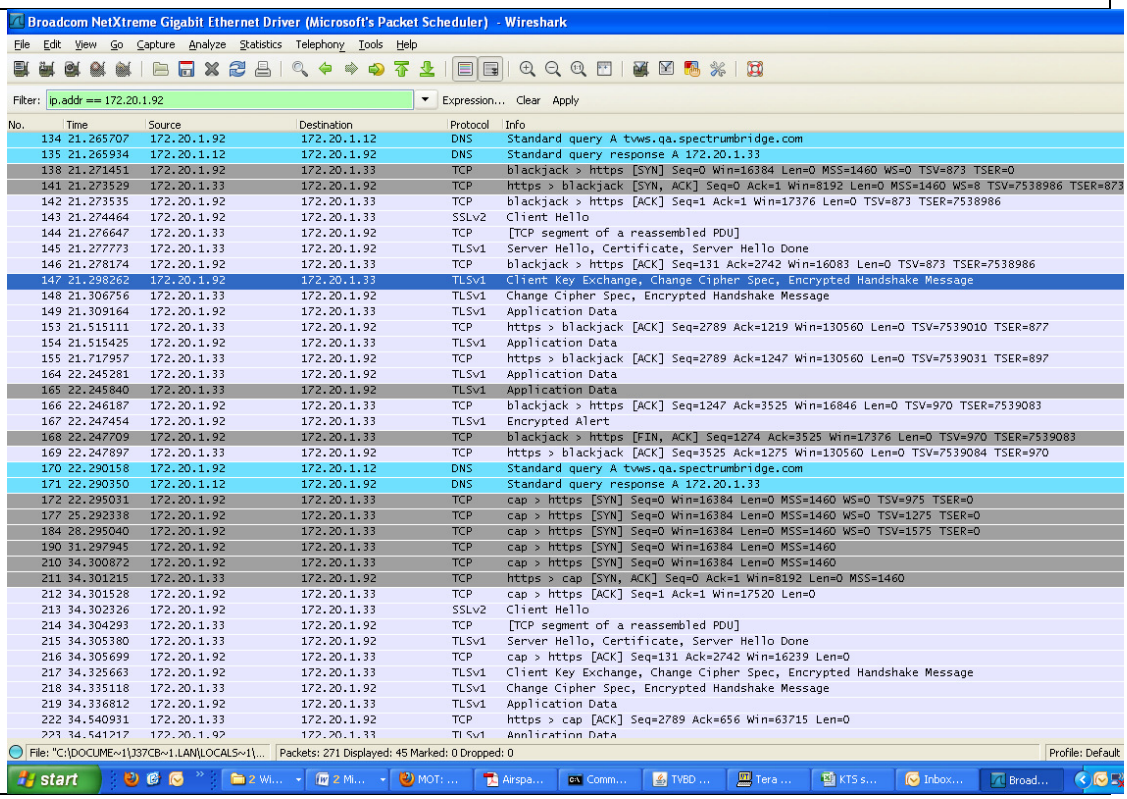
3.4.2 Fixed TVBD registration

Test Scope:	Fixed TVBD registration
Compliance:	**47 CFR, Chapter I, Part 15, Subpart H, Section §15.713(f)(1)(2)(3)**
Test Procedure:	*Prior to operating for the first time, a fixed TVBD must register with the TV bands database by providing the information listed in §15.713(3)* 1. Connect the equipment under test per the setup in Figure 4.
	2. It is assumed that the equipment has been previously provisioned with the Spectrum Bridge WSDB.
	3. Use the TVBD Element Manager to enable normal WS authorization.
	4. Register EUT1 with the database.
	5. Repeat steps 1-4 for EUT2.
Test Results:	Via the EMS or the Terminal Emulator observe processes. Example: IPAddress Resolution:172.20.1.33 Connect to 172.20.1.33 Port: 443 Delivered the packet 172.20.1.33 Registration Info Status not good WakeUpTime: 5 32 setDebugFlag ok 00351278: 73 62 69 72 65 67 00 00 00 1A 00 00 00 8F 12 35 |sbireg.....5| 00351288: 00 00 00 00 00 0E 95 01 61 01 61 04 61 09 09 09 |.....a.a.a...| 00351298: 01 61 02 41 4C 01 31 02 55 53 02 61 61 02 31 31 |.a.AL.1.US.aa.11| 003512A8: FF IPAddress Resolution:172.20.1.33 Connect to 172.20.1.33 Port: 443 Delivered the packet 172.20.1.33 Registration Info Status good :0
Test Status:	Prior to operating for the first time, EUTs register with the TV bands database

	by providing the information listed in paragraph (f)(3) of §15.713.
Test Procedure:	*After changing location, a fixed TVBD must register with the TV bands database by providing the information listed in §15.713(3)* 6. Keep the configuration from the test from above.
	7. In the EMS, under the 'Registration' tab, change the location information by entering test coordinates lat 32.0 / long -82.0) and valid antenna height.
	8. Repeat step 7 for EUT2.
Test Results:	Via the EMS or the Terminal Emulator observe processes. Example: IPAddress Resolution:172.20.1.33 Connect to 172.20.1.33 Port: 443 Delivered the packet 172.20.1.33 Registration Info Status not good WakeUpTime: 5 32 setDebugFlag ok 00351278: 73 62 69 72 65 67 00 00 00 1A 00 00 00 8F 12 35 |sbireg.....5| 00351288: 00 00 00 00 00 0E 95 01 61 01 61 04 61 09 09 09 |.....a.a.a...| 00351298: 01 61 02 41 4C 01 31 02 55 53 02 61 61 02 31 31 |.a.AL.1.US.aa.11| 003512A8: FF IPAddress Resolution:172.20.1.33 Connect to 172.20.1.33 Port: 443 Delivered the packet 172.20.1.33 Registration Info Status good :0
Test Status:	After changing their location, EUTs register with the TV bands database by providing the information listed in paragraph (f)(3) of §15.713.

3.4.3 TVBD access security

Test Scope:	TVBD access security
Compliance:	**47 CFR, Chapter I, Part 15, Subpart H, Section §15.709(a)(6); §15.711(b)(3)(vi); §15.711(f); §15.713(j)**
Test Procedure:	Procedures from tests 3.4.1. and 3.4.2 apply.
Test Results:	Observe Network Protocols Tracing. Refer to Exhibit D for Secure Communications description.

Test Status:	

3.4.4 Geo-location

Test Scope:	Geo-location
Compliance:	**47 CFR, Chapter I, Part 15, Subpart H, Section §15.711(b)(1); §15.713(e)(1)**
Test Procedure:	Procedures from tests 3.4.1 and 3.4.2 apply.
Test Results:	Results from tests 3.4.1 and 3.4.2 apply.
Test Status:	Refer to the results from tests 3.4.1 and 3.3.2

3.4.5 Database access interval

Test Scope:	Database access interval
Compliance:	**47 CFR, Chapter I, Part 15, Subpart H, Section §15.711(b)(3)(i)(iii)**
Test Procedure:	1. Connect the equipment under test per the setup in Figure 4.

	2. It is assumed that the equipment has been previously provisioned and registered with the Spectrum Bridge WSDB. The test location is randomly chosen at latitude 28.0 / longitude -81.0. Valid antenna height is input.
	3. Use the TVBD Element Manager to enable normal WS authorization.
	4. Reboot EUT1.
	5. Once the TVBDs receive available channel maps and start operating on a valid channel, adjust the database query interval. This is implemented by setting 1 minute value of the 'Query Interval' under the 'White Space' tab in the TVBD Element Manager.
	6. Repeat steps 1-5 for EUT2.
Test Results:	Monitor device performance.
Test Status:	EUTs access the database at least once a day to verify that the operating channels continue to remain available. Operation ceases immediately if the channel is no longer available.

3.4.6 Database access update

Test Scope:	Database access interval
Compliance:	**47 CFR, Chapter I, Part 15, Subpart H, Section §15.711(b)(iii)**
Test Procedure:	1. Connect the equipment under test per the setup in Figure 4.
	2. It is assumed that the equipment has been previously provisioned and registered with the Spectrum Bridge WSDB. The test location is randomly chosen at latitude 28.0 / longitude -81.0. Valid antenna height is input.
	3. Use the TVBD Element Manager to enable normal WS authorization.
	4. Reboot EUT1.
	5. Once the TVBDs receive available channel maps and start operating on a valid channel, adjust the database query interval. This is implemented by setting 1 minute value of the 'Query Interval' under the 'White Space' tab in the TVBD Element Manager.
	6. Repeat steps 1-5 for EUT2.
Test Results:	Monitor device performance.
Test Status:	When EUTs are forced to fail to contact the TV bands database during any given day, EUTs continue to operate until 11:59 PM of the following day at which time they cease operations. EUTs do not cease operation once they've contacted the TV bands database during the intervening period.

3.4.7 Available Channels

Test Scope:	Available Channels
Compliance:	**47 CFR, Chapter I, Part 15, Subpart H, Section §15.707(c); §15.711(b)(3)(i); §15.711(c); §15.711(e); §15.712(f)(2); §15.713(e)(3)**
Test Procedure:	Procedures from tests 3.4.1. apply.
Test Results:	Results from tests 3.4.1. apply.
Test Status:	EUTs operate only on available channels as identified in paragraphs (a) and (b) of section §15.707 and as determined by Spectrum Bridge's database in accordance with the interference avoidance mechanisms of §§ 15.711 and 15.712. EUTs access the TV bands database over the Internet to determine the TV channels that are available at their geographic coordinates, taking into consideration the fixed device's antenna height, prior to their initial service transmission at a given location. Devices operate only on channels that are indicated in the database as being available for a given location. EUTs access the database at least once a day to verify that the operating channels continue to remain available. Operation on a channel ceases immediately if the database indicates that the channel is no longer available. Spectrum Bridge's database provides available channels list for the 48 hour period beginning at the time of the device's last access to the database for a list of available channels. As configured, EUT2 does not have a direct connection to the Internet. It can receive the transmissions of EUT1. EUT2 acts as fixed TVBD needing initialization and it transmits to EUT1 on EUT1's operational channel. EUT2 uses this link to access the database to register its location and receive a list of channels that are available for it to use. Subsequently, the newly registered EUT2 only uses the television channels that the database indicates are available for it to use. EUT2 does not obtain lists of available channels from EUT1 as provided by the TV bands database. EUT2 contacts the database to obtain a list of available channels on which it may operate. EUTs do not operate on TV channels 36, 37, 38 and on the first channel on each side of TV channel 37 that is not occupied by a licensed service. This is maintained by the database automatically reserving first channel below and first channel above TV channel 37 for protected devices and not allowing fixed TVBD operation on these channels.

3.4.8 Display of Available Channels

Test Scope:	Available Channels
Compliance:	**47 CFR, Chapter I, Part 15, Subpart H, Section §15.707(c); §15.711(b)(3)(i); §15.711(e); §15.711(c); §15.712(f)(2); §15.713(e)(3)**
Test Procedure:	N/A
Test Results:	Available channels are displayed through the EMS on the White Space Channel tab.
Test Status:	EUTs have incorporated the capability to display a list of identified available channels and its operating channels via the Element Manager application.

3.4.9 TVBD ID Signal

Test Scope:	**TVBD ID Signal**
Compliance:	**47 CFR, Chapter I, Part 15, Subpart H, Section §15.711(d)**
Test Procedure:	1. Connect the equipment under test per the setup in Figure 4.
	2. It is assumed that the equipment has been previously provisioned and registered with the Spectrum Bridge WSDB. The test location is randomly chosen at latitude 28.0 / longitude -81.0. Valid antenna height is input.
	3. Use the TVBD Element Manager to enable normal WS authorization.
Test Results:	See Exhibit E: "TVBD ID Signal".
Test Status:	EUTs transmit identifying information. The identification signal conforms to industry recognized standard. The identification signal carries sufficient information to identify EUTs and their geographic coordinates.