

Figure 8.19-5: Received channel list for coordinates set in scenario (a) and (b). LPA channel 27 at location coordinates 33.7N, 113.8W

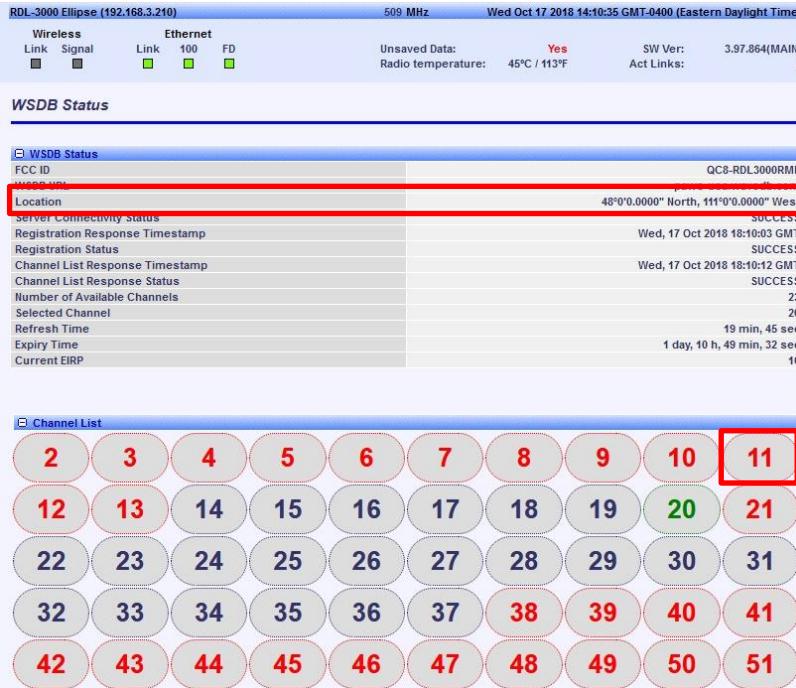


Figure 8.19-6: Received channel list for coordinates set in scenario (a) and (b). LPD channel 11 at location coordinates 48.0N, 111.0W

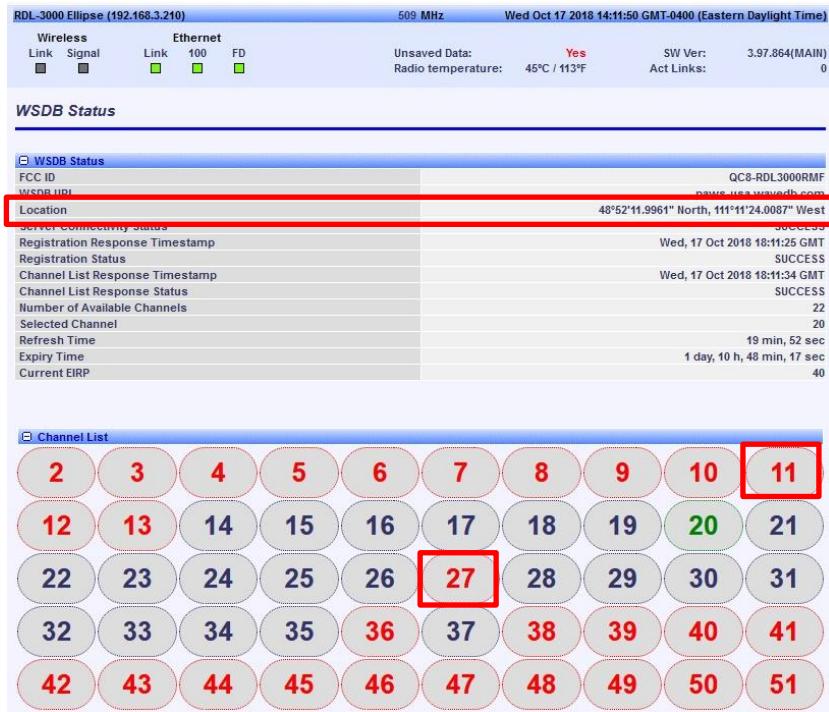


Figure 8.19-7: Received channel list for coordinates set in scenario (a) and (b). LPT channel 27 and TV receive site channel 11 at location coordinates 48.87N, 111.19W

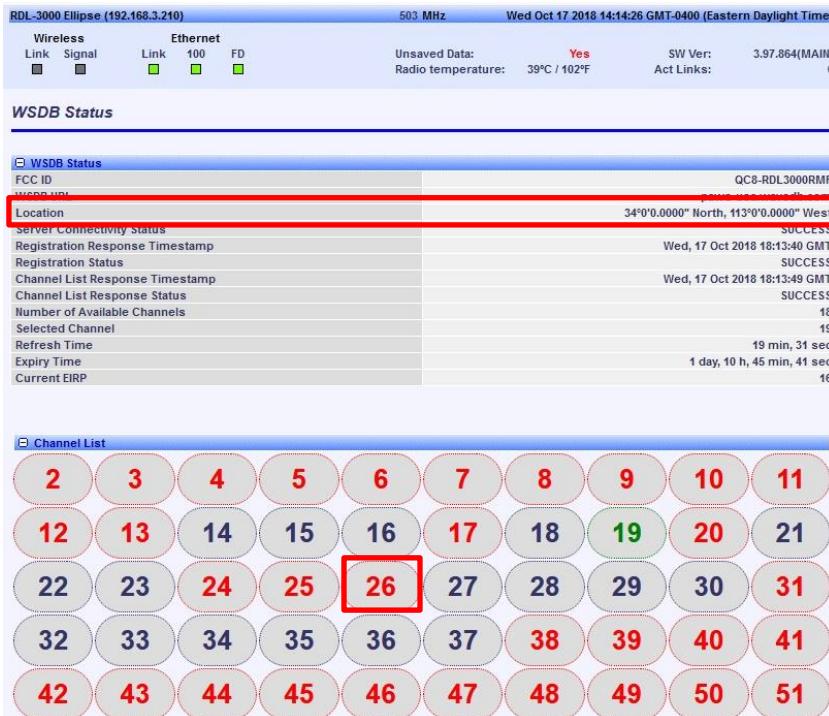


Figure 8.19-8: Received channel list for coordinates set in scenario (a) and (b). MVPD channel 26 at location coordinates 34.0N, 113.0W

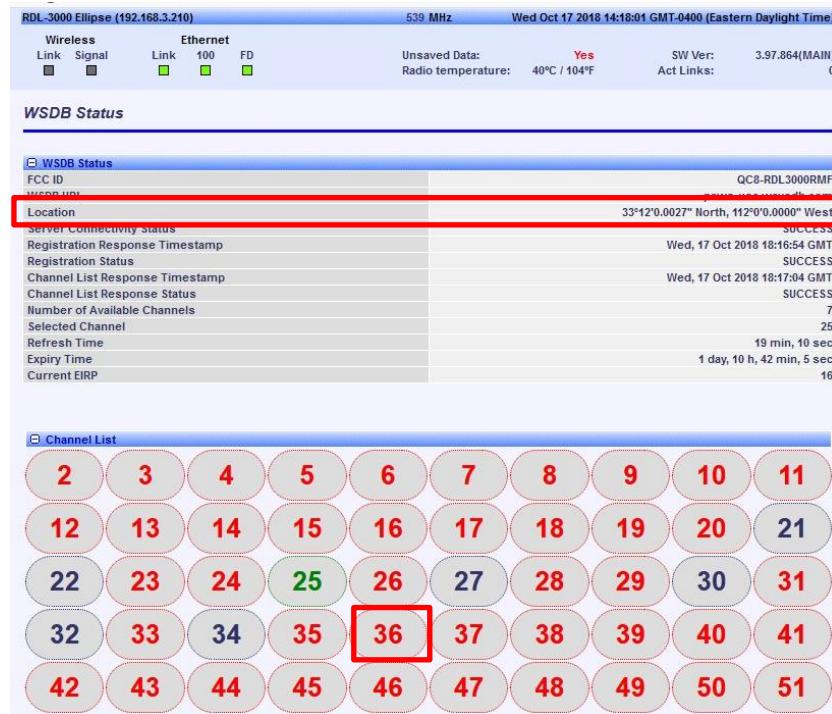


Figure 8.19-9: Received channel list for coordinates set in scenario (c). Permanent BAS link channel 36 at location coordinates 33.2N, 112.0W

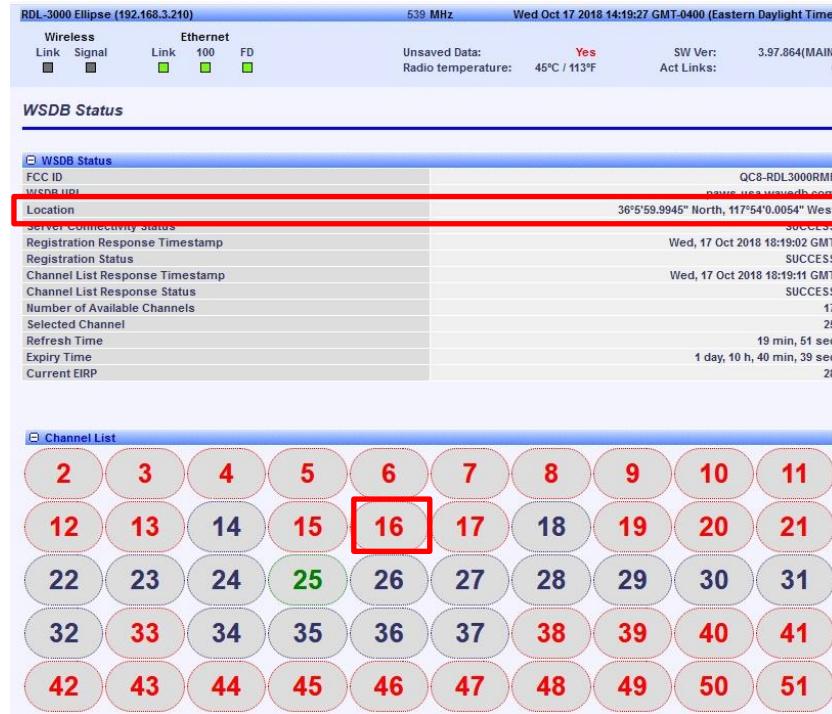


Figure 8.19-10: Received channel list for coordinates set in scenario (d). PLMRS/CMRS operations channel 16 at location coordinates 36.1N, 117.9W

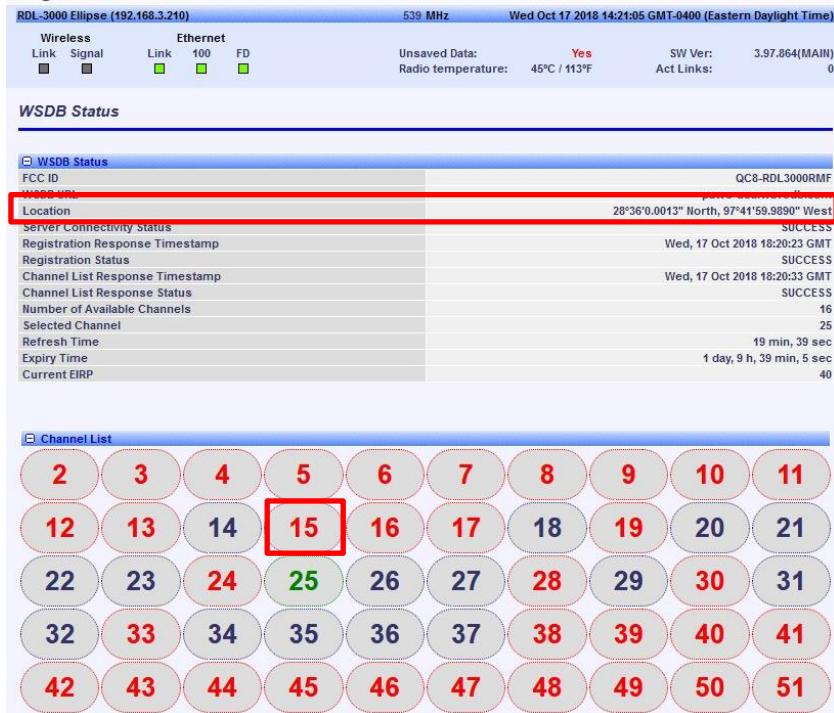


Figure 8.19-11: Received channel list for coordinates set in scenario (e). Offshore radiotelephone on channel 15 at location coordinates 28.6N, 97.1W

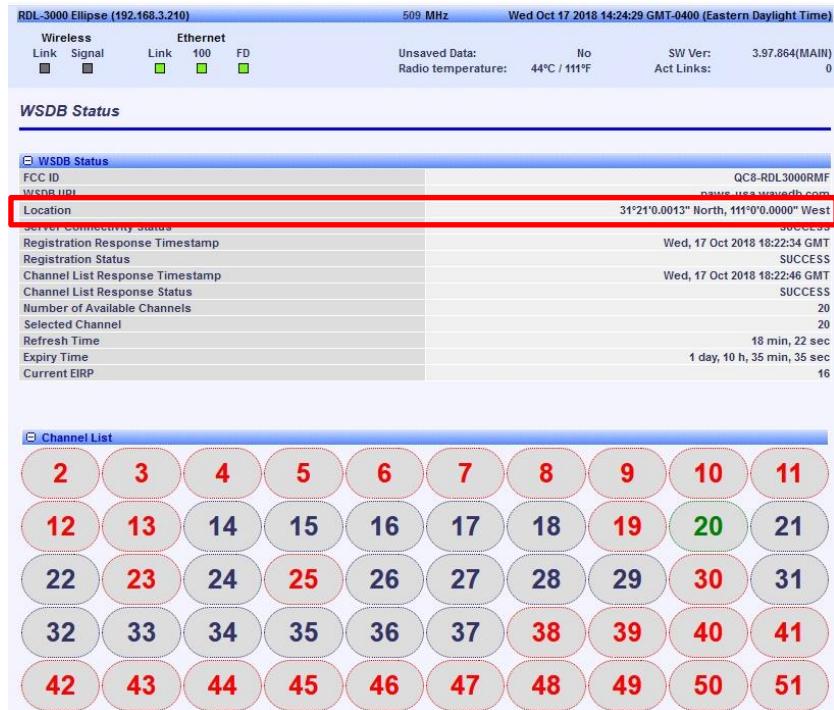


Figure 8.19-12: Received channel list for coordinates set in scenario (g). Mexico border at location coordinates 31.35N, 111.0W

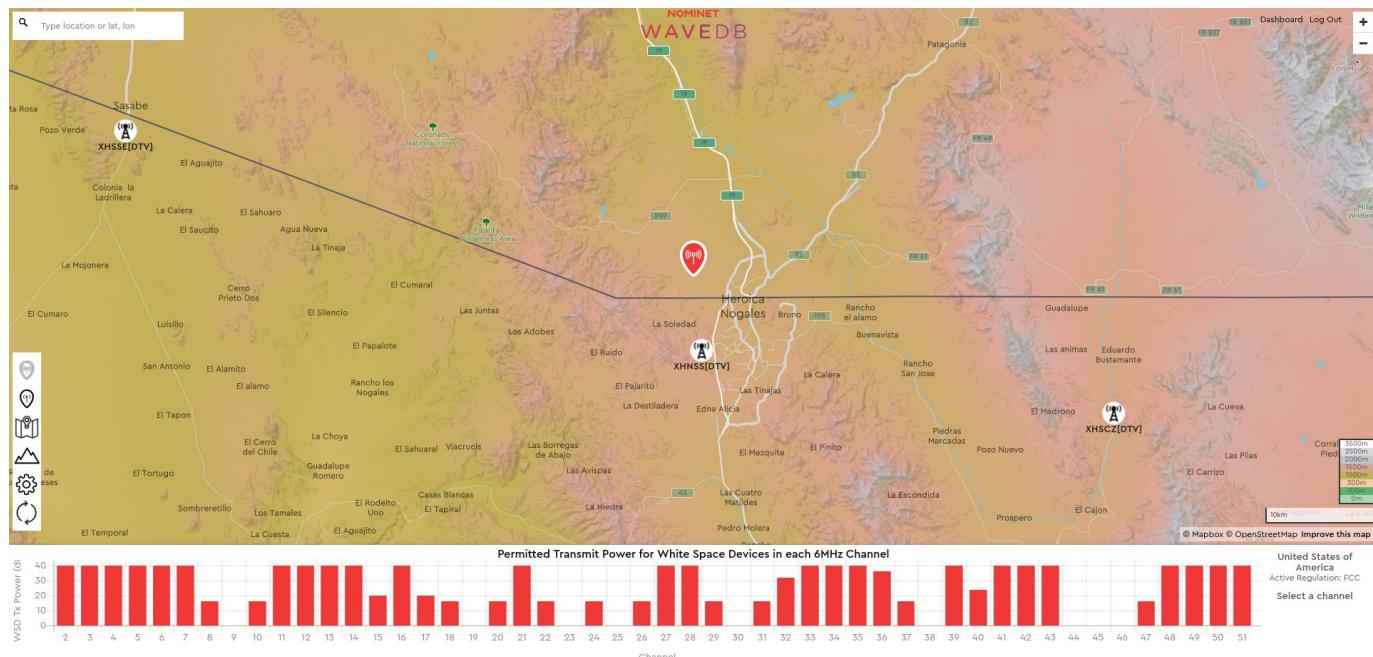


Figure 8.19-13: Channel availability for coordinates set in scenario (g). Mexico border at 31.35N, 111.0W

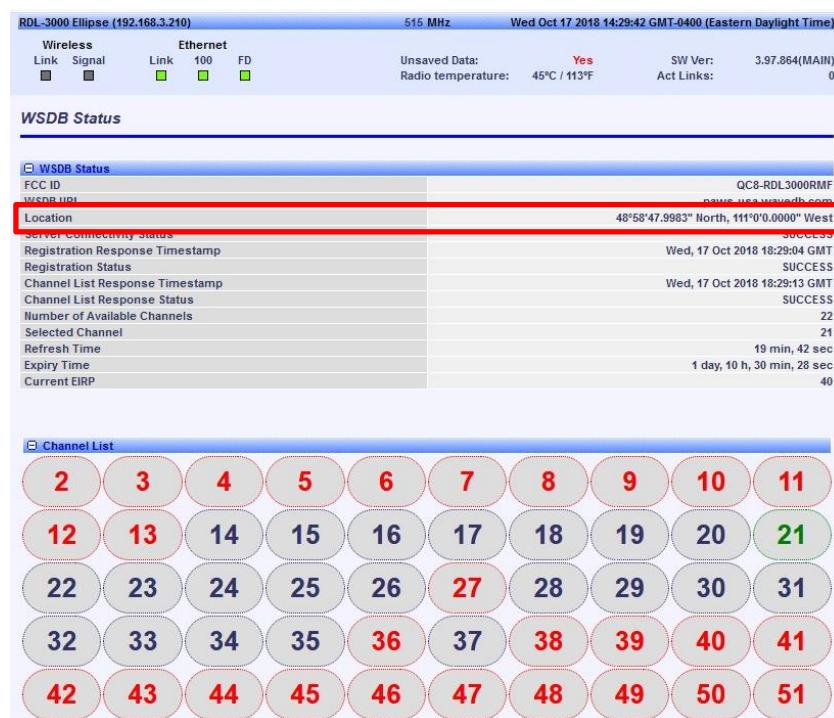


Figure 8.19-14: Received channel list for coordinates set in scenario (g). Canada border at location coordinates 48.98N, 111.0W

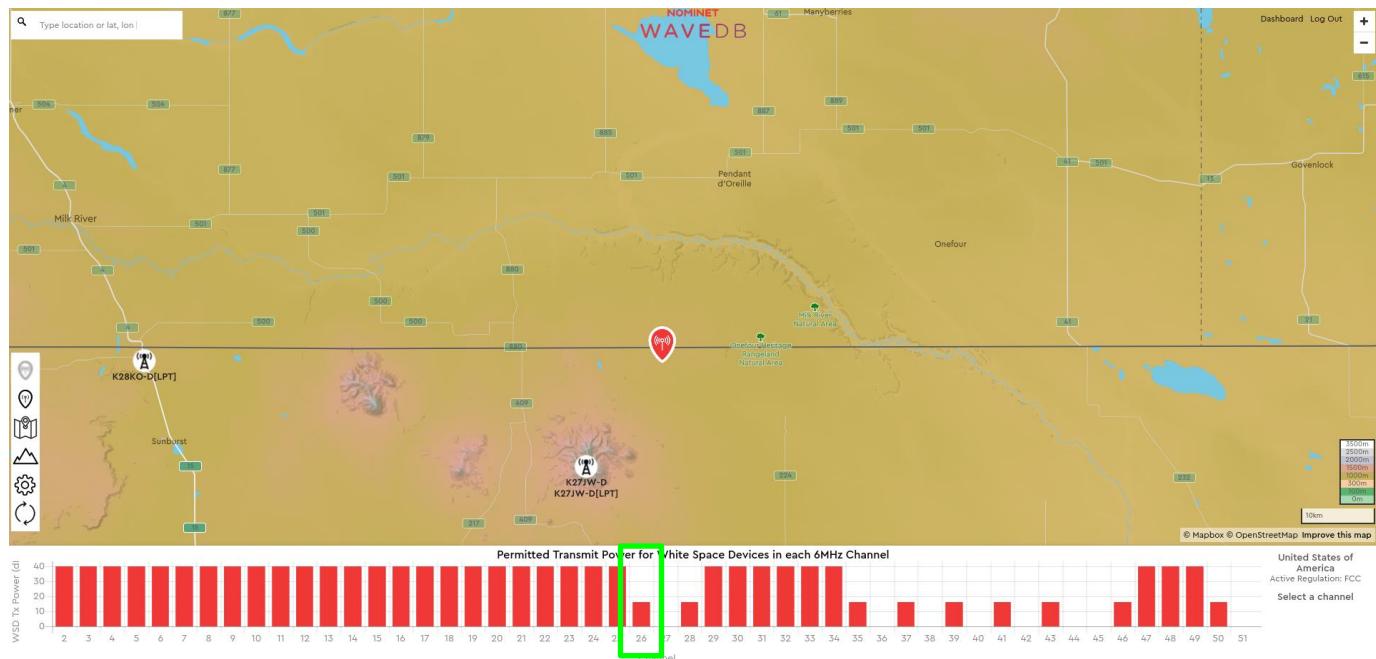


Figure 8.19-15: Channel availability for coordinates set in scenario (g). Canada border at 48.98N, 111.0W

RDL-3000 Ellipse (192.168.3.210)		545 MHz		Thu Oct 18 2018 12:51:25 GMT-0400 (Eastern Daylight Time)																																	
Wireless	Ethernet	Link	Signal	Link	100																																
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																																
				Unused Data: <input checked="" type="checkbox"/>	Yes																																
				Radio temperature: 44°C / 111°F	SW Ver: 3.97.864(MAIN)																																
				Act Links: 0																																	
Wireless Configuration																																					
<table border="1"> <tr> <td colspan="2">Basic Wireless Configuration</td> </tr> <tr> <td>System Mode</td> <td>PMP SC</td> </tr> <tr> <td>Channel Size [MHz]</td> <td>6</td> </tr> <tr> <td>RF Frequency [MHz]</td> <td>545</td> <td>Channel</td> <td>26 [545 MHz]</td> </tr> <tr> <td>Tx Power[dBm]</td> <td>18</td> </tr> </table>						Basic Wireless Configuration		System Mode	PMP SC	Channel Size [MHz]	6	RF Frequency [MHz]	545	Channel	26 [545 MHz]	Tx Power[dBm]	18																				
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Channel Size [MHz]	6																																				
RF Frequency [MHz]	545	Channel	26 [545 MHz]																																		
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<table border="1"> <tr> <td colspan="2">Advanced Wireless Configuration</td> </tr> <tr> <td>Max. Distance</td> <td>10</td> <td>km</td> </tr> <tr> <td></td> <td>6</td> <td>miles</td> </tr> <tr> <td>Antenna Gain [dBi]</td> <td>11</td> </tr> <tr> <td>Target RSSI Enabled</td> <td><input type="checkbox"/></td> </tr> <tr> <td>Registration Period [frames]</td> <td>1</td> </tr> <tr> <td>Scheduling Cycle [ms]</td> <td>10</td> </tr> <tr> <td>Fixed Frame</td> <td><input type="checkbox"/></td> </tr> <tr> <td>GPS Antenna Type</td> <td>Active</td> </tr> <tr> <td>Antenna Alignment Buzzer Enable</td> <td><input type="checkbox"/></td> </tr> <tr> <td>Management MCS</td> <td>BPSK 1/2</td> </tr> <tr> <td>Cyclic Prefix</td> <td>1/4</td> </tr> <tr> <td>Radio Mode</td> <td>RF Port 2</td> </tr> <tr> <td>Conservative Link Adaptation</td> <td><input type="checkbox"/></td> </tr> <tr> <td>AMPDUs</td> <td>Auto</td> </tr> </table>						Advanced Wireless Configuration		Max. Distance	10	km		6	miles	Antenna Gain [dBi]	11	Target RSSI Enabled	<input type="checkbox"/>	Registration Period [frames]	1	Scheduling Cycle [ms]	10	Fixed Frame	<input type="checkbox"/>	GPS Antenna Type	Active	Antenna Alignment Buzzer Enable	<input type="checkbox"/>	Management MCS	BPSK 1/2	Cyclic Prefix	1/4	Radio Mode	RF Port 2	Conservative Link Adaptation	<input type="checkbox"/>	AMPDUs	Auto
Advanced Wireless Configuration																																					
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Scheduling Cycle [ms]	10																																				
Fixed Frame	<input type="checkbox"/>																																				
GPS Antenna Type	Active																																				
Antenna Alignment Buzzer Enable	<input type="checkbox"/>																																				
Management MCS	BPSK 1/2																																				
Cyclic Prefix	1/4																																				
Radio Mode	RF Port 2																																				
Conservative Link Adaptation	<input type="checkbox"/>																																				
AMPDUs	Auto																																				
<table border="1"> <tr> <td colspan="2">Redundancy Configuration</td> </tr> <tr> <td>Redundancy Role</td> <td>Off</td> </tr> <tr> <td>Peer IP Address</td> <td>0.0.0.0</td> </tr> <tr> <td>Timeout [s]</td> <td>5</td> </tr> </table>						Redundancy Configuration		Redundancy Role	Off	Peer IP Address	0.0.0.0	Timeout [s]	5																								
Redundancy Configuration																																					
Redundancy Role	Off																																				
Peer IP Address	0.0.0.0																																				
Timeout [s]	5																																				

Figure 8.19-16: Tx power and Antenna gain settings for channel 26 at the location specified in scenario (g) for Canada border at location coordinates 48.98N, 111.0W. Desired EIRP is 18 dBm + 11 dBi = 29 dBm.

Section 8
Test name
Specification

Testing data
FCC 15.712 Interference protection requirements (Fixed and personal/portable)
FCC Part 15 Subpart H



RDL-3000 Ellipse (192.168.3.210) 545 MHz Thu Oct 18 2018 12:50:49 GMT-0400 (Eastern Daylight Time)

Wireless	Ethernet			
Link	Signal	Link	100	FD
■	■	■	■	■

Unused Data: Yes
Radio temperature: 44°C / 111°F
SW Ver: 3.97.864(MAIN)
Act Links: 0

WSDB Status

WSDB Status		
FCC ID	QC8-RDL3000RMF	
WSDB URL	paws-usa.wavedb.com	
Location	48°58'0.0018" North, 111°9'0.0000" West	
Server Connectivity Status	SUCCESS	
Registration Response Timestamp	Thu, 18 Oct 2018 16:46:07 GMT	
Registration Status	SUCCESS	
Channel List Response Timestamp	Thu, 18 Oct 2018 16:46:17 GMT	
Channel List Response Status	SUCCESS	
Number of Available Channels	22	
Selected Channel	26	
Refresh Time	15 min, 36 sec	
Expiry Time	1 day, 12 h, 9 min, 18 sec	
Current EIRP	16	

Channel List

2	3	4	5	6	7	8	9	10	11
12	13	14	15	16	17	18	19	20	21
22	23	24	25	26	27	28	29	30	31
32	33	34	35	36	37	38	39	40	41
42	43	44	45	46	47	48	49	50	51

RDL-3000 Ellipse (192.168.3.210) 545 MHz Thu Oct 18 2018 12:50:10 GMT-0400 (Eastern Daylight Time)

Wireless	Ethernet			
Link	Signal	Link	100	FD
■	■	■	■	■

Unused Data: Yes
Radio temperature: 44°C / 111°F
SW Ver: 3.97.864(MAIN)
Act Links: 0

System Status

Wireless System		
Current Tx Power	5 dBm	
Channel Frequency	545 MHz	
Wireless Security	Off	
DFS	Off	
DFS Action	None	
Status Code	00010000	
Enhanced Video Buffer	On	
GPS Status	3D Fix (9)	
GPS Position	45°19'10.9000" North, 75°41'23.4700" West	
Synchronization Status	Locked	
Redundancy Status	Off	
Redundancy Peer Status	Off	
Noise Level 1	-110 dBm	
Noise Level 2	-103 dBm	

Wireless Summary

Configured	Active
Subscriber Links	1
Subscriber Services	4
Total IDs	0

Wireless KPI

Rx	Tx
Planned Subscription Ratio [%]	0.00
Actual Subscription Ratio [%]	0.00
Estimated Sector Capacity [Mbps]	0.00
Wireless Throughput [Mbps]	0.000

Ethernet Port Statistics

Rx	Tx
Buffered Packets	6551
Discarded Packets	0

Figure 8.19-17: EIRP limit of 16 dBm received for channel 26 at the location specified in scenario (g) for Canada border at location coordinates 48.98N, 111.0W. Output power was automatically reduced to 5 dBm (16 dBm – 11 dBi).

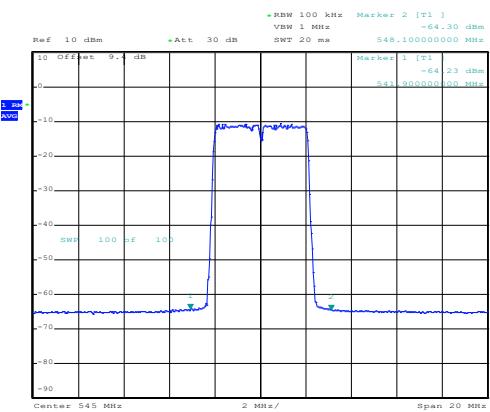
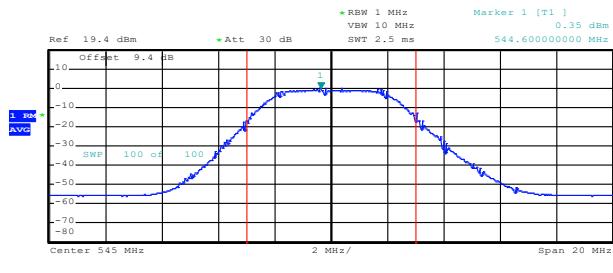


Figure 8.19-18: Tx power measurement at the EUT output on channel 26 at the location specified in scenario (g) for Canada border at location coordinates 48.98N, 111.0W.

Figure 8.19-19: Adjacent channel power measurement at the EUT output on channel 26 at the location specified in scenario (g) for Canada border at location coordinates 48.98N, 111.0W.

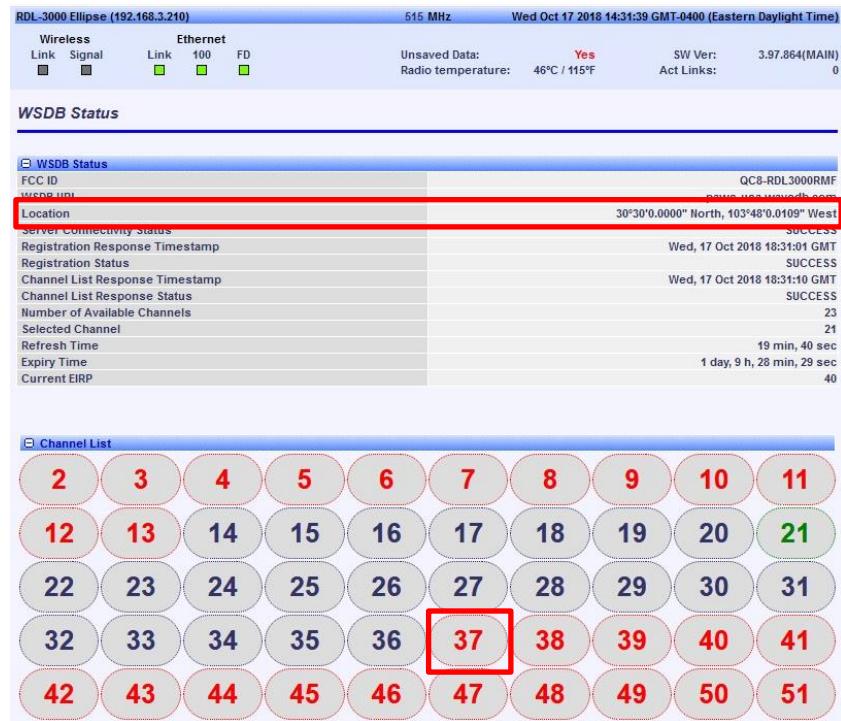


Figure 8.19-20: Received channel list for coordinates set in scenario (h). Radio astronomy services channel 37 at location coordinates 30.5N, 103.8W

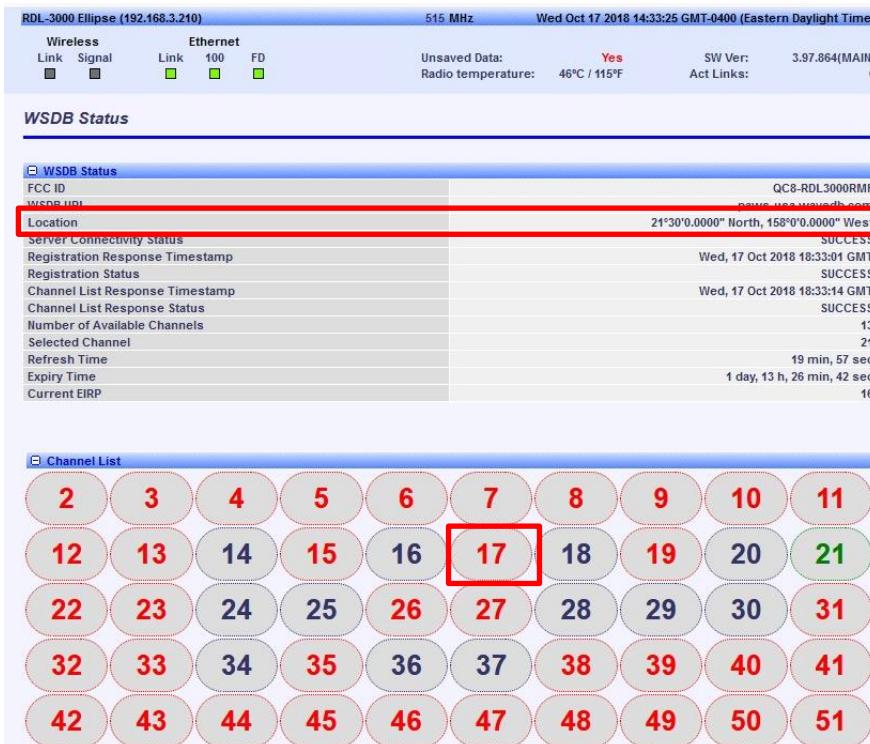


Figure 8.19-21: Received channel list for coordinates set in scenario (k). 488-494 MHz band in Hawaii channel 17 at location coordinates 21.5N, 158.0W

8.20 FCC 15.711(c)(2)(ii), (d)(3), 15.715(e) Fixed and Mode II Power level reduction

8.20.1 Definitions and limits

Using system management software, make a channel availability request to the database. Using the spectrum analyzer, confirm that the WSD operates at no more than the maximum power level indicated by the database and that the power level cannot be set to a higher level than indicated by the database at that specific location. If the device cannot reduce power, it must cease operation. Testing in accordance with KDB 416721 D01, III (2)(o).

8.20.2 Test summary

Test date October 17, 2018

8.20.3 Observations, settings and special notes

EUT was configured with proper registration information and the successful registration was verified. After receiving channel EIRP limit, EUT Tx power and Antenna gain were modified to exceed the limit. It was verified that the output power was automatically reduced to comply with EIRP restriction for the operation channel used.

8.20.4 Test data

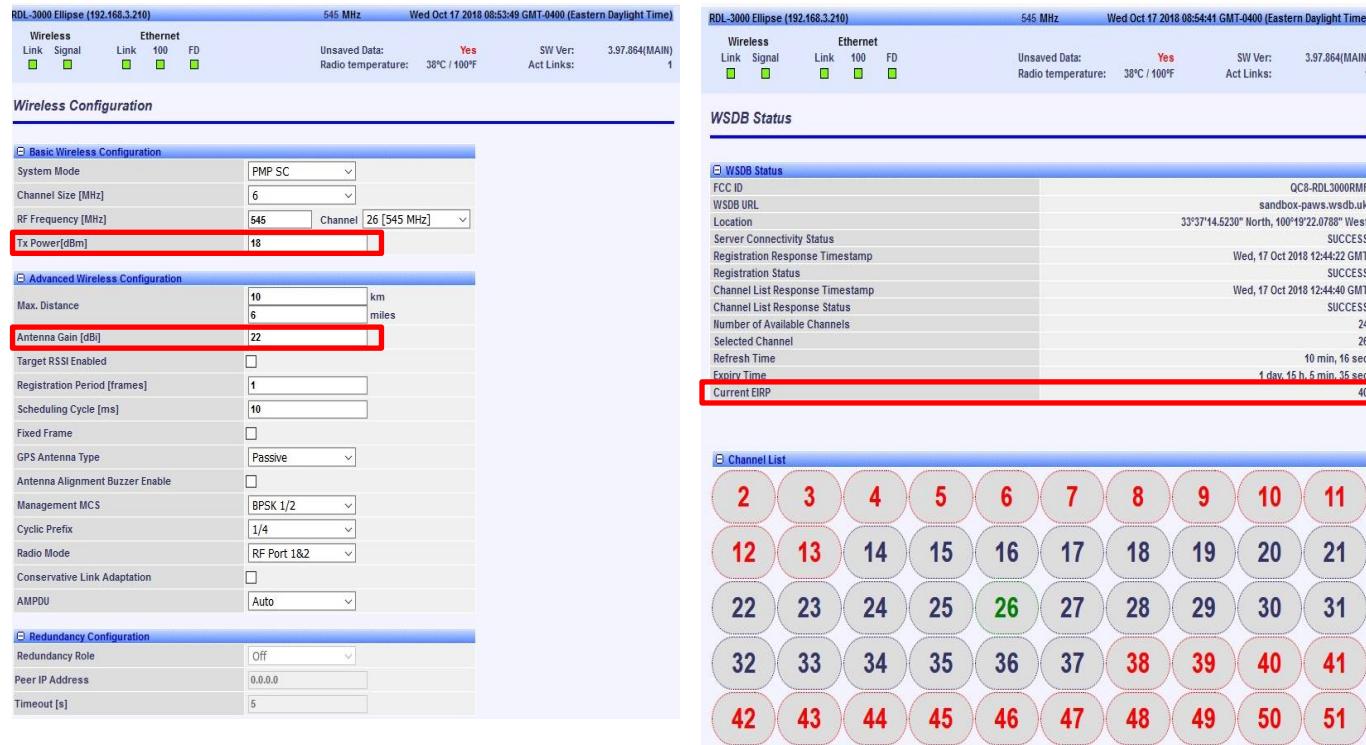
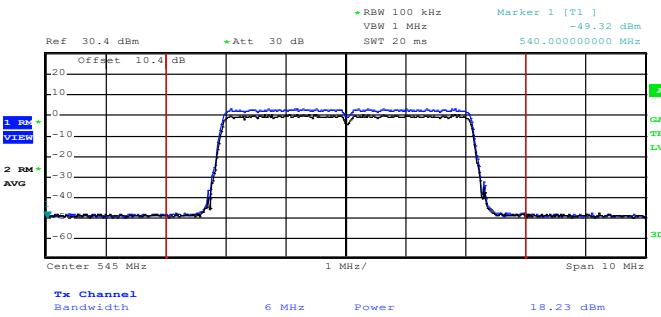


Figure 8.20-1: Tx power and Antenna gain settings to meet EIRP requirement of Base station device at the channel 26. EIRP limit received for this channel is 40 dBm.



Date: 17.OCT.2018 09:08:55

Figure 8.20-2: Output power of Base station device measurement on the channel 26 after registration and reception of 40 dBm EIRP limit. Output power = EIRP limit – Antenna gain = 40 dBm – 22 dBi= 18 dBm

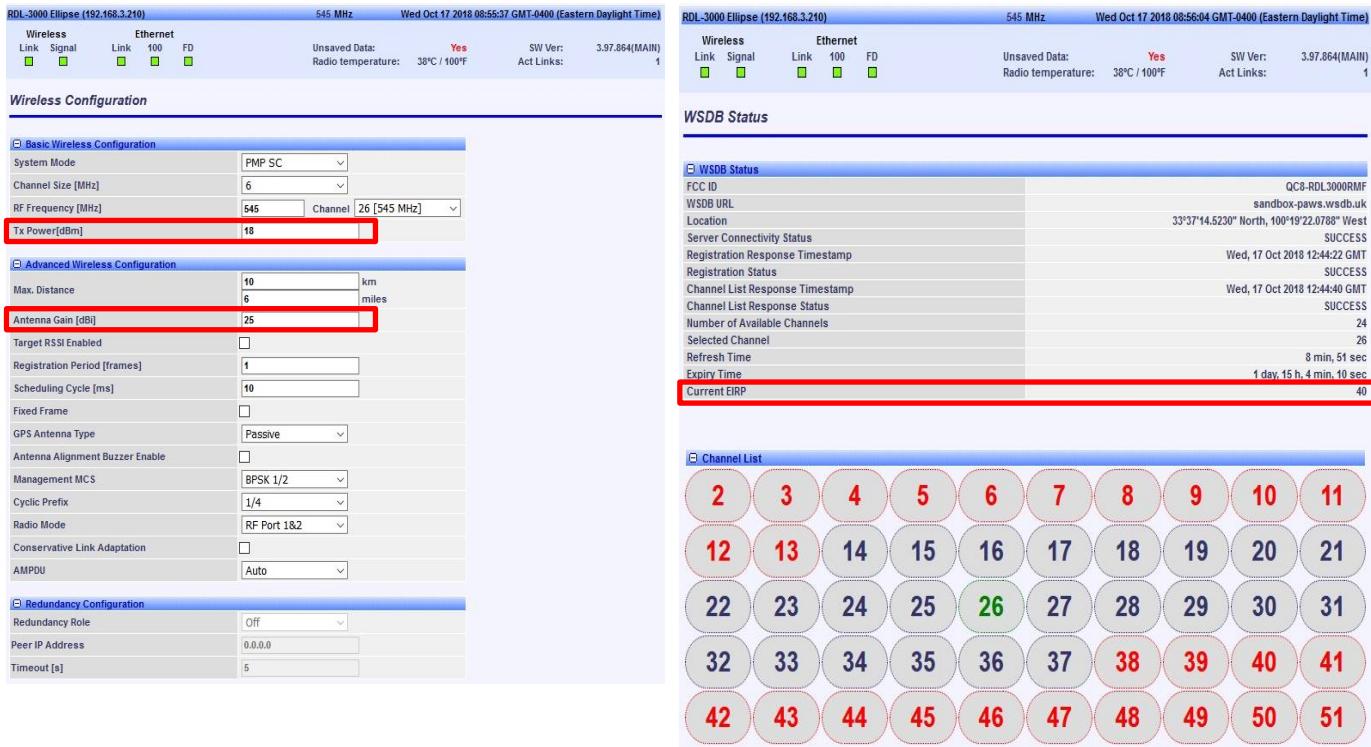
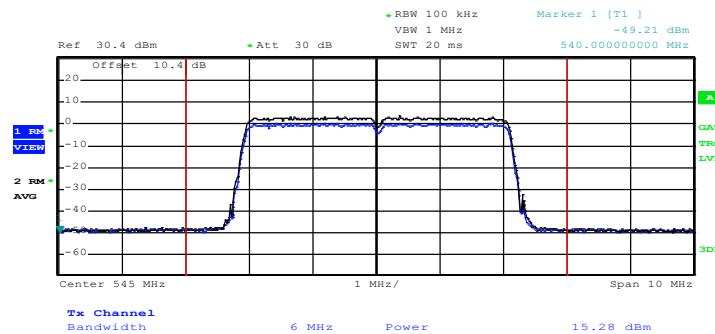


Figure 8.20-3: Tx power and Antenna gain settings to exceed EIRP requirement of Base station device at the channel 26. EIRP limit received for this channel is 40 dBm.



Date: 17.OCT.2018 09:10:33

Figure 8.20-4: Output power of Base station device measurement on the channel 26 after registration and reception of 40 dBm EIRP limit. Output power = EIRP limit – Antenna gain = 40 dBm – 25 dBi= 15 dBm, despite the setting of 18 dBm.

RDL-3000 Enterprise (192.168.3.253)

Wireless		Ethernet		
Link	Signal	Link	100	FD
■				

Unused Data: No
Radio temperature: 42°C / 108°F
SW Ver: 3.97.864(MAIN)
Act Links: 1

Wireless Configuration

Basic Wireless Configuration

System Mode	PMP SS
Channel Size [MHz]	6
Auto Frequency Scan	<input type="checkbox"/> Rescan
RF Frequency [MHz]	605
Tx Power[dBm]	18
STID	<input type="text"/>
STID Password	<input type="text"/>

Advanced Wireless Configuration

Antenna Gain [dBi]	20
Link Stickiness Time [Seconds]	0
Antenna Alignment Buzzer Enable	<input type="checkbox"/>
Cyclic Prefix	1/4
Radio Mode	RF Port 1&2
Conservative Link Adaptation	<input type="checkbox"/>

RDL-3000 Enterprise (192.168.3.253)

Wireless		Ethernet		
Link	Signal	Link	100	FD
■				

Unused Data: No
Radio temperature: 42°C / 108°F
SW Ver: 3.97.864(MAIN)
Act Links: 1

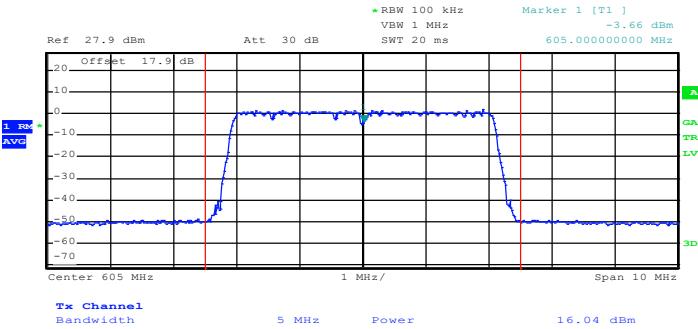
WSDB Status

WSDB Status

QC8-RDL3000RMF	
WSDB URL	sandbox-paws.wsdb.uk
Location	37°48'30.346S North, 100°20'55.1879W West
Server Connectivity Status	SUCCESS
Registration Response Timestamp	Wed, 17 Oct 2018 15:37:03 GMT
Registration Status	SUCCESS
Channel List Response Timestamp	Wed, 17 Oct 2018 15:57:24 GMT
Channel List Response Status	SUCCESS
Number of Available Channels	23
Selected Channel	36
Refresh Time	16 min, 49 sec
Expires Time	1 day, 11 h, 59 min, 24 sec
Current EIRP	36

Channel List

Figure 8.20-5: Tx power and Antenna gain settings to exceed EIRP requirement of Subscriber device at the channel 36. EIRP limit received for this channel is 36 dBm.



Date: 17.OCT.2018 12:16:33

Figure 8.20-6: Output power of Subscriber device measurement on the channel 36 after registration and reception of 36 dBm EIRP limit. Output power = EIRP limit – Antenna gain = 36 dBm – 20 dBi = 16 dBm, despite the setting of 18 dBm.

RDL-3000 Enterprise (192.168.3.253) 605 MHz Wed Oct 17 2018 11:57:14 GMT-0400 (Eastern Daylight Time)

Wireless	Ethernet		
Link	Signal	Link	100
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Unused Data: No SW Ver: 3.97.864(MAIN)
Radio temperature: 42°C / 108°F Act Links: 1

Wireless Configuration

Basic Wireless Configuration

System Mode	PMP SS		
Channel Size [MHz]	6		
Auto Frequency Scan	<input type="checkbox"/> <input type="button" value="Rescan"/>		
RF Frequency [MHz]	605	Channel	36 [605 MHz]
Tx Power[dBm]	18		
STID	<input type="text"/>		
STID Password	<input type="text"/>		

Advanced Wireless Configuration

Antenna Gain [dBi]	0
Link Stickiness Time [Seconds]	0
Antenna Alignment Buzzer Enable	<input type="checkbox"/>
Cyclic Prefix	1/4
Radio Mode	RF Port 1&2
Conservative Link Adaptation	<input type="checkbox"/>

RDL-3000 Enterprise (192.168.3.253) 605 MHz Wed Oct 17 2018 12:00:43 GMT-0400 (Eastern Daylight Time)

Wireless	Ethernet		
Link	Signal	Link	100
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Unused Data: No SW Ver: 3.97.864(MAIN)
Radio temperature: 42°C / 108°F Act Links: 1

WSDB Status

WSDB Status

FCC ID	QC8-RDL3000RMF
WSDB URL	sandbox-paws.wsdb.uk
Location	37°48'30.3469" North, 100°20'55.1879" West
Server Connectivity Status	SUCCESS
Registration Response Timestamp	Wed, 17 Oct 2018 16:37:03 GMT
Registration Status	SUCCESS
Channel List Response Timestamp	Wed, 17 Oct 2018 15:57:24 GMT
Channel List Response Status	SUCCESS
Number of Available Channels	23
Selected Channel	36
Refresh Time	16 min, 49 sec
Expiry Time	4 days, 11 h, 59 min, 24 sec
Current EIRP	36

Channel List

2	3	4	5	6	7	8	9	10	11
12	13	14	15	16	17	18	19	20	21
22	23	24	25	26	27	28	29	30	31
32	33	34	35	36	37	38	39	40	41
42	43	44	45	46	47	48	49	50	51

Figure 8.20-7: Tx power and Antenna gain settings to meet EIRP requirement of Subscriber device at the channel 36. EIRP limit received for this channel is 36 dBm.



Date: 17.OCT.2018 12:12:51

Figure 8.20-8: Output power of Subscriber device measurement on the channel 36 after registration and reception of 36 dBm EIRP limit. Output power = EIRP limit – Antenna gain = 36 dBm – 0 dB = 26 dBm, since the setting was 18 dBm, output power measured was 18 dBm.

8.21 FCC 15.711(j) Security

8.21.1 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 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).

8.21.2 Test summary

Test date	October 16, 2018
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8.21.3 Observations, settings and special notes

Please see the attached document: RDL-3000-RMH Secure Communications

Section 9. Block diagrams of test set-ups

9.1 Test setup diagram

