



Title: WinnForum Ts-0122 test details

Lab: DEKRA Testing and Certification, Inc.

Contact: Vinayak Thotton Veettill
vinayak.thotton@dekra.com,
+1 703 655 5450

Date: 2018-11-17

1. Introduction

Dekra Certification Inc has created this document to define the test cases executed as part of this certification process. The document details the test cases as defined in the test specification document Winn Forum TS-0122-V1.0.0.

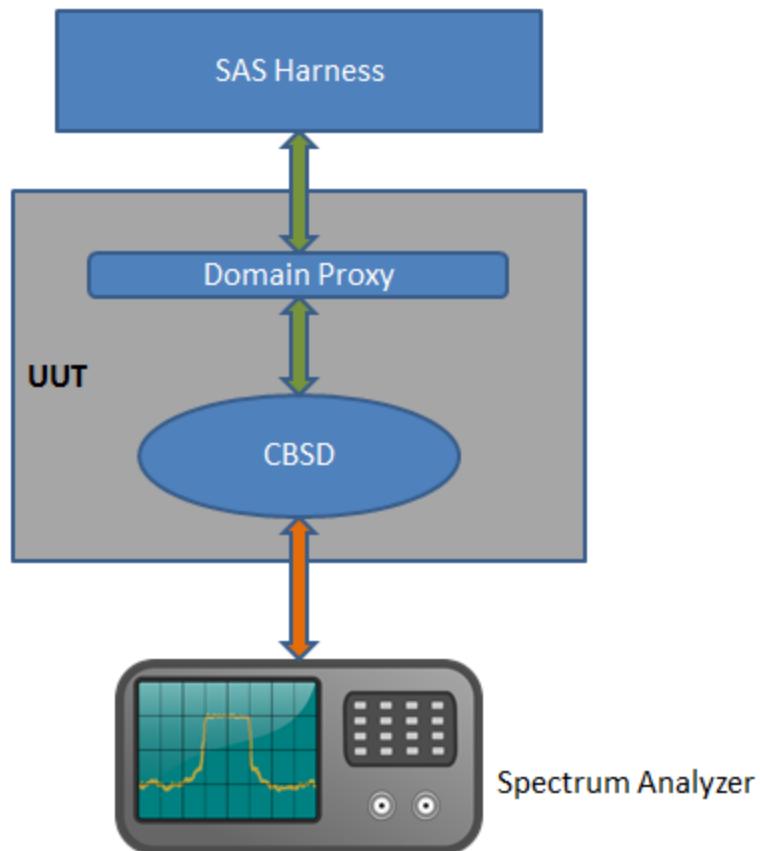
2. Device Details

Identification of item tested	Breeze Compact Base Station
Trademark.....:	
Model and /or type reference.....:	CMP.XT-BS-3.X
Other identification of the product	TBD
Final HW version	004-002-00
Final SW version	0700.07617
Features.....:	CBSD, Domain Proxy, LTE-TDD 48
Domain Proxy Identifier	BreezeVIEW
Domain Proxy Final SW Version	7.0.0.028
Manufacturer	Telrad Networks Ltd. 1 Bat Sheva Street, P.O.B. 6118, Lod 711600, Israel

3. Specification Reference

Test Specification: Winn Forum TS-0122-V1.0.0.

4. *Test Setup*



5. ***Test case descriptions, parameters and test steps***

5.1 ***WINNF.FT.D.REG.2***

This test is mandatory for the Domain proxy that is controlling CBSDs which support multi-step registration. This test validates that each of the required parameters appear within the registration request message. This test case applies to Domain Proxy supervising two CBSDs.

Test Steps:

#	Test Execution Steps	Results	
1	<p>Ensure the following conditions are met for test entry:</p> <ul style="list-style-type: none"> •UUT has successfully completed SAS Discovery and Authentication with SAS Test Harness •UUT is in the Unregistered state 	--	--
2	<p>DP with two CBSD sends correct Registration request information, as specified in [n.5], in the form of one 2-element Array or as individual messages to the SAS Test Harness:</p> <ul style="list-style-type: none"> •The required userId, fccId and cbsdSerialNumber registration parameters shall be sent for each CBSD and conform to proper format and acceptable ranges. •Any REG-conditional or optional registration parameters that may be included in the message shall be verified that they conform to proper format and are within acceptable ranges. Note: It is outside the scope of this document to test the Registration information that is supplied via another means. 	PASS	FAIL
3	<ul style="list-style-type: none"> •SAS Test Harness sends a CBSD Registration Response in the form of one 2-element Array or individual messages as follows: <ul style="list-style-type: none"> - cbsdId = Ci - measReportConfig shall not be included - responseCode = 0 for each CBSD 	--	--
4	After completion of step 3, SAS Test Harness will not provide any positive response (responseCode=0) to further request messages from the UUT.	--	--
5	<p>Monitor the RF output of each UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify:</p> <ul style="list-style-type: none"> •UUT shall not transmit RF 	PASS	FAIL

5.2 WINNF.FT.C.REG.7

The purpose of this test is to verify the CBSD sends notification to the SAS when an installation parameter has been changed.

This test is limited to CBSDs that support a registration parameter change/update to be made at the CBSD.

Further, this test only applies to CBSD devices that allow a registration parameter change to be made prior to sending a deregistration.

Test Steps:

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: •UUT has successfully completed SAS Discovery and Authentication with SAS Test Harness	--	--
2	UUT has successfully registered with SAS Test Harness	--	--
3	Change an installation parameters at the UUT (time T) Tester needs to record the current time at which the parameter change is executed.	--	--
4	Monitor the SAS-CBSD interface. UUT sends a deregistrationRequest to the SAS Test Harness The deregistration request shall be sent within (T + 60 seconds) from step 3.	PASS	FAIL

5.3 WINNF.FT.D.REG.9

This test case applies to Domain Proxy supervising two CBSDs. The following are the test execution steps where the Registration response contains *responseCode* (Ri) = 102 (Domain Proxy Missing Required parameters) for each CBSD

Test Steps:

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: •UUT has successfully completed SAS Discovery and Authentication with SAS Test Harness •UUT is in the Unregistered state	--	--
2	The DP with two CBSDs sends a Registration request in the form of one 2-element Array or as individual messages to SAS Test Harness.	--	--

3	SAS Test Harness sends a CBSD Registration Response in the form of one 2-element Array or as individual messages as follows: - SAS response does not include a <i>cbsdId</i> . - <i>responseCode</i> = Ri for CBSD1 and CBSD2	--	--
4	After completion of step 3, SAS Test Harness will not provide any positive response (<i>responseCode</i> =0) to further request messages from the UUT.	--	--
5	Monitor the RF output of each UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify: • UUT shall not transmit RF	PASS	FAIL

5.4 WINNF.FT.D.REG.11

This test case applies to Domain Proxy supervising two CBSDs. The following are the test execution steps where the Registration response contains *responseCode* (Ri) = 200 (Domain Proxy Pending registration) for each CBSD

Test Steps:

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: •UUT has successfully completed SAS Discovery and Authentication with SAS Test Harness •UUT is in the Unregistered state	--	--
2	The DP with two CBSDs sends a Registration request in the form of one 2-element Array or as individual messages to SAS Test Harness.	--	--
3	SAS Test Harness sends a CBSD Registration Response in the form of one 2-element Array or as individual messages as follows: - SAS response does not include a <i>cbsdId</i> . - <i>responseCode</i> = Ri for CBSD1 and CBSD2	--	--
4	After completion of step 3, SAS Test Harness will not provide any positive response (<i>responseCode</i> =0) to further request messages from the UUT.	--	--
5	Monitor the RF output of each UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify: • UUT shall not transmit RF	PASS	FAIL

5.5 WINNF.FT.D.REG.13

This test case applies to Domain Proxy supervising two CBSDs. The following are the test execution steps where the Registration response contains *responseCode* R1 = 0 for CBSD1 and R2 = 103 (Invalid parameter) for CBSD2

Test Steps:

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: •UUT has successfully completed SAS Discovery and Authentication with SAS Test Harness •UUT is in the Unregistered state	--	--
2	The DP with two CBSDs sends a Registration request in the form of one 2-element Array or as individual messages to SAS Test Harness.	--	--
3	SAS Test Harness sends a CBSD Registration Response in the form of one 2-element Array or as individual messages as follows: - SAS response does not include a <i>cbsdId</i> . - <i>responseCode</i> = Ri for CBSD1 and CBSD2	--	--
4	After completion of step 3, SAS Test Harness will not provide any positive response (<i>responseCode</i> =0) to further request messages from the UUT.	--	--
5	Monitor the RF output of each UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify: • UUT shall not transmit RF	PASS	FAIL

5.6 WINNF.FT.D.REG.15

This test case applies to Domain Proxy supervising two CBSDs. The following are the test execution steps where the Registration response contains *responseCode* R1 = 0 for CBSD1 and R2 = 101 (Domain Proxy Blacklisted CBSD) for CBSD2

Test Steps:

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: •UUT has successfully completed SAS Discovery and Authentication with SAS Test Harness •UUT is in the Unregistered state	--	--
2	The DP with two CBSDs sends a Registration request in the form of one 2-element Array or as individual messages to SAS Test Harness.	--	--

3	SAS Test Harness sends a CBSD Registration Response in the form of one 2-element Array or as individual messages as follows: - SAS response does not include a <i>cbsdId</i> . - <i>responseCode</i> = Ri for CBSD1 and CBSD2	--	--
4	After completion of step 3, SAS Test Harness will not provide any positive response (<i>responseCode</i> =0) to further request messages from the UUT.	--	--
5	Monitor the RF output of each UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify: • UUT shall not transmit RF	PASS	FAIL

5.7 WINNF.FT.D.REG.17

This test case applies to Domain Proxy supervising two CBSDs. The following are the test execution steps where the Registration response contains *responseCode* (Ri) = 100 (Domain Proxy Unsupported SAS protocol version) for each CBSD

Test Steps:

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: •UUT has successfully completed SAS Discovery and Authentication with SAS Test Harness •UUT is in the Unregistered state	--	--
2	The DP with two CBSDs sends a Registration request in the form of one 2-element Array or as individual messages to SAS Test Harness.	--	--
3	SAS Test Harness sends a CBSD Registration Response in the form of one 2-element Array or as individual messages as follows: - SAS response does not include a <i>cbsdId</i> . - <i>responseCode</i> = Ri for CBSD1 and CBSD2	--	--
4	After completion of step 3, SAS Test Harness will not provide any positive response (<i>responseCode</i> =0) to further request messages from the UUT.	--	--
5	Monitor the RF output of each UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify: • UUT shall not transmit RF	PASS	FAIL

5.8 WINNF.FT.D.REG.19

This test case applies to Domain Proxy supervising two CBSDs. The following are the test execution steps where the Registration response contains responseCode R1 = 0 for CBSD1 and R2 = 201 (Domain Proxy Group Error) for CBSD2

Test Steps:

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: •UUT has successfully completed SAS Discovery and Authentication with SAS Test Harness •UUT is in the Unregistered state	--	--
2	The DP with two CBSDs sends a Registration request in the form of one 2-element Array or as individual messages to SAS Test Harness.	--	--
3	SAS Test Harness sends a CBSD Registration Response in the form of one 2-element Array or as individual messages as follows: - SAS response does not include a <i>cbsdId</i> . - <i>responseCode</i> = Ri for CBSD1 and CBSD2	--	--
4	After completion of step 3, SAS Test Harness will not provide any positive response (<i>responseCode</i> =0) to further request messages from the UUT.	--	--
5	Monitor the RF output of each UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify: • UUT shall not transmit RF	PASS	FAIL

5.9 WINNF.FT.C.GRA.1

The following steps describe the test execution where the Grant response contains *responseCode* (R) = 400 (INTERFERENCE)

Test Steps:

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: •UUT has registered successfully with SAS Test Harness, with <i>cbsdId</i> = C	--	--
2	UUT sends valid Grant Request.	--	--
3	SAS Test Harness sends a Grant Response message, including • <i>cbsdId</i> =C • <i>responseCode</i> = R	--	--

4	After completion of step 3, SAS Test Harness will not provide any positive response (<i>responseCode</i> =0) to further request messages from the UUT.	--	--
5	Monitor the RF output of the UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify: •UUT shall not transmit RF	PASS	FAIL

5.10 WINNF.FT.C.GRA.2

The following steps describe the test execution where the Grant response contains responseCode (R) = 401 (GRANT CONFLICT)

Test Steps:

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: •UUT has registered successfully with SAS Test Harness, with <i>cbsdId</i> = C	--	--
2	UUT sends valid Grant Request.	--	--
3	SAS Test Harness sends a Grant Response message, including • <i>cbsdId</i> =C • <i>responseCode</i> = R	--	--
4	After completion of step 3, SAS Test Harness will not provide any positive response (<i>responseCode</i> =0) to further request messages from the UUT.	--	--
5	Monitor the RF output of the UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify: •UUT shall not transmit RF	PASS	FAIL

5.11 WINNF.FT.D.HBT.2

This test case incorporates validation of successful Spectrum Inquiry messaging (if present) and successful Grant messaging into the Heartbeat Success case.

This test case applies to Domain Proxy supervising two CBSDs.

Test Steps:

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: •DP has two CBSD registered successfully with SAS Test Harness, with <i>cbsdId</i> = Ci, i={1,2}	--	--

2	<p>DP sends a message:</p> <ul style="list-style-type: none"> •If message is a Spectrum Inquiry Request, go to step 3 •If message is a Grant Request, go to step 5 	--	--
3	<p>DP sends a Spectrum Inquiry Request message for each CBSD. This may occur in a separate message per CBSD, or together in a single message with array of 2.</p> <p>Verify Spectrum Inquiry Request message is formatted correctly for each CBSD, including for CBSD<i>i</i>, <i>i</i>={1,2}:</p> <ul style="list-style-type: none"> •<i>cbsdId</i> = Ci •List of frequencyRange objects sent by DP are within the CBRS frequency range 	PASS	FAIL
4	<p>If a separate Spectrum Inquiry Request message was sent for each CBSD, the SAS Test Harness shall respond to each Spectrum Inquiry Request message with a separate Spectrum Inquiry Response message.</p> <p>If a single Spectrum Inquiry Request message was sent containing a 2-object array (one per CBSD), the SAS Test Harness shall respond with a single Spectrum Inquiry Response message containing a 2-object array.</p> <p>Verify parameters for each CBSD within the Spectrum Inquiry Response message are as follows, for CBSD<i>i</i>, <i>i</i>={1,2}:</p> <ul style="list-style-type: none"> •<i>cbsdId</i> = Ci •availableChannel is an array of availableChannel objects •<i>responseCode</i> = 0 	--	--
5	<p>DP sends a Grant Request message for each CBSD. This may occur in a separate message per CBSD, or together in a single message with array of 2.</p> <p>Verify Grant Request message is formatted correctly for each CBSD, including for CBSD<i>i</i>, <i>i</i>={1,2}:</p> <ul style="list-style-type: none"> •<i>cbsdId</i> = C •maxEIRP is at or below the limit appropriate for CBSD category as defined by Part 96 •operationFrequencyRange, Fi, sent by UUT is a valid range within the CBRS band 	PASS	FAIL

6	<p>If a separate Grant Request message was sent for each CBSD, the SAS Test Harness shall respond to each Grant Request message with a separate Grant Response message.</p> <p>If a single Grant Request message was sent containing a 2-object array (one per CBSD), the SAS Test Harness shall respond with a single Grant Response message containing a 2-object array.</p> <p>Verify parameters for each CBSD within the Grant Response message are as follows, for CBSDi, $i=\{1,2\}$:</p> <ul style="list-style-type: none"> •cbsdId = C_i •grantId = G_i = a valid grant ID •grantExpireTime = UTC time greater than duration of the test •responseCode = 0 	--	--
7	<p>Ensure DP sends first Heartbeat Request message for each CBSD. This may occur in a separate message per CBSD, or together in a single message with array of 2.</p> <p>Verify Heartbeat Request message is formatted correctly for each CBSD, including, for CBSDi $i=\{1,2\}$:</p> <ul style="list-style-type: none"> •cbsdId = C_i, $i=\{1,2\}$ •grantId = G_i, $i=\{1,2\}$ •operationState = “GRANTED” 	PASS	FAIL
8	<p>If a separate Heartbeat Request message was sent for each CBSD by the DP, the SAS Test Harness shall respond to each Heartbeat Request message with a separate Heartbeat Response message.</p> <p>If a single Heartbeat Request message was sent by the DP containing a 2-object array (one per CBSD), the SAS Test Harness shall respond with a single Heartbeat Response message containing a 2-object array.</p>	--	--
8	<p>Verify parameters for each CBSD within the Heartbeat Response message are as follows, for CBSDi:</p> <ul style="list-style-type: none"> •cbsdId = C_i •grantId = G_i •transmitExpireTime = current UTC time + 200 seconds •responseCode = 0 	--	--
9	<p>For further Heartbeat Request messages sent from DP after completion of step 8, validate message is sent within latest specified heartbeatInterval for CBSDi:</p> <ul style="list-style-type: none"> •cbsdId = C_i •grantId = G_i •operationState = “AUTHORIZED” 	PASS	FAIL

	<p>and SAS Test Harness responds with a Heartbeat Response message including the following parameters, for CBSDi</p> <ul style="list-style-type: none"> •<i>cbsdId</i> = Ci •<i>grantId</i> = Gi •<i>transmitExpireTime</i> = current UTC time + 200 seconds •<i>responseCode</i> = 0 		
10	<p>Monitor the RF output of the UUT from start of test until UUT transmission commences. Monitor the RF output of the UUT from start of test until RF transmission commences. Verify:</p> <ul style="list-style-type: none"> •UUT does not transmit at any time prior to completion of the first heartbeat response •UUT transmits after step 8 is complete, and its transmission is limited to within the bandwidth range Fi. 	PASS	FAIL

5.12 WINNF.FT.C.HBT.3

Heartbeat responseCode=105 (DREGISTER)

Test Steps:

#	Test Execution Steps	Results	
1	<p>Ensure the following conditions are met for test entry:</p> <ul style="list-style-type: none"> •UUT has registered successfully with SAS Test Harness •UUT has a valid single grant as follows: <ul style="list-style-type: none"> ovalid <i>cbsdId</i> = C ovalid <i>grantId</i> = G <i>ogrant</i> is for frequency range F, power P <i>ograntExpireTime</i> = UTC time greater than duration of the test •UUT is in AUTHORIZED state and is transmitting within the grant bandwidth F on RF interface 	--	--
2	<p>UUT sends a Heartbeat Request message.</p> <p>Ensure Heartbeat Request message is sent within Heartbeat Interval specified in the latest Heartbeat Response, and formatted correctly, including:</p> <ul style="list-style-type: none"> •<i>cbsdId</i> = C •<i>grantId</i> = G •<i>operationState</i> = “AUTHORIZED” 	PASS	FAIL

3	SAS Test Harness sends a Heartbeat Response message, including the following parameters: • <i>cbsdId</i> = C • <i>grantId</i> = G • <i>transmitExpireTime</i> = T = Current UTC time • <i>responseCode</i> = 105 (DEREGISTER)	--	--
4	After completion of step 3, SAS Test Harness shall not allow any further grants to the UUT.	--	--
5	Monitor the RF output of the UUT. Verify: •UUT shall stop transmission within (T + 60 seconds) of completion of step 3	PASS	FAIL

5.13 WINNF.FT.C.HBT.4

Heartbeat responseCode=500 (TERMINATED_GRANT)

Test Steps:

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: •UUT has registered successfully with SAS Test Harness •UUT has a valid single grant as follows: ovalid <i>cbsdId</i> = C ovalid <i>grantId</i> = G ogrant is for frequency range F, power P $ograntExpireTime$ = UTC time greater than duration of the test •UUT is in AUTHORIZED state and is transmitting within the grant bandwidth F on RF interface	--	--
2	UUT sends a Heartbeat Request message. Ensure Heartbeat Request message is sent within latest specified heartbeatInterval, and is formatted correctly, including: • <i>cbsdId</i> = C • <i>grantId</i> = G • <i>operationState</i> = "AUTHORIZED"	PASS	FAIL

	SAS Test Harness sends a Heartbeat Response message, including the following parameters: <ul style="list-style-type: none"> •<i>cbsdId</i> = C •<i>grantId</i> = G •<i>transmitExpireTime</i> = T = current UTC time •<i>responseCode</i> = 500 (TERMINATED_GRANT) 	--	--
4	After completion of step 3, SAS Test Harness shall not allow any further grants to the UUT.	--	--
5	Monitor the RF output of the UUT. Verify: <ul style="list-style-type: none"> •UUT shall stop transmission within (T + 60 seconds) of completion of step 3 	PASS	FAIL

5.14 WINNF.FT.C.HBT.5

Heartbeat responseCode=501 (SUSPENDED_GRANT) in First Heartbeat Response

Test Steps:

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: <ul style="list-style-type: none"> •UUT has registered successfully with SAS Test Harness •UUT has a valid single grant as follows: $isValid$ <i>cbsdId</i> = C $isValid$ <i>grantId</i> = G $oGrant$ is for frequency range F, power P $oGrantExpireTime$ = UTC time greater than duration of the test •UUT is in GRANTED, but not AUTHORIZED state (i.e. has not performed its first Heartbeat Request) 	--	--
2	UUT sends a Heartbeat Request message. Verify Heartbeat Request message is formatted correctly, including: <ul style="list-style-type: none"> •<i>cbsdId</i> = C •<i>grantId</i> = G •<i>operationState</i> = "GRANTED" 	PASS	FAIL

	SAS Test Harness sends a Heartbeat Response message, including the following parameters: • <i>cbsdId</i> = C • <i>grantId</i> = G • <i>transmitExpireTime</i> = T = current UTC time • <i>responseCode</i> = 501 (SUSPENDED_GRANT)	--	--
4	After completion of step 3, SAS Test Harness shall not allow any further grants to the UUT.	--	--
5	Monitor the SAS-CBSD interface. Verify either A OR B occurs: A. UUT sends a Heartbeat Request message. Ensure message is sent within latest specified heartbeatInterval, and is correctly formatted with parameters: • <i>cbsdId</i> = C • <i>grantId</i> = G • <i>operationState</i> = "GRANTED" B. UUT sends a Relinquishment request message. Ensure message is correctly formatted with parameters: • <i>cbsdId</i> = C • <i>grantId</i> = G Monitor the RF output of the UUT. Verify: •UUT does not transmit at any time	PASS	FAIL

5.15 WINNF.FT.C.HBT.6

Heartbeat responseCode=501 (SUSPENDED_GRANT) in Subsequent Heartbeat Response

Test Steps:

#	Test Execution Steps	Results

1	<p>Ensure the following conditions are met for test entry:</p> <ul style="list-style-type: none"> •UUT has registered successfully with SAS Test Harness •UUT has a valid single grant as follows: <p>ovalid <i>cbsdId</i> = C ovalid <i>grantId</i> = G ogrant is for frequency range F, power P <i>ograntExpireTime</i> = UTC time greater than duration of the test •UUT is in AUTHORIZED state and is transmitting within the grant bandwidth F on RF interface</p>	--	--	
2	<p>UUT sends a Heartbeat Request message.</p> <p>Verify Heartbeat Request message is sent within latest specified heartbeatInterval, and is formatted correctly, including:</p> <ul style="list-style-type: none"> •<i>cbsdId</i> = C •<i>grantId</i> = G •<i>operationState</i> = “AUTHORIZED” 	PASS	FAIL	
3	<p>SAS Test Harness sends a Heartbeat Response message, including the following parameters:</p> <ul style="list-style-type: none"> •<i>cbsdId</i> = C •<i>grantId</i> = G •<i>transmitExpireTime</i> = T = current UTC time •<i>responseCode</i> = 501 (SUSPENDED_GRANT) 	--	--	
4	<p>After completion of step 3, SAS Test Harness shall not allow any further grants to the UUT.</p>	--	--	
5	<p>Monitor the SAS-CBSD interface. Verify either A OR B occurs:</p> <p>A. UUT sends a Heartbeat Request message. Ensure message is sent within latest specified heartbeatInterval, and is correctly formatted with parameters:</p> <ul style="list-style-type: none"> •<i>cbsdId</i> = C •<i>grantId</i> = G •<i>operationState</i> = “GRANTED” <p>B. UUT sends a Relinquishment Request message. Ensure message is correctly formatted with parameters:</p> <ul style="list-style-type: none"> •<i>cbsdId</i> = C •<i>grantId</i> = G <p>Monitor the RF output of the UUT. Verify:</p> <ul style="list-style-type: none"> • UUT shall stop transmission within (T + 60 seconds) of completion of step 3 	PASS	FAIL	

5.16 WINNF.FT.C.HBT.7

Heartbeat responseCode=502 (UNSYNC_OP_PARAM)

Test Steps:

#	Test Execution Steps	Results	
1	<p>Ensure the following conditions are met for test entry:</p> <ul style="list-style-type: none"> •UUT has registered successfully with SAS Test Harness •UUT has a valid single grant as follows: <p>ovalid <i>cbsdId</i> = C ovalid <i>grantId</i> = G <i>ogrant</i> is for frequency range F, power P <i>ograntExpireTime</i> = UTC time greater than duration of the test •UUT is in AUTHORIZED state and is transmitting within the grant bandwidth F on RF interface</p>	--	--
2	<p>UUT sends a Heartbeat Request message.</p> <p>Verify Heartbeat Request message is sent within latest specified <i>heartbeatInterval</i>, and is formatted correctly, including:</p> <ul style="list-style-type: none"> •<i>cbsdId</i> = C •<i>grantId</i> = G •<i>operationState</i> = “AUTHORIZED” 	PASS	FAIL
3	<p>SAS Test Harness sends a Heartbeat Response message, including the following parameters:</p> <ul style="list-style-type: none"> •<i>cbsdId</i> = C •<i>grantId</i> = G •<i>transmitExpireTime</i> = T = Current UTC Time •<i>responseCode</i> = 502 (UNSYNC_OP_PARAM) 	--	--
4	After completion of step 3, SAS Test Harness shall not allow any further grants to the UUT.	--	--
5	<p>Monitor the SAS-CBSD interface. Verify:</p> <ul style="list-style-type: none"> •UUT sends a Grant Relinquishment Request message. Verify message is correctly formatted with parameters: <p><i>ocbdsId</i> = C <i>ograntId</i> = G</p> <p>Monitor the RF output of the UUT. Verify:</p> <ul style="list-style-type: none"> •UUT shall stop transmission within (T+60) seconds of completion of step 3. 	PASS	FAIL

5.17 WINNF.FT.D.HBT.8

Domain Proxy Heartbeat responseCode=500 (TERMINATED_GRANT)

Test Steps:

#	Test Execution Steps	Results	
1	<p>Ensure the following conditions are met for test entry:</p> <ul style="list-style-type: none"> •DP has two CBSD registered successfully with SAS Test Harness •Each CBSD {1,2} has a valid single grant as follows: $isValid\ cbsdId = Ci, i=\{1,2\}$ $isValid\ grantId = Gi, i=\{1,2\}$ $ogrant$ is for frequency range Fi, power Pi $ograntExpireTime$ = UTC time greater than duration of the test •Both CBSD are in AUTHORIZED state and transmitting within their granted bandwidth on RF interface 	--	--
2	<p>DP sends a Heartbeat Request message for each CBSD. This may occur in a separate message per CBSD, or together in a single message with array of size 2.</p> <p>Verify Heartbeat Request message is sent within latest specified $heartbeatInterval$, and is formatted correctly for each CBSD, including, for CBSDi $i=\{1,2\}$:</p> <ul style="list-style-type: none"> •$cbsdId = Ci, i = \{1,2\}$ •$grantId = Gi, i = \{1,2\}$ •$operationState = "AUTHORIZED"$ 	PASS	FAIL

	<p>If separate Heartbeat Request message was sent for each CBSD by the DP, the SAS Test Harness shall respond to each Heartbeat Request message with a separate Heartbeat Response message.</p> <p>If a single Heartbeat Request message was sent by the DP containing a 2-object array (one per CBSD), the SAS Test Harness shall respond with a single Heartbeat Response message containing a 2-object array.</p>		
3	<p>Parameters for each CBSD within the Heartbeat Response message should be as follows, for CBSDi:</p> <ul style="list-style-type: none"> • <i>cbsdId</i> = Ci • <i>grantId</i> = Gi • For CBSD1: $transmitExpireTime$ = current UTC time + 200 seconds $responseCode$ = 0 • For CBSD2: $transmitExpireTime$ = T = current UTC time $responseCode$ = 500 (TERMINATED_GRANT) 	--	--
4	<p>After completion of step 3, SAS Test Harness shall not allow any further grants to the UUT.</p> <p>If CBSD sends further Heartbeat Request messages for CBSD1, SAS Test Harness shall respond with a Heartbeat Response message with parameters:</p> <ul style="list-style-type: none"> • <i>cbsdId</i> = C1 • <i>grantId</i> = G1 • $transmitExpireTime$ = current UTC time + 200 seconds • $responseCode$ = 0 • Heartbeat Request message is within <i>heartbeatInterval</i> of previous Heartbeat Request message 	--	--

	Monitor the RF output of CBSD2. Verify: •CBSD2 shall stop transmission within bandwidth F2 within (T + 60 seconds) of completion of step 3		
5		PASS	FAIL

5.18 WINNF.FT.C.HBT.9

Heartbeat Response Absent (First Heartbeat)

Test Steps:

#	Test Execution Steps	Results	
1	<p>Ensure the following conditions are met for test entry:</p> <ul style="list-style-type: none"> •UUT has registered successfully with SAS Test Harness •UUT has a valid single grant as follows: <p>ovalid <i>cbsdId</i> = C ovalid <i>grantId</i> = G <i>ogrant</i> is for frequency range F, power P <i>ograntExpireTime</i> = UTC time greater than duration of the test •UUT is in GRANTED, but not AUTHORIZED state (i.e. has not performed its first Heartbeat Request)</p>	--	--

2	<p>UUT sends a Heartbeat Request message. Ensure Heartbeat Request message is sent within latest specified <i>heartbeatInterval</i>, and is formatted correctly, including:</p> <ul style="list-style-type: none"> •<i>cbsdId</i> = C •<i>grantId</i> = G •<i>operationState</i> = “GRANTED” 	PASS	FAIL
3	After completion of Step 2, SAS Test Harness does not respond to any further messages from UUT to simulate loss of network connection	--	--
4	<p>Monitor the RF output of the UUT from start of test to 60 seconds after step 3. Verify:</p> <ul style="list-style-type: none"> •At any time during the test, UUT shall not transmit on RF interface 	PASS	FAIL

5.19 WINNF.FT.C.HBT.10

Heartbeat Response Absent (Subsequent Heartbeat)

Test Steps:

#	Test Execution Steps	Results	
1	<p>Ensure the following conditions are met for test entry:</p> <ul style="list-style-type: none"> •UUT has registered successfully with SAS Test Harness •UUT has a valid single grant as follows: <p>ovalid <i>cbsdId</i> = C ovalid <i>grantId</i> = G</p> <p>ogrant is for frequency range F, power P <i>ograntExpireTime</i> = UTC time greater than duration of the test</p> <ul style="list-style-type: none"> •UUT is in AUTHORIZED state and is transmitting within the grant bandwidth F on RF interface 	--	--
2	<p>UUT sends a Heartbeat Request message. Verify Heartbeat Request message is sent within the latest specified <i>heartbeatInterval</i>, and is formatted correctly, including:</p> <ul style="list-style-type: none"> •<i>cbsdId</i> = C •<i>grantId</i> = G •<i>operationState</i> = “AUTHORIZED” 	PASS	FAIL

3	SAS Test Harness sends a Heartbeat Response message, with the following parameters: • <i>cbsdId</i> = C • <i>grantId</i> = G • <i>transmitExpireTime</i> = current UTC time + 200 seconds • <i>responseCode</i> = 0	--	--
4	After completion of Step 3, SAS Test Harness does not respond to any further messages from UUT	--	--
5	Monitor the RF output of the UUT. Verify: •UUT shall stop all transmission on RF interface within (<i>transmitExpireTime</i> + 60 seconds), using the <i>transmitExpireTime</i> sent in Step 3.	PASS	FAIL

5.20 WINNF.FT.C.HBT.11

Successful Grant Renewal in Heartbeat Test Case

Test Steps:

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: •UUT has registered successfully with SAS Test Harness •UUT has a valid single grant as follows: ovalid <i>cbsdId</i> = C ovalid <i>grantId</i> = G ogrant is for frequency range F, power P •UUT is in AUTHORIZED state and is transmitting within the grant bandwidth F on RF interface. •Grant has the following parameters at the start of the test: <i>ograntExpireTime</i> = UTC time equal to time at start of test + 300 seconds = <i>Tgrant_expire</i> <i>otransmitExpireTime</i> = UTC time equal to time at start of test + 200 seconds <i>oheartbeatInterval</i> = 60 seconds	--	--
2	UUT sends a Heartbeat Request message. If Heartbeat Request message contains <i>grantRenew</i> = TRUE, go to Step 6, else go to Step 3.	--	--

3	Verify Heartbeat Request message is sent within the latest specified <i>heartbeatInterval</i> , and is formatted correctly, including: <ul style="list-style-type: none"> •<i>cbsdId</i> = C •<i>grantId</i> = G •<i>operationState</i> = "AUTHORIZED" 	PASS	FAIL
4	SAS Test Harness sends a Heartbeat Response message, with the following parameters: <ul style="list-style-type: none"> •<i>cbsdId</i> = C •<i>grantId</i> = G •<i>transmitExpireTime</i> = current UTC + 200 seconds •<i>grantExpireTime</i> = same as Step 1 •<i>responseCode</i> = 0 	--	--
5	Go to Step 2	--	--
6	Verify Heartbeat Request message is sent within the latest specified <i>heartbeatInterval</i> , and is formatted correctly, including: <ul style="list-style-type: none"> •<i>cbsdId</i> = C •<i>grantId</i> = G •<i>operationState</i> = "AUTHORIZED" •<i>grantRenew</i> = TRUE 	PASS	FAIL
7	SAS Test Harness sends a Heartbeat Response message, with the following parameters: <ul style="list-style-type: none"> •<i>cbsdId</i> = C •<i>grantId</i> = G •<i>grantExpireTime</i> = UTC time set far in the future •<i>transmitExpireTime</i> = current UTC time + 200 seconds •<i>responseCode</i> = 0 	--	--
8	Continue to respond to any subsequentHeartbeat Request from CBSD with Heartbeat Response with the following parameters: <ul style="list-style-type: none"> •<i>cbsdId</i> = C •<i>grantId</i> = G •<i>transmitExpireTime</i> = same as Step 7 •<i>responseCode</i> = 0 	--	--
9	Monitor RF transmission of UUT from start of test until <i>Tgrant_expire</i> + 60 seconds and ensure UUT continues to transmit throughout the time period.	PASS	FAIL

5.21 WINNF.FT.C.MES.3

Grant Response contains measReportConfig

This test case is mandatory for UUT supporting RECEIVED_POWER_WITH_GRANT measurement reports.

Test Steps:

#	Test Execution Steps	Results	
1	<p>Ensure the following conditions are met for test entry:</p> <ul style="list-style-type: none"> •UUT has successfully completed SAS Discovery and Authentication with SAS Test Harness •UUT has successfully registered with SAS Test Harness, with <i>cbsdId</i>=C and <i>measCapability</i> = “RECEIVED_POWER_WITH_GRANT” 	--	--
2	<p>UUT sends a Grant Request message.</p> <p>Verify Grant Request message contains all required parameters properly formatted, and specifically:</p> <ul style="list-style-type: none"> •<i>cbsdId</i> = C •<i>operationParam</i> is present and format is valid 	PASS	FAIL
3	<p>SAS Test Harness sends a Grant Response message, with the following parameters:</p> <ul style="list-style-type: none"> •<i>cbsdId</i> = C •<i>grantId</i> = G = valid grant ID •<i>grantExpireTime</i> = UTC time in the future •<i>heartbeatInterval</i> = 60 seconds •<i>measReportConfig</i>= “RECEIVED_POWER_WITH_GRANT” •<i>operationParam</i> is set to valid operating parameters •<i>channelType</i> = “GAA” •<i>responseCode</i> = 0 	--	--
4	<p>UUT sends a Heartbeat Request message. Verify message contains all required parameters properly formatted, and specifically:</p> <ul style="list-style-type: none"> •<i>cbsdId</i> = C •<i>grantId</i> = G •<i>operationState</i> = “GRANTED” 	PASS	FAIL

	If Heartbeat Request message (step 4) contains measReport object, then: •verify measReport is properly formatted as object rcvdPowerMeasReport •end test, with PASS result else, if Heartbeat Request message (step 4) does not contain measReport object, then: If number of Heartbeat Requests sent by UUT after Step 3 is = 5, then stop test with result of FAIL	PASS	FAIL
6	SAS Test Harness sends a Heartbeat Response message, containing all required parameters properly formatted, and specifically: •cbsdId = C •grantId = G •transmitExpireTime = current UTC time + 200 seconds •responseCode = 0 Go to Step 4, above	--	--

5.22 WINNF.FT.D.MES.5

Domain Proxy Heartbeat Response contains *measReportConfig*

This test case is mandatory for Domain Proxy supervising CBSD which support RECEIVED_POWER_WITH_GRANT measurement reports.

Test Steps:

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: •DP has successfully completed SAS Discovery and Authentication with SAS Test Harness •DP has successfully registered 2 CBSD with SAS Test Harness, each with <i>cbsdId</i> =Ci, i={1,2} and <i>measCapability</i> = “RECEIVED_POWER_WITH_GRANT” •DP has received a valid grant with <i>grantId</i> = Gi, i={1,2} for each CBSD •Both CBSD are in Grant State AUTHORIZED and actively transmitting within the bounds of their grants. •Grants have <i>heartbeatInterval</i> =60 seconds	--	--

	Verify DP sends a Heartbeat Request message for each CBSD. This may occur in a separate message per CBSD, or together in a single message with array of 2. Verify Heartbeat Request message contains all required parameters properly formatted for each CBSD, specifically, for CBSD <i>i</i> : <ul style="list-style-type: none"> •<i>cbsdId</i> = Ci •<i>grantId</i> = Gi •<i>operationState</i> = “AUTHORIZED” 	PASS	FAIL
2	If a separate Heartbeat Request message was sent for each CBSD by the DP, the SAS Test Harness shall respond to each Heartbeat Request message with a separate Heartbeat Response message. If a single Heartbeat Request message was sent by the DP containing a 2-object array (one per CBSD), the SAS Test Harness shall respond with a single Heartbeat Response message containing a 2-object array. Parameters for each CBSD within the Heartbeat Response message containing all required parameters properly formatted, and specifically: <ul style="list-style-type: none"> •<i>cbsdId</i> = Ci •<i>grantId</i> = Gi •<i>measReportConfig</i> = “RECEIVED_POWER_WITH_GRANT” •<i>responseCode</i> = 0 	--	--
3	Verify DP sends a Heartbeat Request message for each CBSD. This may occur in a separate message per CBSD, or together in a single message with array of 2. Verify Heartbeat Request message contains all required parameters properly formatted for each CBSD, and specifically, for CBSD <i>i</i> , <i>i</i> = {1,2}: <ul style="list-style-type: none"> •<i>cbsdId</i> = Ci •<i>grantId</i> = Gi •<i>operationState</i> = “AUTHORIZED” •Check whether <i>measReport</i> is present, and if present, ensure it is a properly formatted <i>rcvdPowerMeasReport</i> object, and record its reception for each CBSD<i>i</i>, <i>i</i> = {1,2}. 	PASS	FAIL
4	If Heartbeat Request message (step 4) contains <i>measReport</i> object, then: <ul style="list-style-type: none"> •Verify <i>measReport</i> is properly formatted as object <i>rcvdPowerMeasReport</i> •record which CBSD have successfully sent a <i>measReport</i> object 	PASS	FAIL
5			

	<p>If all CBSD_i, $i = \{1,2\}$ have successfully sent a measReport object, then</p> <ul style="list-style-type: none"> •end test, with PASS result <p>else, if the number of Heartbeat Requests sent per CBSD is 5 or more, then stop test with result of FAIL</p>		
6	<p>If a separate Heartbeat Request message was sent for each CBSD by the DP, the SAS Test Harness shall respond to each Heartbeat Request message with a separate Heartbeat Response message.</p> <p>If a single Heartbeat Request message was sent by the DP containing a 2-object array (one per CBSD), the SAS Test Harness shall respond with a single Heartbeat Response message containing a 2-object array.</p> <p>Parameters for each CBSD within the Heartbeat Response message containing all required parameters properly formatted, and specifically:</p> <ul style="list-style-type: none"> •cbsdId = Ci •grantId = Gi •responseCode = 0 <p>Go to Step 4, above.</p>	--	--

5.23 **WINNF.FT.D.RLQ.2**

Domain Proxy Successful Relinquishment

Test Steps:

#	Test Execution Steps	Results	
1	<p>Ensure the following conditions are met for test entry:</p> <ul style="list-style-type: none"> •DP has successfully completed SAS Discovery and Authentication with SAS Test Harness •DP has successfully registered 2 CBSD with SAS Test Harness, each with $cbsdId=Gi$, $i=\{1,2\}$ •DP has received a valid grant with $grantId = Gi$, $i=\{1,2\}$ for each CBSD •Both CBSD are in Grant State AUTHORIZED and actively transmitting within the bounds of their grants. <p>Invoke trigger to relinquish each UUT Grant from the SAS Test Harness</p>	--	--

	Verify DP sends a Relinquishment Request message for each CBSD. This may occur in a separate message per CBSD, or together in a single message with array of 2.		
2	Verify Relinquishment Request message contains all required parameters properly formatted for each CBSD, specifically, for CBSDi: • <i>cbsdId</i> = Ci • <i>grantId</i> = Gi	PASS	FAIL
3	If a separate Relinquishment Request message was sent for each CBSD by the DP, the SAS Test Harness shall respond to each request message with a separate response message. If a single Relinquishment Request message was sent by the DP containing a 2-object array (one per CBSD), the SAS Test Harness shall respond with a single Response message containing a 2-object array. Parameters for each CBSD within the Relinquishment Response shall be as follows: • <i>cbsdId</i> = Ci • <i>grantId</i> = Gi • <i>responseCode</i> = 0	--	--
4	After completion of step 3, SAS Test Harness will not provide any additional positive response (<i>responseCode</i> =0) to further request messages from the UUT.	--	--
5	Monitor the RF output of each UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify: •UUT shall stop RF transmission at any time between triggering the relinquishments and UUT sending the relinquishment requests for each CBSD.	PASS	FAIL

5.24 WINNF.FT.D.RLQ.4

Domain Proxy Unsuccessful Relinquishment, *responseCode*=102

This test case applies to Domain Proxy supervising two CBSDs. The following are the test execution steps where the Relinquishment response contains *responseCode* (R_i) = 102 for each CBSD.

Test Steps:

#	Test Execution Steps	Results	
1	<p>Ensure the following conditions are met for test entry:</p> <ul style="list-style-type: none"> •DP has successfully completed SAS Discovery and Authentication with SAS Test Harness •DP has successfully registered 2 CBSD with SAS Test Harness, each with $cbsdId= Ci, i=\{1,2\}$ •DP has received a valid grant with $grantId = Gi, i=\{1,2\}$ for each CBSD •Both CBSD are in Grant State AUTHORIZED and actively transmitting within the bounds of their grants. <p>Invoke trigger on UUT to Relinquish Grant from the SAS Test Harness</p>	--	--
2	<p>DP with two CBSDs sends Relinquishment Request with two objects to the SAS Test Harness.</p> <p>This may occur in a separate message per CBSD, or together in a single message with array of 2.</p> <p>Verify DP sends a Relinquishment Request message for each CBSD.</p> <p>This may occur in a separate message per CBSD, or together in a single message with array of 2.</p> <p>Verify Relinquishment Request message contains all required parameters properly formatted for each CBSD, specifically, for CBSD<i>i</i>:</p> <ul style="list-style-type: none"> •$cbsdId = Ci$ •$grantId = Gi$ 	--	--
3	<p>If a separate Relinquishment Request message was sent for each CBSD by the DP, the SAS Test Harness shall respond to each request message with a separate response message.</p> <p>If a single Relinquishment Request message was sent by the DP containing a 2-object array (one per CBSD), the SAS Test Harness shall respond with a single Response message containing a 2-object array.</p> <p>Parameters for each CBSD within the Relinquishment Response Message shall be as follows:</p> <ul style="list-style-type: none"> •$cbsdId = Ci$ •No $grantId$ •$responseCode = Ri$ 	--	--
4	After completion of step 3, SAS Test Harness will not provide any positive response ($responseCode=0$) to further request messages from the UUT.	--	--

5	<p>Monitor the RF output of each UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify:</p> <p>A. UUT stopped RF transmission at any time between triggering the relinquishment and UUT sending the relinquishment request</p>	PASS	FAIL
---	--	------	------

5.25 WINNF.FT.D.RLQ.6

Domain Proxy Unsuccessful Relinquishment, responseCode=103

This test case applies to Domain Proxy supervising two CBSDs. The following are the test execution steps where the Relinquishment response contains responseCode (Ri) = 103 for each CBSD.

Test Steps:

#	Test Execution Steps	Results	
1	<p>Ensure the following conditions are met for test entry:</p> <ul style="list-style-type: none"> •DP has successfully completed SAS Discovery and Authentication with SAS Test Harness •DP has successfully registered 2 CBSD with SAS Test Harness, each with $cbsdId=C_i$, $i=\{1,2\}$ •DP has received a valid grant with $grantId = G_i$, $i=\{1,2\}$ for each CBSD •Both CBSD are in Grant State AUTHORIZED and actively transmitting within the bounds of their grants. <p>Invoke trigger on UUT to Relinquish Grant from the SAS Test Harness</p>	--	--
2	<p>DP with two CBSDs sends Relinquishment Request with two objects to the SAS Test Harness.</p> <p>This may occur in a separate message per CBSD, or together in a single message with array of 2.</p> <p>Verify DP sends a Relinquishment Request message for each CBSD.</p> <p>This may occur in a separate message per CBSD, or together in a single message with array of 2.</p> <p>Verify Relinquishment Request message contains all required parameters properly formatted for each CBSD, specifically, for CBSD<i>i</i>:</p> <ul style="list-style-type: none"> •$cbsdId = C_i$ •$grantId = G_i$ 	--	--

	If a separate Relinquishment Request message was sent for each CBSD by the DP, the SAS Test Harness shall respond to each request message with a separate response message.		
3	<p>If a single Relinquishment Request message was sent by the DP containing a 2-object array (one per CBSD), the SAS Test Harness shall respond with a single Response message containing a 2-object array.</p> <p>Parameters for each CBSD within the Relinquishment Response Message shall be as follows:</p> <ul style="list-style-type: none"> •cbsdId = Ci •No grantId •responseCode = Ri 	--	--
4	After completion of step 3, SAS Test Harness will not provide any positive response (responseCode=0) to further request messages from the UUT.	--	--
5	Monitor the RF output of each UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify: A. UUT stopped RF transmission at any time between triggering the relinquishment and UUT sending the relinquishment request	PASS	FAIL

5.26 WINNF.FT.D.DRG.2

Domain Proxy Successful Deregistration

Test Steps:

#	Test Execution Steps	Results	
1	<p>Ensure the following conditions are met for test entry:</p> <ul style="list-style-type: none"> •Each UUT has successfully registered with SAS Test Harness •Each UUT is in the authorized state •DP has successfully completed SAS Discovery and Authentication with SAS Test Harness •DP has successfully registered 2 CBSD with SAS Test Harness, each with $cbsdId=Gi$, $i=\{1,2\}$ •DP has received a valid grant with $grantId = Gi$, $i=\{1,2\}$ for each CBSD •Both CBSD are in Grant State AUTHORIZED and actively transmitting within the bounds of their grants. <p>Invoke trigger to deregister each UUT from the SAS Test Harness</p>	--	--

2	UUT sends a Relinquishment request and receives Relinquishment response with <i>responseCode</i> =0	--	--
3	Verify DP sends a Deregistration Request message for each CBSD. This may occur in a separate message per CBSD, or together in a single message with array of 2. Verify Deregistration Request message contains all required parameters properly formatted for each CBSD, specifically, for CBSD <i>i</i> : • <i>cbsdId</i> = Ci	PASS	FAIL
4	If a separate Deregistration Request message was sent for each CBSD by the DP, the SAS Test Harness shall respond to each request message with a separate response message. If a single Deregistration Request message was sent by the DP containing a 2-object array (one per CBSD), the SAS Test Harness shall respond with a single Response message containing a 2-object array. Parameters for each CBSD within the Deregistration Response shall be as follows: • <i>cbsdId</i> = Ci • <i>responseCode</i> = 0	--	--
5	After completion of step 4, SAS Test Harness will not provide any positive response (<i>responseCode</i> =0) to further request messages from the UUT.	--	--
6	Monitor the RF output of each UUT from start of test until 60 seconds after Step 4 is complete. This is the end of the test. Verify: •UUT stopped RF transmission at any time between triggering the deregistration and either A OR B occurs: A.UUT sending a Registration Request message, as this is not mandatory B.UUT sending a Deregistration Request message	PASS	FAIL

5.27 WINNF.FT.D.DRG.4

Domain Proxy Deregistration responseCode=102

Test Steps:

#	Test Execution Steps	Results	
1	<p>Ensure the following conditions are met for test entry:</p> <ul style="list-style-type: none"> •DP has successfully completed SAS Discovery and Authentication with SAS Test Harness •DP has successfully registered 2 CBSD with SAS Test Harness, each with $cbsdId=Ci$, $i=\{1,2\}$ •DP has received a valid grant with $grantId = Gi$, $i=\{1,2\}$ for each CBSD •Both CBSD are in Grant State AUTHORIZED and actively transmitting within the bounds of their grants. <p>Invoke trigger to deregister each UUT from the SAS Test Harness</p>	--	--
2	UUT sends a Relinquishment request and receives Relinquishment response with $responseCode=0$ for each CBSD	--	--
3	<p>Verify DP sends a Deregistration Request message for each CBSD. This may occur in a separate message per CBSD, or together in a single message with array of 2.</p> <p>Verify Deregistration Request message contains all required parameters properly formatted for each CBSD, specifically, for CBSDi:</p> <ul style="list-style-type: none"> •$cbsdId = Ci$ 	--	--
4	<p>If a separate Deregistration Request message was sent for each CBSD by the DP, the SAS Test Harness shall respond to each request message with a separate response message.</p> <p>If a single Deregistration Request message was sent by the DP containing a 2-object array (one per CBSD), the SAS Test Harness shall respond with a single Response message containing a 2-object array.</p> <p>Parameters for each CBSD within the Deregistration Response Message shall be as follows:</p> <ul style="list-style-type: none"> •No $cbsdId$ in either response •$responseCode = Ri$ • 	--	--
5	After completion of step 3, SAS Test Harness will not provide any positive response ($responseCode=0$) to further request messages from the UUT.	--	--

6	<p>Monitor the RF output of each UUT from start of test until 60 seconds after Step 4 is complete. This is the end of the test. Verify:</p> <ul style="list-style-type: none"> •UUT stopped RF transmission at any time between triggering the deregistration and either A OR B occurs: <p>A.UUT sending a Registration Request message, as this is not mandatory</p> <p>B.UUT sending a Deregistration Request message</p>	PASS	FAIL
---	--	------	------

5.28 WINNF.FT.C.DRG.5

Deregistration responseCode=103

Test Steps:

#	Test Execution Steps	Results	
1	<p>Ensure the following conditions are met for test entry:</p> <ul style="list-style-type: none"> •UUT has successfully completed SAS Discovery and Authentication with SAS Test Harness •UUT has successfully registered with SAS Test Harness, with <i>cbsdId</i>=C •UUT has received a valid grant with <i>grantId</i> = G •UUT is in Grant State AUTHORIZED and is actively transmitting within the bounds of its grant. <p>Invoke trigger to deregister UUT from the SAS Test Harness</p>	--	--
2	UUT sends a Relinquishment request and receives Relinquishment response with <i>responseCode</i> =0	--	--
3	UUT sends Deregistration Request to SAS Test Harness with <i>cbsdId</i> = C	--	--
4	<p>The SAS Test Harness sends the Deregistration Response Message to UUT with:</p> <ul style="list-style-type: none"> •No <i>cbsdId</i> •<i>responseCode</i> = 103 	--	--
5	After completion of step 3, SAS Test Harness will not provide any positive response (<i>responseCode</i> =0) to further request messages from the UUT.	--	--
6	<p>Monitor the RF output of the UUT from start of test until 60 seconds after Step 4 is complete. This is the end of the test. Verify:</p> <ul style="list-style-type: none"> • UUT stopped RF transmission at any time between triggering the deregistration and either A OR B occurs: 	PASS	FAIL

	<ul style="list-style-type: none"> A. UUT sending a Registration Request message, as this is not mandatory B. UUT sending a Dereistration Request message 		
--	---	--	--

5.29 WINNF.FT.C.SCS.1

Successful TLS connection between UUT and SAS Test Harness

Test Steps:

#	Test Execution Steps	Results	
1	<ul style="list-style-type: none"> •UUT shall start CBSD-SAS communication with the security procedure •The UUT shall establish a TLS handshake with the SAS Test Harness using configured certificate. •Configure the SAS Test Harness to accept the security procedure and establish the connection 	PASS	FAIL
2	<ul style="list-style-type: none"> •Make sure that Mutual authentication happens between UUT and the SAS Test Harness. •Make sure that UUT uses TLS v1.2 •Make sure that cipher suites from one of the following is selected, •TLS_RSA_WITH_AES_128_GCM_SHA256 •TLS_RSA_WITH_AES_256_GCM_SHA384 •TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256 •TLS_ECDHE_ECDSA_WITH_AES_256_GCM_SHA384 •TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256 	PASS	FAIL
3	<p>A successful registration is accomplished using one of the test cases described in section 6.1.4.1, depending on CBSD capability.</p> <ul style="list-style-type: none"> •UUT sends a registration request to the SAS Test Harness and the SAS Test Harness sends a Registration Response with <i>responseCode</i> = 0 and <i>cbsdId</i>. 	PASS	FAIL
4	<p>Monitor the RF output of the UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify:</p> <ul style="list-style-type: none"> •UUT shall not transmit RF 	PASS	FAIL

5.30 WINNF.FT.C.SCS.2

TLS failure due to revoked certificate

Test Steps:

#	Test Execution Steps	Results	
1	•UUT shall start CBSD-SAS communication with the security procedures	PASS	FAIL
2	•Make sure that UUT uses TLS v1.2 for security establishment. •Make sure UUT selects the correct cipher suite. •UUT shall use CRL or OCSP to verify the validity of the server certificate. •Make sure that Mutual authentication does not happen between UUT and the SAS Test Harness.	PASS	FAIL
3	UUT may retry for the security procedure which shall fail	PASS	FAIL
4	SAS Test-Harness shall not receive any Registration request or any application data.	--	--
5	Monitor the RF output of the UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify: •UUT shall not transmit RF	PASS	FAIL

5.31 WINNF.FT.C.SCS.3

TLS failure due to expired server certificate

Test Steps

#	Test Execution Steps	Results	
1	•UUT shall start CBSD-SAS communication with the security procedures	PASS	FAIL
2	•Make sure that UUT uses TLS v1.2 for security establishment. •Make sure UUT selects the correct cipher suite. •UUT shall use CRL or OCSP to verify the validity of the server certificate. •Make sure that Mutual authentication does not happen between UUT and the SAS Test Harness.	PASS	FAIL
3	UUT may retry for the security procedure which shall fail.	PASS	FAIL
4	SAS Test-Harness shall not receive any Registration request or any application data.	--	--

5	Monitor the RF output of the UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify: •UUT shall not transmit RF	PASS	FAIL
---	---	------	------

5.32 WINNF.FT.C.SCS.4

failure when SAS Test Harness certificate is issued by an unknown CA

Test Steps:

#	Test Execution Steps	Results	
1	•UUT shall start CBSD-SAS communication with the security procedures	PASS	FAIL
2	•Make sure that UUT uses TLS v1.2 for security establishment. •Make sure UUT selects the correct cipher suite. •UUT shall use CRL or OCSP to verify the validity of the server certificate •Make sure that Mutual authentication does not happen between UUT and the SAS Test Harness.	PASS	FAIL
3	UUT may retry for the security procedure which shall fail.	PASS	FAIL
4	SAS Test-Harness shall not receive any Registration request or any application data.	--	--
5	Monitor the RF output of the UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify: •UUT shall not transmit RF	PASS	FAIL

5.33 WINNF.FT.C.SCS.5

TLS failure when certificate at the SAS Test Harness is corrupted

Test Steps:

#	Test Execution Steps	Results	
1	•UUT shall start CBSD-SAS communication with the security procedures	PASS	FAIL

2	<ul style="list-style-type: none"> • Make sure that UUT uses TLS v1.2 for security establishment. • Make sure UUT selects the correct cipher suite. • UUT shall use CRL or OCSP to verify the validity of the server certificate. • Make sure that Mutual authentication does not happen between UUT and the SAS Test Harness. 	PASS	FAIL
3	UUT may retry for the security procedure which shall fail.	PASS	FAIL
4	SAS Test-Harness shall not receive any Registration request or any application data.	--	--
5	Monitor the RF output of the UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify: <ul style="list-style-type: none"> • UUT shall not transmit RF 	PASS	FAIL

5.34 WINNF.PT.C.HBT.1

Given a combination of grant parameters: {lowFrequency = FL, highFrequency= FH, Occupied Bandwidth (OBW), where OBW <= (FH – FL), maxEirp = Pi}, this test case enables the UUT to obtain a grant with those parameters, to allow verification that the UUT complies to the maxEirp value of the grant.

The test execution steps below will yield a single measurement case. The test steps are to be repeated for each power measurement step, Pi, i = {1...N}.

Test Steps:

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: <ul style="list-style-type: none"> • UUT has successfully completed SAS Discovery and Authentication with the SAS Test Harness • UUT has registered with the SAS, with CBSD ID = C • UUT has a single valid grant G with parameters {lowFrequency = FL, highFrequency = FH, maxEirp = Pi}, with grant in AUTHORIZED state, and grantExpireTime set to a value far past the duration of this test case <p><i>Note: in order for the UUT to request a grant with the parameters {lowFrequency, highFrequency, maxEirp}, the SAS Test Harness may need to provide appropriate guidance in the availableChannel object of the spectrumInquiry response message, and the operationParam object of the grant response message. Alternately, the UUT vendor may provide the ability to set those parameters on the UUT so that the UUT will request a grant with those parameters.</i></p>	--	--

2	<p>UUT and SAS Test Harness perform a series of Heartbeat Request/Response cycles, which continues until the other test steps are complete. Messaging for each cycle is as follows:</p> <ul style="list-style-type: none"> •UUT sends Heartbeat Request, including: $ocbsdId = C$ $ograntId = G$ •SAS Test Harness responds with Heartbeat Response, including: $ocbsdId = C$ $ograntId = G$ $otransmitExpireTime = \text{current UTC time} + 200 \text{ seconds}$ $oresponseCode = 0$ 	--	--
3	<p>Tester performs power measurement on RF interface(s) of UUT, and verifies it complies with the maxEirp setting, P_i. The RF measurement method is out of scope of this document, but may include additional configuration of the UUT, as required, to fulfil the requirements of the power measurement method.</p> <p><i>Note: it may be required for the vendor to provide a method or configuration to bring the UUT to a mode which is required by the measurement methodology. Any such mode is vendor-specific and depends upon UUT behavior and the measurement methodology.</i></p>	PASS	FAIL

Additional Comments:

A snapshot of the power levels tested along with verdicts and comments is depicted in the table below:

SAS Allowed Power (dBm/MHz)	CBSD Request (dBm/MHz)	Verdict	Comments
37	10	PASS	
10	10	PASS	
15	20	PASS	Grant unsuccessful as CBSD requested higher power than what is allowed by the SAS.
12	12	PASS	
15	15	PASS	
18	18	PASS	
20	20	PASS	



6. *References:*

All test steps, details and procedures are referenced from Winn Forum Test Specification, Test and Certification for Citizens Broadband Radio Service (CBRS); Conformance and Performance Test Technical Specification; CBSD/DP as Unit Under Test (UUT), TS-0122-V1.0.0