



Compliance Certification Services (Kunshan) Inc.

Report No.: KSCR220900182001

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## TEST REPORT

**Application No.:** KSCR2209001820AT(SZCR2209003010AT)  
**FCC ID:** 2AG32PBS41010  
**Applicant:** Baicells Technologies Co., Ltd.  
**Address of Applicant:** 9-10F, 1stBldg., No.81BeiqingRoad, Haidian District, Beijing, China  
**Manufacturer:** Baicells Technologies Co., Ltd.  
**Address of Manufacturer:** 9-10F, 1stBldg., No.81BeiqingRoad, Haidian District, Beijing, China  
**Equipment Under Test (EUT):**  
**EUT Name:** LTE Base Station  
**Model No.:** pBS41010  
**Trade Mark:** Baicells  
**Standard(s):** FCC 47 CFR Part 96  
KDB 940660 D01 V03  
CBRS-A-TS-9001-V1.2.1  
WINNF-TS-0122-V1.0.2  
**Date of Receipt:** 2022-08-30  
**Date of Test:** 2022-09-01 to 2022-09-23  
**Date of Issue:** 2022-09-26

<b>Test Result:</b>	<b>Pass*</b>
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\* In the configuration tested, the EUT complied with the standards specified above.

Eric Lin  
Laboratory Manager

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Revision Record			
Version	Description	Date	Remark
00	Original	2022-09-26	/

Authorized for issue by:			
		Damon Zhou	
		Damon Zhou / Project Engineer	
		Eric Lin	
		Eric Lin / Reviewer	



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## 2 Test Summary

Test Summary for CBSD under control of Domain Proxy			
Item	Standard	Test Case ID	Result
Domain Proxy Multi-Step registration	WINNF-TS-0122-V1.0.2	WINNF.FT.D.REG.2	Pass
Domain Proxy Single-Step registration for CBSD with CPI signed data	WINNF-TS-0122-V1.0.2	WINNF.FT.D.REG.6	Pass
Domain Proxy Missing Required parameters (responseCode 102)	WINNF-TS-0122-V1.0.2	WINNF.FT.D.REG.9	Pass
Domain Proxy Pending registration (responseCode 200)	WINNF-TS-0122-V1.0.2	WINNF.FT.D.REG.11	Pass
Domain Proxy Invalid parameters (responseCode 103)	WINNF-TS-0122-V1.0.2	WINNF.FT.D.REG.13	Pass
Domain Proxy Blacklisted CBSD (responseCode 101)	WINNF-TS-0122-V1.0.2	WINNF.FT.D.REG.15	Pass
Domain Proxy Unsupported SAS protocol version responseCode 100)	WINNF-TS-0122-V1.0.2	WINNF.FT.D.REG.17	Pass
Domain Proxy Group Error (responseCode 201)	WINNF-TS-0122-V1.0.2	WINNF.FT.D.REG.19	Pass
Unsuccessful Grant responseCode=400 (INTERFERENCE)	WINNF-TS-0122-V1.0.2	WINNF.FT.C.GRA.1	Pass
Unsuccessful Grant responseCode=401 (GRANT_CONFLICT)	WINNF-TS-0122-V1.0.2	WINNF.FT.C.GRA.2	Pass
Domain Proxy Heartbeat Success Case (first Heartbeat Response)	WINNF-TS-0122-V1.0.2	WINNF.FT.D.HBT.2	Pass
Heartbeat responseCode=105 (DEREGISTER)	WINNF-TS-0122-V1.0.2	WINNF.FT.C.HBT.3	Pass
Heartbeat responseCode=501 (SUSPENDED_GRANT) in First Heartbeat Response	WINNF-TS-0122-V1.0.2	WINNF.FT.C.HBT.5	Pass
Heartbeat responseCode=501 (SUSPENDED_GRANT) in Subsequent Heartbeat Response	WINNF-TS-0122-V1.0.2	WINNF.FT.C.HBT.6	Pass
Heartbeat responseCode=502 (UNSYNC_OP_PARAM)	WINNF-TS-0122-V1.0.2	WINNF.FT.C.HBT.7	Pass
Domain Proxy Heartbeat responseCode=500 (TEMINATED_GRANT)	WINNF-TS-0122-V1.0.0	WINNF.FT.D.HBT.8	Pass
Heartbeat Response Absent (First Heartbeat)	WINNF-TS-0122-V1.0.2	WINNF.FT.C.HBT.9	Pass
Heartbeat Response Absent (Subsequent Heartbeat)	WINNF-TS-0122-V1.0.2	WINNF.FT.C.HBT.10	Pass
Domain Proxy Registration Response contains measReportConfig	WINNF-TS-0122-V1.0.2	WINNF.FT.D.MES.2	Pass



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Test Summary for CBSD under control of Domain Proxy			
Item	Standard	Test Case ID	Result
Grant Response contains measReportConfig	WINNF-TS-0122-V1.0.2	WINNF.FT.C.MES.3	Pass
Domain Proxy Heartbeat Response contains measReportConfig	WINNF-TS-0122-V1.0.2	WINNF.FT.D.MES.5	Pass
Domain Proxy Successful Relinquishment	WINNF-TS-0122-V1.0.2	WINNF.FT.D.RLQ.2	Pass
Domain Proxy Successful Deregistration	WINNF-TS-0122-V1.0.2	WINNF.FT.D.DRG.2	Pass
Successful TLS connection between UUT and SAS Test Harness	WINNF-TS-0122-V1.0.2	WINNF.FT.C.SCS.1	Pass
TLS failure due to revoked certificate	WINNF-TS-0122-V1.0.2	WINNF.FT.C.SCS.2	Pass
TLS failure due to expired server certificate	WINNF-TS-0122-V1.0.2	WINNF.FT.C.SCS.3	Pass
TLS failure when SAS Test Harness certificate is issue by unknown CA	WINNF-TS-0122-V1.0.2	WINNF.FT.C.SCS.4	Pass
TLS failure when certificate at the SAS Test Harness is corrupted	WINNF-TS-0122-V1.0.2	WINNF.FT.C.SCS.5	Pass
UUT RF Transmit Power Measurement	WINNF-TS-0122-V1.0.2	WINNF.PT.C.HBT.1	Pass
SAS Version: 1.0.0.3			

Test Summary for Standalone CBSD			
Item	Standard	Test Case ID	Result
Multi-Step registration	WINNF-TS-0122-V1.0.2	WINNF.FT.C.REG.1	Pass
Single-Step registration for CBSD with CPI signed data	WINNF-TS-0122-V1.0.2	WINNF.FT.C.REG.5	Pass
Missing Required parameters (responseCode 102)	WINNF-TS-0122-V1.0.2	WINNF.FT.C.REG.8	Pass
Pending registration (responseCode 200)	WINNF-TS-0122-V1.0.2	WINNF.FT.C.REG.10	Pass
Invalid parameter (responseCode 103)	WINNF-TS-0122-V1.0.2	WINNF.FT.C.REG.12	Pass
Blacklisted CBSD (responseCode 101)	WINNF-TS-0122-V1.0.2	WINNF.FT.C.REG.14	Pass
Unsupported SAS protocol version (responseCode 100)	WINNF-TS-0122-V1.0.2	WINNF.FT.C.REG.16	Pass
Group Error (responseCode 201)	WINNF-TS-0122-V1.0.2	WINNF.FT.C.REG.18	Pass
Unsuccessful Grant responseCode=400 (INTERFERENCE)	WINNF-TS-0122-V1.0.2	WINNF.FT.D.GRA.1	Pass



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Test Summary for Standalone CBSD			
Item	Standard	Test Case ID	Result
Unsuccessful Grant responseCode=401 (GRANT_CONFLICT)	WINNF-TS-0122-V1.0.2	WINNF.FT.C.GRA.2	Pass
Heartbeat Success Case (first Heartbeat Response)	WINNF-TS-0122-V1.0.2	WINNF.FT.C.HBT.1	Pass
Heartbeat responseCode=105 (DEREGISTER)	WINNF-TS-0122-V1.0.2	WINNF.FT.C.HBT.3	Pass
Heartbeat responseCode=500 (TERMINATED_GRANT)	WINNF-TS-0122-V1.0.2	WINNF.FT.C.HBT.4	Pass
Heartbeat responseCode=501 (SUSPENDED_GRANT) in First Heartbeat Response	WINNF-TS-0122-V1.0.2	WINNF.FT.C.HBT.5	Pass
Heartbeat responseCode=501 (SUSPENDED_GRANT) in Subsequent Heartbeat Response	WINNF-TS-0122-V1.0.2	WINNF.FT.C.HBT.6	Pass
Heartbeat responseCode=502 (UNSYNC_OP_PARAM)	WINNF-TS-0122-V1.0.2	WINNF.FT.C.HBT.7	Pass
Heartbeat Response Absent (First Heartbeat)	WINNF-TS-0122-V1.0.2	WINNF.FT.C.HBT.9	Pass
Heartbeat Response Absent (Subsequent Heartbeat)	WINNF-TS-0122-V1.0.2	WINNF.FT.C.HBT.10	Pass
Successful Relinquishment	WINNF-TS-0122-V1.0.2	WINNF.FT.C.RLQ.1	Pass
Successful Deregistration	WINNF-TS-0122-V1.0.2	WINNF.FT.C.DRG.1	Pass
Successful TLS connection between UUT and SAS Test Harness	WINNF-TS-0122-V1.0.2	WINNF.FT.C.SCS.1	Pass
TLS failure due to revoked certificate	WINNF-TS-0122-V1.0.2	WINNF.FT.C.SCS.2	Pass
TLS failure due to expired server certificate	WINNF-TS-0122-V1.0.2	WINNF.FT.C.SCS.3	Pass
TLS failure when SAS Test Harness certificate is issue by unknown CA	WINNF-TS-0122-V1.0.2	WINNF.FT.C.SCS.4	Pass
TLS failure when certificate at the SAS Test Harness is corrupted	WINNF-TS-0122-V1.0.2	WINNF.FT.C.SCS.5	Pass
UUT RF Transmit Power Measurement	WINNF-TS-0122-V1.0.2	WINNF.PT.C.HBT	Pass
SAS Version: 1.0.0.3			

The UUT is a BTS-CBSD which can operate under under control of Domain Proxy or operate as standalone CBSD. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:



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Test standards:

**CBRSA-TS-9001-V1.2.1**

CBRS Alliance Certification Test Plan

**WINNF-TS-0122-V1.0.2**

Test and Certification for Citizens Broadband Radio Service (CBRS); Conformance and Performance

Test Technical Specification; CBSD/DP as Unit Under Test (UUT)

**KDB 940660 D01 Part 96 CBRS Eqpt v03**



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## 4 General Information

### 4.1 Details of E.U.T.

Power supply:	Adapter Model NO.: G0566-480-100 Input: 100-240V~50/60Hz, 1.5A Output: 48V, 1.0A
Sample Type:	Fixed device
CBSD Class:	B
Transmitter Frequency Band:	LTE Band 48
Transmitter Frequency Range:	3550~3700MHz
Hardware Version:	Ver.E01
Software Version:	BaiBS_QRTB_2.11.2_V4
Test sample:	SN1: 1202000291216HB0056 SN2: 1202000240194DP0023(FCC ID: 2AG32MBS3100196N)
Antenna Gain:	13.5dBi
Supported Carrier:	Max 1
MIMO Type:	2*2 MIMO
<p>Note: The UUT is a BTS-CBSD which can operate under control of Domain Proxy or operate as standalone CBSD. Domain Proxy information show as below:</p> <p>Model No. of Domain Proxy: LICA-1513A</p> <p>Software Version of Domain Proxy: BaiOMC_7.0.3</p>	

### 4.2 Description of CBSD/DP Support Features

Test Summary for CBSD under control of Domain Proxy		
Condition	Feature Description	Supported
C1	Mandatory for UUT which supports multi-step registration message.	Y
C2	Mandatory for UUT which supports single-step registration with no CPI-signed data in the registration message. By definition, this is a subset of Category A devices which determine all registration information, including location, without CPI intervention.	N
C3	Mandatory for UUT which supports single-step registration containing CPI-signed data in the registration message.	Y
C4	Mandatory for UUT which supports RECEIVED_POWER_WITHOUT_GRANT measurement report type.	Y
C5	Mandatory for UUT which supports RECEIVED_POWER_WITH_GRANT measurement report type.	Y
C6	Mandatory for UUT which supports parameter change being made at the UUT and prior to sending a deregistration.	N



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Test Summary for Standalone CBSD		
Condition	Feature Description	Supported
C1	Mandatory for UUT which supports multi-step registration message.	Y
C2	Mandatory for UUT which supports single-step registration with no CPI-signed data in the registration message. By definition, this is a subset of Category A devices which determine all registration information, including location, without CPI intervention.	N
C3	Mandatory for UUT which supports single-step registration containing CPI-signed data in the registration message.	Y
C4	Mandatory for UUT which supports RECEIVED_POWER_WITHOUT_GRANT measurement report type.	N
C5	Mandatory for UUT which supports RECEIVED_POWER_WITH_GRANT measurement report type.	N
C6	Mandatory for UUT which supports parameter change being made at the UUT and prior to sending a deregistration.	N

Y: Supported

N: Not supported



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### 4.3 Summary of Test Results

Test Summary for CBSD under control of Domain Proxy			
Classes	Test Case Items	Pass Items	Pass Rate (%)
FT (CBSD, DP/CBSD)	28	28	100
PT (CBSD, DP/CBSD)	1	1	100
Total	29	29	100

Test Summary for Standalone CBSD			
Classes	Test Case Items	Pass Items	Pass Rate (%)
FT (CBSD, DP/CBSD)	25	25	100
PT (CBSD, DP/CBSD)	1	1	100
Total	26	26	100

Note:

1. Functional Test (FT): Test to validate the conformance of the Protocols and functionalities implemented in the CBSD/DP UUT to the requirements developed by WInnForum and supporting FCC/DoD requirements.
2. Field/Performance Test (PT): Test to check the capability of the CBSD/DP UUT to support various traffic models and actual operations in the field.

### 4.4 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Radio Frequency	$\pm 7.25 \times 10^{-8}$
2	RF conducted power	$\pm 0.75\text{dB}$
3	Temperature test	$\pm 1^\circ\text{C}$
4	Humidity test	$\pm 3\%$
5	Supply voltages	$\pm 1.5\%$
6	Time	$\pm 3\%$

### 4.5 Description of Support Units

Description	Manufacturer	Model No.	Serial No.
CPE	SMAWAVE	USB Dongle	/
EPC	Lanner Electronics Inc.	LICA-1513A	LR202002004052
Router	TP-LINK	TL-R860+	1175379002425



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## 4.6 Test Location

All tests were performed at:

Compliance Certification Services (Kunshan) Inc.

No.10 Weiye Rd, Innovation park, Eco&Tec, Development Zone, Kunshan City, Jiangsu, China.

Tel: +86 512 5735 5888

Fax: +86 512 5737 0818

No tests were sub-contracted.

## 4.7 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **A2LA (Certificate No. 2541.01)**

Compliance Certification Services (Kunshan) Inc. is accredited by the American Association for Laboratory Accreditation (A2LA). Certificate No. 2541.01.

- **FCC (Designation Number: CN1172)**

Compliance Certification Services (Kunshan) Inc. has been recognized as an accredited testing laboratory. Designation Number: CN1172.



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## 5 Equipment List

Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. Date (yyyy-mm-dd)	Cal. Due date (yyyy-mm-dd)
Laptop	Lenovo	Y510P	HFL000026	N/A	N/A
Spectrum Analyzer	KEYSIGHT	N9020A	KUS2001M00 1-2	2022/08/22	2023/08/21
Shield Room	研创	N/A	KS301115-2	N/A	N/A
Coaxial Cable	Thermax	N/A	14	2021/10/16	2022/10/15
Attenuator	Mini-Circuits	NAT-6-2W	15542-1	N.C.R.	N.C.R.
Humidity / Temperature Indicator	Anymetre	TH603	CZ700001(4/7 )	2021/10/14	2022/10/13



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## 6 Test Method and Environment

### 6.1 CBSD/DP Conformance and Performance

Test Requirement: CBRS CBSD Test Specification WINNF-TS-0122-V1.0.2  
Test Method: CBRS CBSD Test Specification WINNF-TS-0122-V1.0.2  
WINNF-IN-0156\_WinnForum\_SAS\_Test\_Harness\_CBSD\_UUT\_Tutorial\_v1\_0\_0\_1

### 6.2 CBSD Test Procedure

- a. Connect the UUT to SAS Test Harness system and RF Test instruments via the CBSD interface and RF components. The highest level is set to test configuration.
- b. UUT shall be UTC time synchronized
- c. The frequency band is granted and set as UUT supported Modulation and Channels, transmitted power of the UUT according to it granted parameters from the SAS Test Harness.
- d. Each test case results were recorded and validated by SAS Test Harness system and RF instruments test cases was recorded test results from SAS Test Harness system.



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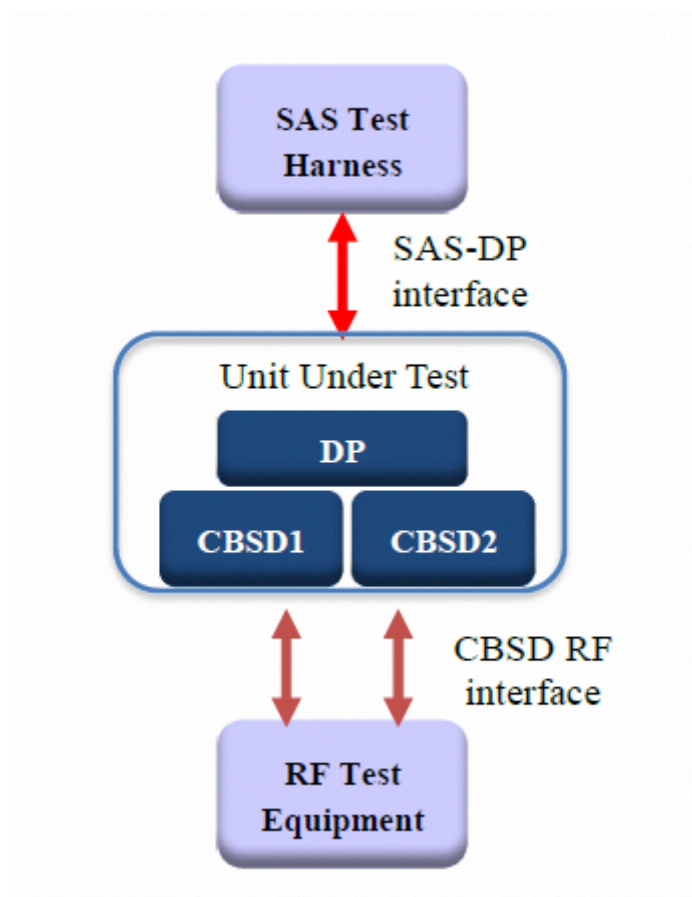
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### 6.3 Test Environment

Test Harness Version:	V1.0.0.3
Operating System:	Microsoft Windows 10
TLS Version:	1.2
Python Version:	2.7.13
Environmental Conditions:	25deg. C, 65%RH
Input Power:	120Vac, 60Hz

### 6.4 Test Setup



DP/CBSD as UUT, BTS-CBSD communication with Domain Proxy

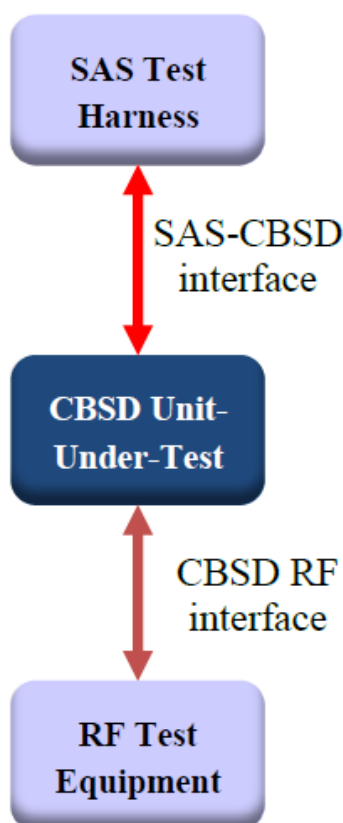


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CBSD as UUT, BTS-CBSD communication with SAS



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## 7 Test Data For CBSD Under Control of Domain Proxy

### 7.1 CBSD Registration Process

#### 7.1.1 WINNF.FT.D.REG.2

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: <ul style="list-style-type: none"> <li>● UUT has successfully completed SAS Discovery and Authentication with the SAS Test Harness</li> <li>● UUT is in the Unregistered state</li> </ul>	--	--
2	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: <ul style="list-style-type: none"> <li>● The required userId, fcld and cbsdSerialNumber registration parameters shall be sent for each CBSD and conform to proper format and acceptable ranges.</li> <li>● 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.</li> </ul> <p>Note: It is outside the scope of this document to test the Registration information that is supplied via another means.</p>	<div>■</div> Pass	<div>□</div> Fail
3	<ul style="list-style-type: none"> <li>● 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"> <li>- cbsdId = Ci</li> <li>- measReportConfig shall not be included</li> <li>- responseCode = 0 for each CBSD</li> </ul> </li> </ul>	--	--
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 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"> <li>● UUT shall not transmit RF</li> </ul>	<div>■</div> Pass	<div>□</div> Fail



## 7.1.2 WINNF.FT.D.REG.6

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: <ul style="list-style-type: none"> <li>UUT has successfully completed SAS Discovery and Authentication with the SAS Test Harness</li> <li>UUT is in the Unregistered state</li> <li>All of the required and REG-Conditional parameters shall be configured and CPI signature provided</li> </ul>	--	--
2	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: <ul style="list-style-type: none"> <li>The required userId, fcId and cbsdSerialNumber and REG-Conditional cbsdCategory, airInterface, measCapability and cpiSignatureData registration parameters shall be sent from the CBSD and conform to proper format and acceptable ranges.</li> <li>Any optional registration parameters that may be included in the message shall be verified that they conform to proper format and are within acceptable ranges.</li> </ul>	<div>■</div> Pass	<div>□</div> Fail
3	<ul style="list-style-type: none"> <li>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"> <li>cbsdId = Ci</li> <li>measReportConfig shall not be included</li> <li>responseCode = 0 for each CBSD</li> </ul> </li> </ul>	--	--
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 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"> <li>UUT shall not transmit RF</li> </ul>	<div>■</div> Pass	<div>□</div> Fail



## 7.1.3 WINNF.FT.D.REG.9

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: <ul style="list-style-type: none"> <li>● UUT has successfully completed SAS Discovery and Authentication with SAS Test Harness</li> <li>● UUT is in the Unregistered state</li> </ul>	--	--
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: <ul style="list-style-type: none"> <li>- SAS response does not include a cbsdId.</li> <li>- responseCode = 102 for CBSD1 and CBSD2</li> </ul>	--	--
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 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"> <li>● UUT shall not transmit RF</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail

## 7.1.4 WINNF.FT.D.REG.11

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: <ul style="list-style-type: none"> <li>● UUT has successfully completed SAS Discovery and Authentication with SAS Test Harness</li> <li>● UUT is in the Unregistered state</li> </ul>	--	--
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: <ul style="list-style-type: none"> <li>- SAS response does not include a cbsdId.</li> <li>- responseCode = 200 for CBSD1 and CBSD2</li> </ul>	--	--
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 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"> <li>● UUT shall not transmit RF</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail



## 7.1.5 WINNF.FT.D.REG.13

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: <ul style="list-style-type: none"> <li>● UUT has successfully completed SAS Discovery and Authentication with SAS Test Harness</li> <li>● UUT is in the Unregistered state</li> </ul>	--	--
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: <ul style="list-style-type: none"> <li>- SAS response does not include a cbsdId.</li> <li>- responseCode = 0 for CBSD1</li> <li>- responseCode = 103 for CBSD2</li> </ul>	--	--
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 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"> <li>● UUT shall not transmit RF</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail

## 7.1.6 WINNF.FT.D.REG.15

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: <ul style="list-style-type: none"> <li>● UUT has successfully completed SAS Discovery and Authentication with SAS Test Harness</li> <li>● UUT is in the Unregistered state</li> </ul>	--	--
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: <ul style="list-style-type: none"> <li>- SAS response does not include a cbsdId.</li> <li>- responseCode = 0 for CBSD1</li> <li>- responseCode = 101 for CBSD2</li> </ul>	--	--
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 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"> <li>● UUT shall not transmit RF</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail



## 7.1.7 WINNF.FT.D.REG.17

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: <ul style="list-style-type: none"> <li>● UUT has successfully completed SAS Discovery and Authentication with SAS Test Harness</li> <li>● UUT is in the Unregistered state</li> </ul>	--	--
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: <ul style="list-style-type: none"> <li>- SAS response does not include a cbsdId.</li> <li>- responseCode = 100 for CBSD1 and CBSD2</li> </ul>	--	--
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 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"> <li>● UUT shall not transmit RF</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail

## 7.1.8 WINNF.FT.D.REG.19

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: <ul style="list-style-type: none"> <li>● UUT has successfully completed SAS Discovery and Authentication with SAS Test Harness</li> <li>● UUT is in the Unregistered state</li> </ul>	--	--
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: <ul style="list-style-type: none"> <li>- SAS response does not include a cbsdId.</li> <li>- responseCode = 0 for CBSD1</li> <li>- responseCode = 201 for CBSD2</li> </ul>	--	--
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 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"> <li>● UUT shall not transmit RF</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail



## 7.2 CBSD Spectrum Grant Process

### 7.2.1 WINNF.FT.C.GRA.1

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: ● UUT has registered successfully with SAS Test Harness, with cbsdId = C	--	--
2	UUT sends valid Grant Request.	--	--
3	SAS Test Harness sends a Grant Response message, including - cbsdId=C - responseCode = 400	--	--
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 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	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail

### 7.2.2 WINNF.FT.C.GRA.2

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: ● UUT has registered successfully with SAS Test Harness, with cbsdId = C	--	--
2	UUT sends valid Grant Request.	--	--
3	SAS Test Harness sends a Grant Response message, including - cbsdId=C - responseCode = 400	--	--
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 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	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail



### 7.3 CBSD HeartBeat Process

#### 7.3.1 WINNF.FT.D.HBT.2

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: <ul style="list-style-type: none"> <li>● DP has two CBSD registered successfully with SAS Test Harness, with cbsdId = Ci, i={1,2}</li> </ul>	--	--
2	DP sends a message: <ul style="list-style-type: none"> <li>● If message is type Spectrum Inquiry Request, go to step 3, or</li> <li>● If message is type Grant Request, go to step 5</li> </ul>	--	--
3	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. Verify Spectrum Inquiry Request message is formatted correctly for each CBSD, including for CBSDi, i={1,2}: <ul style="list-style-type: none"> <li>● cbsdId = Ci</li> <li>● List of frequencyRange objects sent by DP are within the CBRS frequency range</li> </ul>	■ Pass	□ Fail
4	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. 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. Verify parameters for each CBSD within the Spectrum Inquiry Response message are as follows, for CBSDi, i={1,2}: <ul style="list-style-type: none"> <li>● cbsdId = Ci</li> <li>● availableChannel is an array of availableChannel objects</li> <li>● responseCode = 0</li> </ul>	--	--
5	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. Verify Grant Request message is formatted correctly for each CBSD, including for CBSDi, i={1,2}: <ul style="list-style-type: none"> <li>● cbsdId = C</li> <li>● maxEIRP is at or below the limit appropriate for CBSD category as defined by Part 96</li> <li>● operationFrequencyRange, Fi, sent by UUT is a valid range within the CBRS band</li> </ul>	■ Pass	□ Fail
6	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.  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.  Verify parameters for each CBSD within the Grant Response message are as follows, for CBSDi, i={1,2}: <ul style="list-style-type: none"> <li>● cbsdId = Ci</li> <li>● grantId = Gi = a valid grant ID</li> </ul>	--	--



	<ul style="list-style-type: none"> <li>● grantExpireTime = UTC time greater than duration of the test</li> <li>● responseCode = 0</li> </ul>		
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. Verify Heartbeat Request message is formatted correctly for each CBSD, including, for CBSDi i={1,2}:</p> <ul style="list-style-type: none"> <li>● cbsdId = Ci, i={1,2}</li> <li>● grantId = Gi, i={1,2}</li> <li>● operationState = "GRANTED"</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> 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> <p>Verify parameters for each CBSD within the Heartbeat Response message are as follows, for CBSDi:</p> <ul style="list-style-type: none"> <li>● cbsdId = Ci</li> <li>● grantId = Gi</li> <li>● transmitExpireTime = current UTC time + 200 seconds</li> <li>● responseCode = 0</li> </ul>	--	--
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"> <li>● cbsdId = Ci</li> <li>● grantId = Gi</li> <li>● operationState = "AUTHORIZED"</li> </ul> <p>and SAS Test Harness responds with a Heartbeat Response message including the following parameters, for CBSDi</p> <ul style="list-style-type: none"> <li>● cbsdId = Ci</li> <li>● grantId = Gi</li> <li>● transmitExpireTime = current UTC time + 200 seconds</li> <li>● responseCode = 0</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
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"> <li>● UUT does not transmit at any time prior to completion of the first heartbeat response</li> <li>● UUT transmits after step 8 is complete, and its transmission is limited to within the bandwidth range Fi.</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail

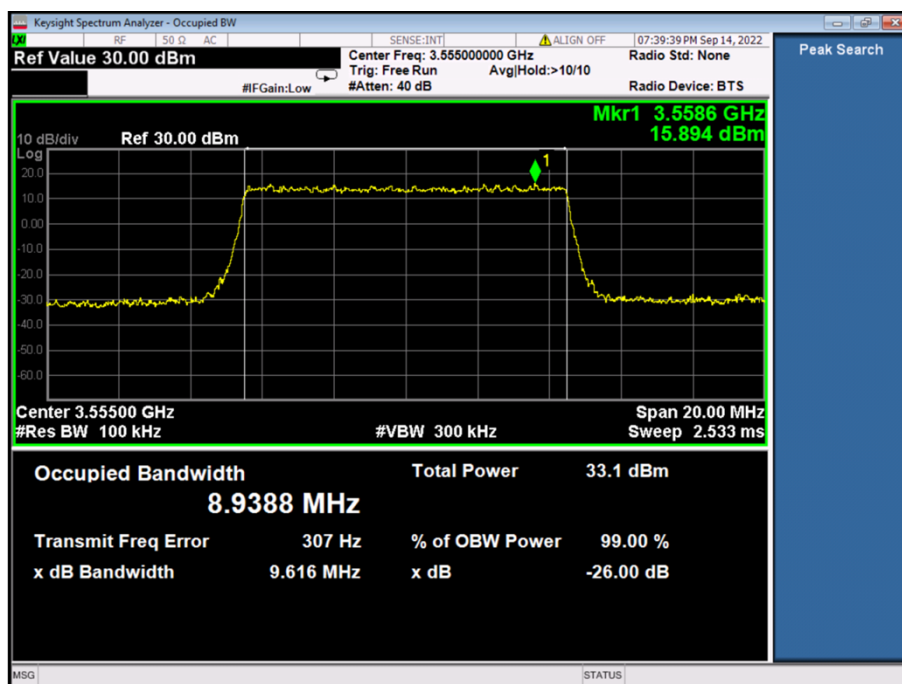


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## 7.3.2 WINNF.FT.C.HBT.3

#	Test Execution Steps	Results	
1	<p>Ensure the following conditions are met for test entry:</p> <ul style="list-style-type: none"> <li>● UUT has registered successfully with SAS Test Harness</li> <li>● UUT has a valid single grant as follows: <ul style="list-style-type: none"> <li>○ valid cbsdId = C</li> <li>○ valid grantId = G</li> <li>○ grant is for frequency range F, power P</li> <li>○ grantExpireTime = UTC time greater than duration of the test</li> </ul> </li> <li>● UUT is in AUTHORIZED state and is transmitting within the grant bandwidth F on RF interface</li> </ul>	--	--
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"> <li>● cbsdId = C</li> <li>● grantId = G</li> <li>● operationState = "AUTHORIZED"</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
3	<p>SAS Test Harness sends a Heartbeat Response message, including the following parameters:</p> <ul style="list-style-type: none"> <li>● cbsdId = C</li> <li>● grantId = G</li> <li>● transmitExpireTime = T = Current UTC time</li> <li>● responseCode = 105 (DEREGISTER)</li> </ul>	--	--
4	After completion of step 3, SAS Test Harness shall not allow any further grants to the UUT.	--	--
5	<p>Monitor the RF output of the UUT. Verify:</p> <ul style="list-style-type: none"> <li>● UUT shall stop transmission within (T + 60 seconds) of completion of step 3</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail



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## 7.3.3 WINNF.FT.C.HBT.5

#	Test Execution Steps	Results	
1	<p>Ensure the following conditions are met for test entry:</p> <ul style="list-style-type: none"> <li>● UUT has registered successfully with SAS Test Harness</li> <li>● UUT has a valid single grant as follows: <ul style="list-style-type: none"> <li>○ valid cbsdId = C</li> <li>○ valid grantId = G</li> <li>○ grant is for frequency range F, power P</li> <li>○ grantExpireTime = UTC time greater than duration of the test</li> </ul> </li> <li>● UUT is in GRANTED, but not AUTHORIZED state (i.e. has not performed its first Heartbeat Request)</li> </ul>	--	--
2	<p>UUT sends a Heartbeat Request message.</p> <p>Verify Heartbeat Request message is formatted correctly, including:</p> <ul style="list-style-type: none"> <li>● cbsdId = C</li> <li>● grantId = G</li> <li>● operationState = "GRANTED"</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
3	<p>SAS Test Harness sends a Heartbeat Response message, including the following parameters:</p> <ul style="list-style-type: none"> <li>● cbsdId = C</li> <li>● grantId = G</li> <li>● transmitExpireTime = T = current UTC time</li> <li>● responseCode = 501 (SUSPENDED_GRANT)</li> </ul>	--	--
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"> <li>● cbsdId = C</li> <li>● grantId = G</li> <li>● operationState = "GRANTED"</li> </ul> <p>B. UUT sends a Relinquishment request message. Ensure message is correctly formatted with parameters:</p> <ul style="list-style-type: none"> <li>● cbsdId = C</li> <li>● grantId = G</li> </ul> <p>Monitor the RF output of the UUT. Verify:</p> <ul style="list-style-type: none"> <li>● UUT does not transmit at any time</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail



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## 7.3.4 WINNF.FT.C.HBT.6

#	Test Execution Steps	Results	
1	<p>Ensure the following conditions are met for test entry:</p> <ul style="list-style-type: none"> <li>● UUT has registered successfully with SAS Test Harness</li> <li>● UUT has a valid single grant as follows: <ul style="list-style-type: none"> <li>○ valid cbsdId = C</li> <li>○ valid grantId = G</li> <li>○ grant is for frequency range F, power P</li> <li>○ grantExpireTime = UTC time greater than duration of the test</li> </ul> </li> <li>● UUT is in AUTHORIZED state and is transmitting within the grant bandwidth F on RF interface</li> </ul>	--	--
2	<p>UUT sends a Heartbeat Request message.</p> <p>Ensure Heartbeat Request message is sent within latest specified heartbeatInterval, and is formatted correctly, including:</p> <ul style="list-style-type: none"> <li>● cbsdId = C</li> <li>● grantId = G</li> <li>● operationState = "AUTHORIZED"</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
3	<p>SAS Test Harness sends a Heartbeat Response message, including the following parameters:</p> <ul style="list-style-type: none"> <li>● cbsdId = C</li> <li>● grantId = G</li> <li>● transmitExpireTime = T = current UTC time</li> <li>● responseCode = 501 (SUSPENDED_GRANT)</li> </ul>	--	--
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"> <li>● cbsdId = C</li> <li>● grantId = G</li> <li>● operationState = "GRANTED"</li> </ul> <p>B. UUT sends a Relinquishment request message. Ensure message is correctly formatted with parameters:</p> <ul style="list-style-type: none"> <li>● cbsdId = C</li> <li>● grantId = G</li> </ul> <p>Monitor the RF output of the UUT. Verify:</p> <ul style="list-style-type: none"> <li>● UUT shall stop transmission within (T+60) seconds of completion of step 3</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail



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## 7.3.5 WINNF.FT.C.HBT.7

#	Test Execution Steps	Results	
1	<p>Ensure the following conditions are met for test entry:</p> <ul style="list-style-type: none"> <li>● UUT has registered successfully with SAS Test Harness</li> <li>● UUT has a valid single grant as follows: <ul style="list-style-type: none"> <li>○ valid cbsdId = C</li> <li>○ valid grantId = G</li> <li>○ grant is for frequency range F, power P</li> <li>○ grantExpireTime = UTC time greater than duration of the test</li> </ul> </li> <li>● UUT is in AUTHORIZED state and is transmitting within the grant bandwidth F on RF interface</li> </ul>	--	--
2	<p>UUT sends a Heartbeat Request message. Ensure Heartbeat Request message is sent within latest specified heartbeatInterval, and is formatted correctly, including:</p> <ul style="list-style-type: none"> <li>● cbsdId = C</li> <li>● grantId = G</li> <li>● operationState = "AUTHORIZED"</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
3	<p>SAS Test Harness sends a Heartbeat Response message, including the following parameters:</p> <ul style="list-style-type: none"> <li>● cbsdId = C</li> <li>● grantId = G</li> <li>● transmitExpireTime = T = current UTC time</li> <li>● responseCode = 502 (UNSYNC_OP_PARAM)</li> </ul>	--	--
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"> <li>● UUT sends a Grant Relinquishment Request message. Verify message is correctly formatted with parameters: <ul style="list-style-type: none"> <li>○ cbsdId = C</li> <li>○ grantId = G</li> </ul> </li> </ul> <p>Monitor the RF output of the UUT. Verify:</p> <ul style="list-style-type: none"> <li>● UUT shall stop transmission within (T+60) seconds of completion of step 3</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail



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## 7.3.6 WINNF.FT.D.HBT.8

#	Test Execution Steps	Results	
1	<p>Ensure the following conditions are met for test entry:</p> <ul style="list-style-type: none"> <li>● DP has two CBSD registered successfully with SAS Test Harness</li> <li>● Each CBSD {1,2} has a valid single grant as follows <ul style="list-style-type: none"> <li>○ valid cbsdId = Ci, i={1,2}</li> <li>○ valid grantId = Gi, i={1,2}</li> <li>○ grant is for frequency range Fi, power Pi</li> <li>○ grantExpireTime = UTC time greater than duration of the test</li> </ul> </li> <li>● Both CBSD are in AUTHORIZED state and transmitting within their granted bandwidth on RF interface</li> </ul>	--	--
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. 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"> <li>● cbsdId = Ci, i = {1,2}</li> <li>● grantId = Gi, i = {1,2}</li> <li>● operationState = "AUTHORIZED"</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
3	<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. 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 should be as follows, for CBSDi:</p> <ul style="list-style-type: none"> <li>● cbsdId = Ci</li> <li>● grantId = Gi</li> <li>● For CBSD1: <ul style="list-style-type: none"> <li>○ transmitExpireTime = current UTC time + 200 seconds</li> <li>○ responseCode = 0</li> </ul> </li> <li>● For CBSD2: <ul style="list-style-type: none"> <li>○ transmitExpireTime = T = current UTC time</li> <li>○ responseCode = 500 (TERMINATED GRANT)</li> </ul> </li> </ul>	--	--
4	<p>After completion of step 3, SAS Test Harness shall not allow any further grants to the UUT. 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"> <li>● cbsdId = C1</li> <li>● grantId = G1</li> <li>● transmitExpireTime = current UTC time + 200 seconds</li> <li>● responseCode = 0</li> <li>● Heartbeat Request message is within heartbeatInterval of previous Heartbeat Request message</li> </ul>	--	--
5	<p>Monitor the RF output of CBSD2. Verify:</p> <ul style="list-style-type: none"> <li>● CBSD2 shall stop transmission within bandwidth F2 within (T + 60 seconds) of completion of step 3</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail



## 7.3.7 WINNF.FT.C.HBT.9

#	Test Execution Steps	Results	
1	<p>Ensure the following conditions are met for test entry:</p> <ul style="list-style-type: none"> <li>● UUT has registered successfully with SAS Test Harness</li> <li>● UUT has a valid single grant as follows: <ul style="list-style-type: none"> <li>○ valid cbsdId = C</li> <li>○ valid grantId = G</li> <li>○ grant is for frequency range F, power P</li> <li>○ grantExpireTime = UTC time greater than duration of the test</li> </ul> </li> <li>● UUT is in GRANTED, but not AUTHORIZED state(i.e. has not performed its first Heartbeat Request)</li> </ul>	--	--
2	<p>UUT sends a Heartbeat Request message. Ensure Heartbeat Request message is sent within latest specified heartbeatInterval, and is formatted correctly, including:</p> <ul style="list-style-type: none"> <li>● cbsdId = C</li> <li>● grantId = G</li> <li>● operationState = "GRANTED"</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
3	<p>After completion of step 2, SAS Test Harness does not respond to any further</p> <ul style="list-style-type: none"> <li>● messages from UUT to simulate loss of network connection</li> </ul>	--	--
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"> <li>● At any time during the test, UUT shall not transmit on RF interface</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail



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## 7.3.8 WINNF.FT.C.HBT.10

#	Test Execution Steps	Results	
1	<p>Ensure the following conditions are met for test entry:</p> <ul style="list-style-type: none"> <li>● UUT has registered successfully with SAS Test Harness</li> <li>● UUT has a valid single grant as follows: <ul style="list-style-type: none"> <li>○ valid cbsdId = C</li> <li>○ valid grantId = G</li> <li>○ grant is for frequency range F, power P</li> <li>○ grantExpireTime = UTC time greater than duration of the test</li> </ul> </li> <li>● UUT is in AUTHORIZED state and is transmitting within the grant bandwidth F on RF interface</li> </ul>	--	--
2	<p>UUT sends a Heartbeat Request message. Verify Heartbeat Request message is sent within latest specified heartbeatInterval, and is formatted correctly, including:</p> <ul style="list-style-type: none"> <li>● cbsdId = C</li> <li>● grantId = G</li> <li>● operationState = "AUTHORIZED"</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
3	<p>SAS Test Harness sends a Heartbeat Response message, including the following parameters:</p> <ul style="list-style-type: none"> <li>● cbsdId = C</li> <li>● grantId = G</li> <li>● transmitExpireTime = T = current UTC time + 200 seconds</li> <li>● responseCode = 0</li> </ul>	--	--
4	After completion of step 3, SAS Test Harness shall not allow any further grants to the UUT.	--	--
5	<p>Monitor the RF output of the UUT. Verify:</p> <ul style="list-style-type: none"> <li>● UUT shall stop all transmission on RF interface within (transmitExpireTime + 60 seconds), using the transmitExpireTime sent in Step 3.</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail



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## 7.4 CBSD Measurement Report

## 7.4.1 WINNF.FT.D.MES.2

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: <ul style="list-style-type: none"> <li>● DP has successfully completed SAS Discovery and Authentication with SAS Test Harness</li> </ul>	--	--
2	DP sends a Registration Request message for each of two CBSD. This may occur in a separate Request message per CBSD, or together in a single Request message with array of 2. Verify Registration Request message contains all required parameters properly formatted for CBSDi, i={1,2}, and specifically: <ul style="list-style-type: none"> <li>● userId is present and correct</li> <li>● fcld is present and correct</li> <li>● cbsdSerialNumber is present and correct</li> <li>● measCapability = "RECEIVED_POWER_WITHOUT_GRANT"</li> </ul>	■ Pass	□ Fail
3	If a separate Registration Request message was sent for each CBSD by the DP, the SAS Test Harness shall respond to each Registration Request message with a separate Registration Response message.  If a single Registration Request message was sent by the DP containing a 2-object array (one per CBSD), the SAS Test Harness shall respond with a single Registration Response message containing a 2-object array.  Parameters for each CBSD within the Registration Response message should be as follows, for CBSDi: <ul style="list-style-type: none"> <li>● cbsdId = Ci</li> <li>● measReportConfig= "RECEIVED_POWER_WITHOUT_GRANT"</li> <li>● responseCode = 0</li> </ul>	--	--
4	UUT sends a message: <ul style="list-style-type: none"> <li>● If message is type Spectrum Inquiry Request, go to step 5, or</li> <li>● If message is type Grant Request, go to step 7</li> </ul>	--	--
5	UUT sends message type Spectrum Inquiry Request. This may occur in a separate message per CBSD, or together in a single message with array of 2. Verify Spectrum Inquiry Request message contains all required parameters properly formatted for CBSDi, i= {1,2}, and specifically: <ul style="list-style-type: none"> <li>● cbsdId = Ci</li> <li>● measReport is present, and is a properly formatted rcvdPowerMeasReport.</li> </ul>	■ Pass	□ Fail
6	If a separate Spectrum Inquiry Request message was sent for each CBSD by the DP, the SAS Test Harness shall respond to each Spectrum Inquiry Request message with a separate Spectrum Inquiry Response message.  If a single Spectrum Inquiry Request message was sent by the DP 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.  Parameters for each CBSD within the Spectrum Inquiry Response message should be as follows: <ul style="list-style-type: none"> <li>● cbsdId = Ci</li> <li>● availableChannel is an array of availableChannel objects</li> </ul>	--	--



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	<ul style="list-style-type: none"> <li>● responseCode = 0</li> </ul>		
7	<p>UUT sends message type Grant Request message. This may occur in a separate message per CBSD, or together in a single message with array of 2.</p> <p>Verify the Grant Request message contains all required parameters properly formatted for CBSDi, i= {1,2}, and specifically:</p> <ul style="list-style-type: none"> <li>● cbsdId = Ci</li> <li>● measReport is present, and is a properly formatted rcvdPowerMeasReport.</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail



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## 7.4.2 WINNF.FT.C.MES.3

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: <ul style="list-style-type: none"> <li>● UUT has successfully completed SAS Discovery and Authentication with SAS Test Harness</li> <li>● UUT has successfully registered with SAS Test Harness, with cbsdId=C and measCapability = "RECEIVED_POWER_WITH_GRANT"</li> </ul>	--	--
2	UUT sends a Grant Request message. Verify Grant Request message contains all required parameters properly formatted, and specifically: <ul style="list-style-type: none"> <li>● cbsdId = C</li> <li>● operationParam is present and format is valid</li> </ul>	■ Pass	□ Fail
3	SAS Test Harness sends a Grant Response message, with the following parameters: <ul style="list-style-type: none"> <li>● cbsdId = C</li> <li>● grantId = G = valid grant ID</li> <li>● grantExpireTime = UTC time in the future</li> <li>● heartbeatInterval = 60 seconds</li> <li>● measReportConfig= "RECEIVED_POWER_WITH_GRANT"</li> <li>● operationParam is set to valid operating parameters</li> <li>● channelType = "GAA"</li> <li>● responseCode = 0</li> </ul>	--	--
4	UUT sends a Heartbeat Request message. Verify message contains all required parameters properly formatted, and specifically: <ul style="list-style-type: none"> <li>● cbsdId = C</li> <li>● grantId = G</li> <li>● operationState = "GRANTED"</li> </ul>	■ Pass	□ Fail
5	If Heartbeat Request message (step 4) contains measReport object, then: <ul style="list-style-type: none"> <li>● verify measReport is properly formatted as object rcvdPowerMeasReport</li> <li>● end test, with PASS result</li> </ul> else, if Heartbeat Request message (step 4) does not contain measReport object, then: <ul style="list-style-type: none"> <li>● If number of Heartbeat Requests sent by UUT after Step 3 is = 5, then stop test with result of FAIL</li> </ul>	■ Pass	□ Fail
6	SAS Test Harness sends a Heartbeat Response message, containing all required parameters properly formatted, and specifically: <ul style="list-style-type: none"> <li>● cbsdId = C</li> <li>● grantId = G</li> <li>● transmitExpireTime = current UTC time + 200 seconds</li> <li>● responseCode = 0</li> </ul> Go to Step 4, above	--	--



## 7.4.3 WINNF.FT.D.MES.5

#	Test Execution Steps	Results	
1	<p>Ensure the following conditions are met for test entry:</p> <ul style="list-style-type: none"> <li>● DP has successfully completed SAS Discovery and Authentication with SAS Test Harness</li> <li>● DP has successfully registered 2 CBSD with SAS Test Harness, each with cbsdId=Ci, i={1,2} and measCapability = "RECEIVED_POWER_WITH_GRANT"</li> <li>● DP has received a valid grant with grantId = Gi, i={1,2} for each CBSD</li> <li>● Both CBSD are in Grant State AUTHORIZED and actively transmitting within the bounds of their grants.</li> <li>● Grants have heartbeatInterval =60 seconds</li> </ul>	--	--
2	<p>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 CBSDi:</p> <ul style="list-style-type: none"> <li>● cbsdId = Ci</li> <li>● grantId = Gi</li> <li>● operationState = "AUTHORIZED"</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
3	<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"> <li>● cbsdId = Ci</li> <li>● grantId = Gi</li> <li>● measReportConfig= "RECEIVED_POWER_WITH_GRANT"</li> <li>● responseCode = 0</li> </ul>	--	--
4	<p>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 CBSDi, i = {1,2}:</p> <ul style="list-style-type: none"> <li>● cbsdId = Ci</li> <li>● grantId = Gi</li> <li>● operationState = "AUTHORIZED"</li> <li>● Check whether measReport is present, and if present, ensure it is a properly formatted rcvdPowerMeasReport object, and record its reception for each CBSDi, i = {1,2}.</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
5	<p>If Heartbeat Request message (step 4) contains measReport object, then:</p> <ul style="list-style-type: none"> <li>● Verify measReport is properly formatted as object rcvdPowerMeasReport</li> <li>● record which CBSD have successfully sent a measReport object</li> </ul> <p>If all CBSDi, i = {1,2} have successfully sent a measReport object, then</p>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail



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	<ul style="list-style-type: none"> <li>● end test, with PASS result</li> </ul> <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"> <li>● cbsdId = Ci</li> <li>● grantId = Gi</li> <li>● responseCode = 0</li> </ul> <p>Go to Step 4, above.</p>	--	--



## 7.5 CBSD Relinquishment Process

### 7.5.1 WINNF.FT.D.RLQ.2

#	Test Execution Steps	Results	
1	<p>Ensure the following conditions are met for test entry:</p> <ul style="list-style-type: none"> <li>● DP has successfully completed SAS Discovery and Authentication with SAS Test Harness</li> <li>● DP has successfully registered 2 CBSD with SAS Test Harness, each with cbsdId=Ci, i={1,2}</li> <li>● DP has received a valid grant with grantId = Gi, i={1,2} for each CBSD</li> <li>● Both CBSD are in Grant State AUTHORIZED and actively transmitting within the bounds of their grants.</li> </ul> <p>Invoke trigger to relinquish UUT Grant from the SAS Test Harness</p>	--	--
2	<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.</p> <p>Verify Relinquishment Request message contains all required parameters properly formatted for each CBSD, specifically, for CBSDi:</p> <ul style="list-style-type: none"> <li>● cbsdId = Ci</li> <li>● grantId = Gi</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
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 shall be as follows:</p> <ul style="list-style-type: none"> <li>● cbsdId = Ci</li> <li>● grantId = Gi</li> <li>● responseCode = 0</li> </ul>	--	--
4	After completion of step 3, SAS Test Harness will not provide any additional 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"> <li>● UUT shall stop RF transmission at any time between triggering the relinquishments and UUT sending the relinquishment requests for each CBSD.</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail



## 7.6 CBSD Deregistration Process

### 7.6.1 WINNF.FT.D.DRG.2

#	Test Execution Steps	Results	
1	<p>Ensure the following conditions are met for test entry:</p> <ul style="list-style-type: none"> <li>Each UUT has successfully registered with SAS Test Harness</li> <li>Each UUT is in the authorized state</li> <li>DP has successfully completed SAS Discovery and Authentication with SAS Test Harness</li> <li>DP has successfully registered 2 CBSD with SAS Test Harness, each with <math>cbsdId=Ci, i=\{1,2\}</math></li> <li>DP has received a valid grant with <math>grantId = Gi, i=\{1,2\}</math> for each CBSD</li> <li>Both CBSD are in Grant State AUTHORIZED and actively transmitting within the bounds of their grants.</li> </ul> <p>Invoke trigger to relinquish UUT Grant from the SAS Test Harness</p>	--	--
2	UUT sends a Relinquishment request and receives Relinquishment response with $responseCode=0$	--	--
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. Verify Deregistration Request message contains all required parameters properly formatted for each CBSD, specifically, for CBSDi:</p> <ul style="list-style-type: none"> <li><math>cbsdId = Ci</math></li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
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 shall be as follows:</p> <ul style="list-style-type: none"> <li><math>cbsdId = Ci</math></li> <li><math>responseCode = 0</math></li> </ul>	--	--
5	After completion of step 4, 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"> <li>UUT stopped RF transmission at any time between triggering the deregistration and either A OR B occurs:</li> </ul> <p>A. UUT sending a Registration Request message, as this is not mandatory</p> <p>B. UUT sending a Deregistration Request message</p>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail



## 7.7 CBSD Security Validation

## 7.7.1 WINNF.FT.C.SCS.1

#	Test Execution Steps	Results	
1	<ul style="list-style-type: none"> <li>UUT shall start CBSD-SAS communication with the security procedure</li> <li>The UUT shall establish a TLS handshake with the SAS Test Harness using configured certificate.</li> <li>Configure the SAS Test Harness to accept the security procedure and establish the connection</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
2	<ul style="list-style-type: none"> <li>Make sure that Mutual authentication happens between UUT and the SAS Test Harness.</li> <li>Make sure that UUT uses TLS v1.2</li> <li>Make sure that cipher suites from one of the following is selected,               <ul style="list-style-type: none"> <li>TLS_RSA_WITH_AES_128_GCM_SHA256</li> <li>TLS_RSA_WITH_AES_256_GCM_SHA384</li> <li>TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256</li> <li>TLS_ECDHE_ECDSA_WITH_AES_256_GCM_SHA384</li> <li>TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256</li> </ul> </li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> 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"> <li>UUT sends a registration request to the SAS Test Harness and the SAS Test Harness sends a Registration Response with responseCode = 0 and cbsdId.</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> 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"> <li>UUT shall not transmit RF</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail

## 7.7.2 WINNF.FT.C.SCS.2

#	Test Execution Steps	Results	
1	<ul style="list-style-type: none"> <li>UUT shall start CBSD-SAS communication with the security procedures</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
2	<ul style="list-style-type: none"> <li>Make sure that UUT uses TLS v1.2 for security establishment.</li> <li>Make sure UUT selects the correct cipher suite.</li> <li>UUT shall use CRL or OCSP to verify the validity of the server certificate.</li> <li>Make sure that Mutual authentication does not happen between UUT and the SAS Test Harness.</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
3	<ul style="list-style-type: none"> <li>UUT may retry for the security procedure which shall fail.</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
4	<ul style="list-style-type: none"> <li>SAS Test-Harness shall not receive any Registration request or any application data.</li> </ul>	--	--
5	<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"> <li>UUT shall not transmit RF</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail



## 7.7.3 WINNF.FT.C.SCS.3

#	Test Execution Steps	Results	
1	<ul style="list-style-type: none"> <li>UUT shall start CBSD-SAS communication with the security procedures</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
2	<ul style="list-style-type: none"> <li>Make sure that UUT uses TLS v1.2 for security establishment.</li> <li>Make sure UUT selects the correct cipher suite.</li> <li>UUT shall use CRL or OCSP to verify the validity of the server certificate.</li> <li>Make sure that Mutual authentication does not happen between UUT and the SAS Test Harness.</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
3	<ul style="list-style-type: none"> <li>UUT may retry for the security procedure which shall fail.</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
4	<ul style="list-style-type: none"> <li>SAS Test-Harness shall not receive any Registration request or any application data.</li> </ul>	--	--
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"> <li>UUT shall not transmit RF</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail

## 7.7.4 WINNF.FT.C.SCS.4

#	Test Execution Steps	Results	
1	<ul style="list-style-type: none"> <li>UUT shall start CBSD-SAS communication with the security procedures</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
2	<ul style="list-style-type: none"> <li>Make sure that UUT uses TLS v1.2 for security establishment.</li> <li>Make sure UUT selects the correct cipher suite.</li> <li>UUT shall use CRL or OCSP to verify the validity of the server certificate</li> <li>Make sure that Mutual authentication does not happen between UUT and the SAS Test Harness.</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
3	<ul style="list-style-type: none"> <li>UUT may retry for the security procedure which shall fail.</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
4	<ul style="list-style-type: none"> <li>SAS Test-Harness shall not receive any Registration request or any application data.</li> </ul>	--	--
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"> <li>UUT shall not transmit RF</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail



## 7.7.5 WINNF.FT.C.SCS.5

#	Test Execution Steps	Results	
1	<ul style="list-style-type: none"> <li>UUT shall start CBSD-SAS communication with the security procedures</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
2	<ul style="list-style-type: none"> <li>Make sure that UUT uses TLS v1.2 for security establishment.</li> <li>Make sure UUT selects the correct cipher suite.</li> <li>UUT shall use CRL or OCSP to verify the validity of the server certificate</li> <li>Make sure that Mutual authentication does not happen between UUT and the SAS Test Harness.</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
3	<ul style="list-style-type: none"> <li>UUT may retry for the security procedure which shall fail.</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
4	<ul style="list-style-type: none"> <li>SAS Test-Harness shall not receive any Registration request or any application data.</li> </ul>	--	--
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"> <li>UUT shall not transmit RF</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail



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## 7.8 CBSD RF Power Measurement

### 7.8.1 WINNF.PT.C.HBT.1

#	Test Execution Steps	Results	
1	<p>Ensure the following conditions are met for test entry:</p> <ul style="list-style-type: none"> <li>UUT has successfully completed SAS Discovery and Authentication with the SAS Test Harness</li> <li>UUT has registered with the SAS, with CBSD ID = C</li> <li>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</li> <li>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</li> </ul>	--	--
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"> <li>UUT sends Heartbeat Request, including: <ul style="list-style-type: none"> <li>cbsdId = C</li> <li>grantId = G</li> </ul> </li> <li>SAS Test Harness responds with Heartbeat Response, including: <ul style="list-style-type: none"> <li>cbsdId = C</li> <li>grantId = G</li> <li>transmitExpireTime = current UTC time + 200 seconds</li> <li>responseCode = 0</li> </ul> </li> </ul>	--	--
3	<p>Tester performs power measurement on RF interface(s) of UUT, and verifies it complies with the maxEirp setting, Pi. The RF measurement method is out of scope of this document, but may include additional configuration of the UUT, as required, to fulfill the requirements of the power measurement method.</p> <ul style="list-style-type: none"> <li>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.</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail



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RF measurement plot for Test Case:

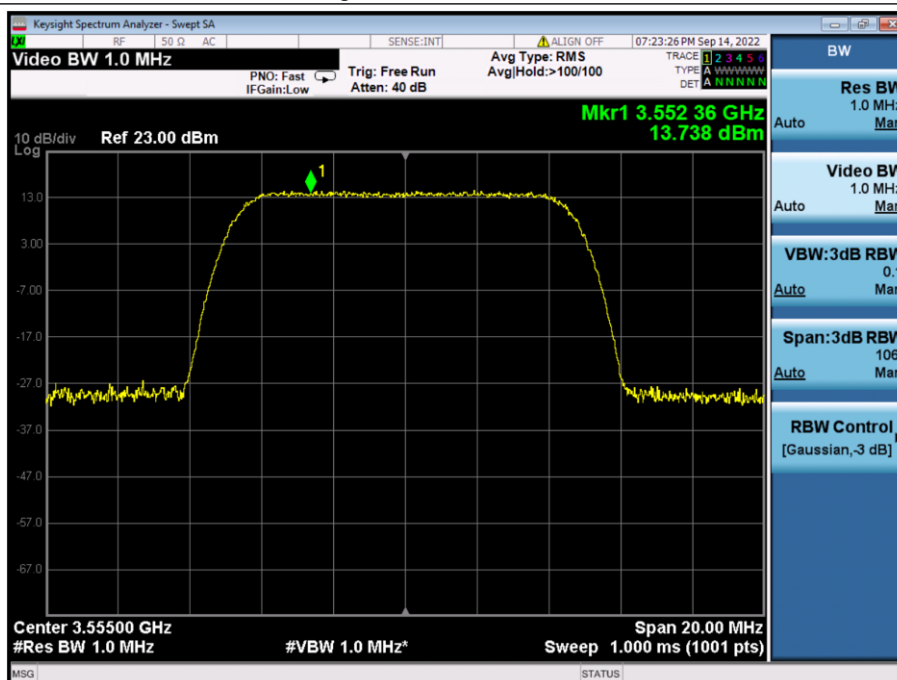
- Tester performs power measurement on RF interface(s) of UUT, and verifies it complies with the maxEirp setting, Pi. The RF measurement method is out of scope of this document, but may include additional configuration of the UUT, as required, to fulfill the requirements of the power measurement method.

Freq. (MHz)	Conducted PSD (dBm/MHz)	Antenna Gain (dBi)	Loss (dB)	Array Gain (dB)	EIRP PSD (dBm/MHz)	Limit (dBm/MHz)	Verdict
3555	13.738	13.5	3.0	3.01	33.248	34	Pass
3555	1.439	13.5	3.0	3.01	20.949	22	Pass
3555	-5.102	13.5	3.0	3.01	14.408	15	Pass

Note:

- Array Gain=10log(n), n is the antenna number, for this test the n=2
- EIRP PSD= Conducted PSD+ Antenna Gain+ Array Gain
- Loss includes cable loss and loss of attenuator

Target Power: 34dBm/MHz



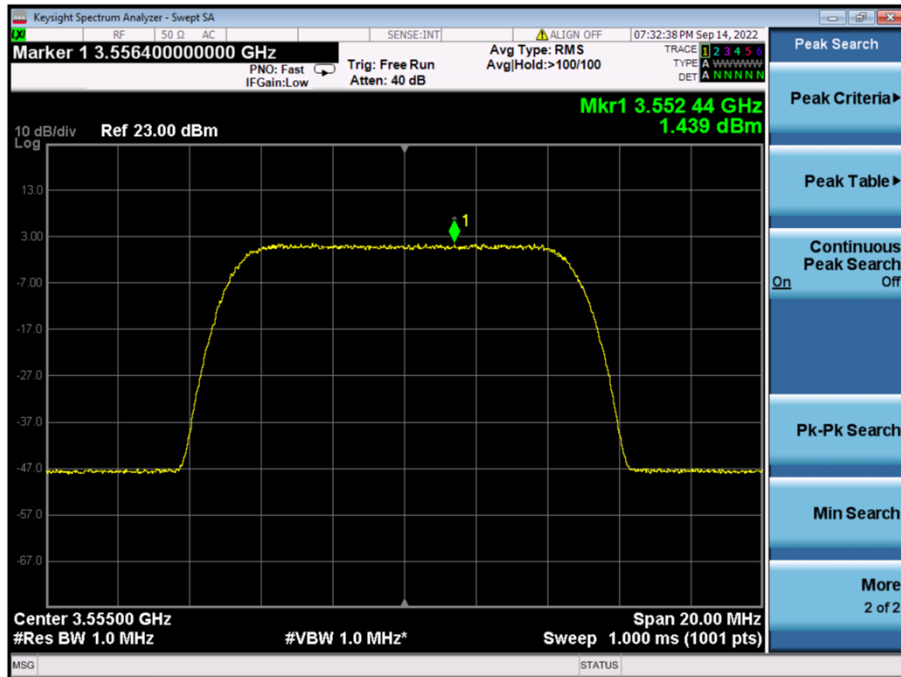
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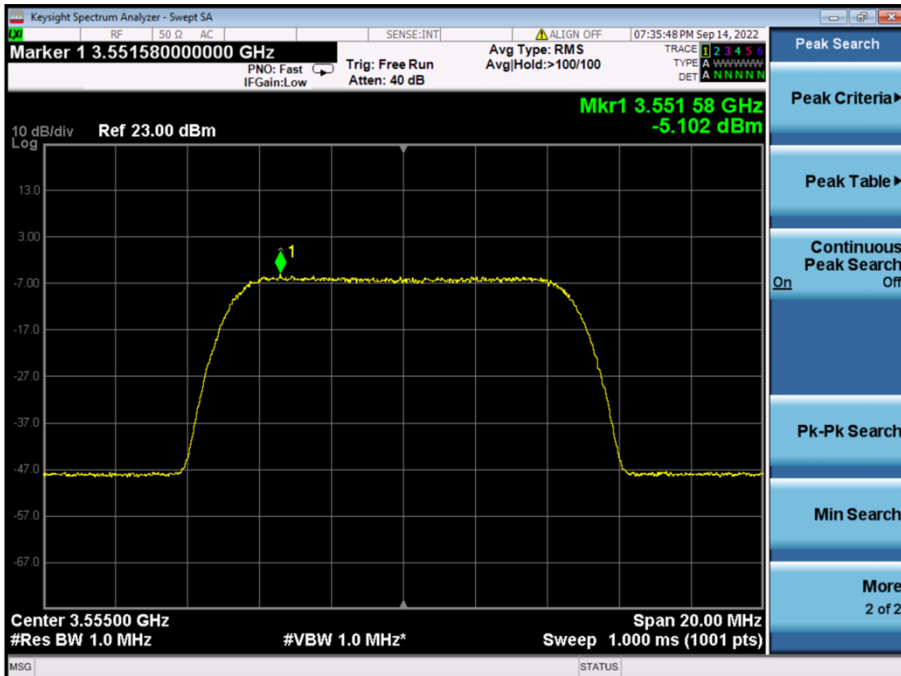
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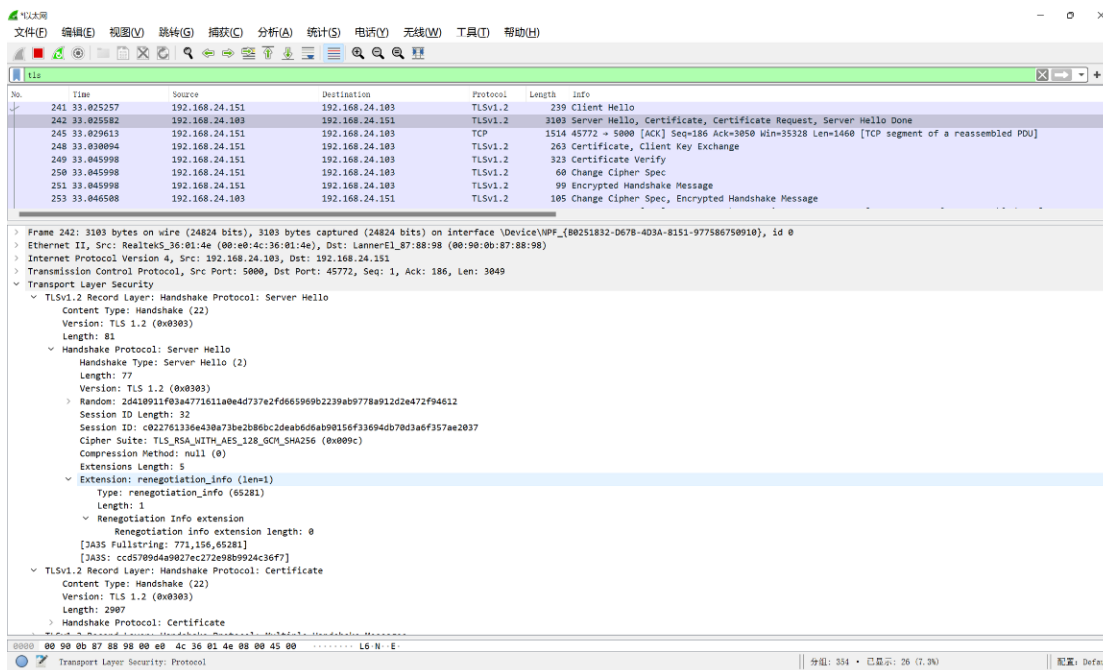
f(86-512)57370818

[sgs.china@sgs.com](mailto:sgs.china@sgs.com)

## 8 Test Data Log For CBSD Under Control of Domain Proxy

Test data log refer to log files (Log files appendix) except for securitytest cases which shows below.

### 8.1 WINNF.FT.C.SCS.1



No.	Time	Source	Destination	Protocol	Length	Info
241	33.025257	192.168.24.151	192.168.24.103	TLSv1.2	239	Client Hello
242	33.025682	192.168.24.103	192.168.24.151	TLSv1.2	3183	Server Hello, Certificate, Certificate Request, Server Hello Done
243	33.029613	192.168.24.151	192.168.24.103	TCP	1514	45772 → 5800 [ACK] Seq=186 Ack=3050 Win=33328 Len=1460 [TCP segment of a reassembled PDU]
248	33.030094	192.168.24.151	192.168.24.103	TLSv1.2	263	Certificate, Client Key Exchange
249	33.045998	192.168.24.151	192.168.24.103	TLSv1.2	323	Certificate Verify
250	33.045998	192.168.24.151	192.168.24.103	TLSv1.2	60	Change Cipher Spec
251	33.045998	192.168.24.151	192.168.24.103	TLSv1.2	99	Encrypted Handshake Message
253	33.046588	192.168.24.103	192.168.24.151	TLSv1.2	185	Change Cipher Spec, Encrypted Handshake Message



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## 8.2 WINNF.FT.C.SCS.2

Wireshark packet capture analysis of an HTTP GET request. The packet list shows a GET request from 192.168.24.151 to 192.168.24.103. The packet details pane shows the request structure: GET /criserver.cgi HTTP/1.1, Host: 192.168.24.103, Connection: Keep-Alive, User-Agent: Apache-HttpClient/4.5.6, Accept-Encoding: gzip, deflate. The packet bytes pane shows the raw data: 00 5f 2f c0 00 47 45 54 20 2f 63 72 6c 73 65 ...

No.	Time	Source	Destination	Protocol	Length	Info
29	36.383383	192.168.24.151	192.168.24.103	HTTP	221	GET /criserver.cgi HTTP/1.1
31	36.370106	192.168.24.103	192.168.24.151	HTTP	1132	HTTP/1.1 200 OK
39	36.189510	192.168.24.103	192.168.24.151	HTTP	682	POST /cell/SAS/getState.action?serialNumber=1202000291216H000568dualCarrierType=deviceType=emb HT
42	36.173637	192.168.24.151	192.168.24.103	HTTP/JSON	60	HTTP/1.1 200 , JavaScript Object Notation (application/json)
44	33.013357	192.168.24.103	192.168.24.151	HTTP	738	POST /msgPush/getMsg.action HTTP/1.1 (application/x-www-form-urlencoded)
45	33.013890	192.168.24.103	192.168.24.151	HTTP	623	POST /msgPush/getAlarmMsg.action HTTP/1.1
47	32.998141	192.168.24.151	192.168.24.103	HTTP/JSON	60	HTTP/1.1 200 , JavaScript Object Notation (application/json)
51	32.201725	192.168.24.151	192.168.24.103	HTTP/JSON	60	HTTP/1.1 200 , JavaScript Object Notation (application/json)
53	30.187415	192.168.24.103	192.168.24.151	HTTP	682	POST /cell/SAS/getState.action?serialNumber=1202000291216H000568dualCarrierType=deviceType=emb HT
56	30.172892	192.168.24.151	192.168.24.103	HTTP/JSON	60	HTTP/1.1 200 , JavaScript Object Notation (application/json)

Wireshark packet capture analysis of a TLS handshake. The packet list shows a TLSv1.2 Client Hello from 192.168.24.151 to 192.168.24.103. The packet details pane shows the handshake structure: TLSv1.2 Record Layer: Handshake Protocol: Server Hello, Content Type: Handshake (22), Version: TLS 1.2 (0x0303), Length: 81. The packet bytes pane shows the raw data: 00 5f 2f c0 00 47 45 54 20 2f 63 72 6c 73 65 ...

No.	Time	Source	Destination	Protocol	Length	Info
22	5.800926	192.168.24.151	192.168.24.103	TLSv1.2	239	Client Hello
23	5.801179	192.168.24.103	192.168.24.151	TLSv1.2	2246	Server Hello, Certificate, Certificate Request, Server Hello Done
34	5.824340	192.168.24.151	192.168.24.103	TLSv1.2	61	Alert (Level: Fatal, Description: Certificate Revoked)

## 8.3 WINNF.FT.C.SCS.3

No.	Time	Source	Destination	Protocol	Length	Info
22	5.880926	192.168.24.151	192.168.24.103	TLSv1.2	239	Client Hello
23	5.881179	192.168.24.103	192.168.24.151	TLSv1.2	3245	Server Hello, Certificate, Certificate Request, Server Hello Done
34	5.824340	192.168.24.151	192.168.24.103	TLSv1.2	61	Alert (Level: Fatal, Description: Certificate Revoked)

Frame 23: 3245 bytes on wire (25960 bits), 3245 bytes captured (25960 bits) on interface \\Device\\NPF\_{80251832-0678-403A-8151-977586758910}, id 0

Ethernet II, Src: Realtek\_36\_01\_4e (00:e0:4c:36:01:4e), Dst: LannerE1\_87:88:98 (00:90:0b:87:88:98)

Internet Protocol Version 4, Src: 192.168.24.103, Dst: 192.168.24.151

Transmission Control Protocol, Src Port: 5000, Dst Port: 48825, Seq: 1, Ack: 186, Len: 3101

Transport Layer Security

- TLV1.2 Record Layer: Handshake Protocol: Server Hello
  - Content Type: Handshake (22)
  - Version: TLS 1.2 (0x0303)
  - Length: 81
  - Handshake Protocol: Server Hello (2)
    - Length: 77
    - Version: TLS 1.2 (0x0303)
    - Random: 90aec67a5d71c0edd9d3b3c3bfc8336035ed8fb1088fb5df9a8c34887a0115
    - Session ID Length: 32
    - Session ID: a77565c825ac76e18d37964833d5f483508e9bdcfb61ee7dddc83452ed24e
    - Cipher Suite: TLS\_RSA\_WITH\_AES\_128\_GCM\_SHA256 (0x009c)
    - Compression Method: null (0)
    - Extensions Length: 5
    - Extension: renegotiation\_info (len=1)
      - Type: renegotiation\_info (65281)
      - Length: 1
      - Renegotiation Info extension
        - Renegotiation info extension length: 0
        - [JA3S Fullstring: 771,156,65281]
        - [JA3S: ccd5789d4e9827ec272e98b9924c36f7]
  - TLV1.2 Record Layer: Handshake Protocol: Certificate
    - Content Type: Handshake (22)
    - Version: TLS 1.2 (0x0303)
    - Length: 3049

0000 00 90 0b 87 88 98 00 e0 4c 36 01 4e 08 00 45 00 ..... L6 N E

Transport Layer Security: Protocol

帧组: 94 • 已显示: 3 (3.2%)

配置: Default



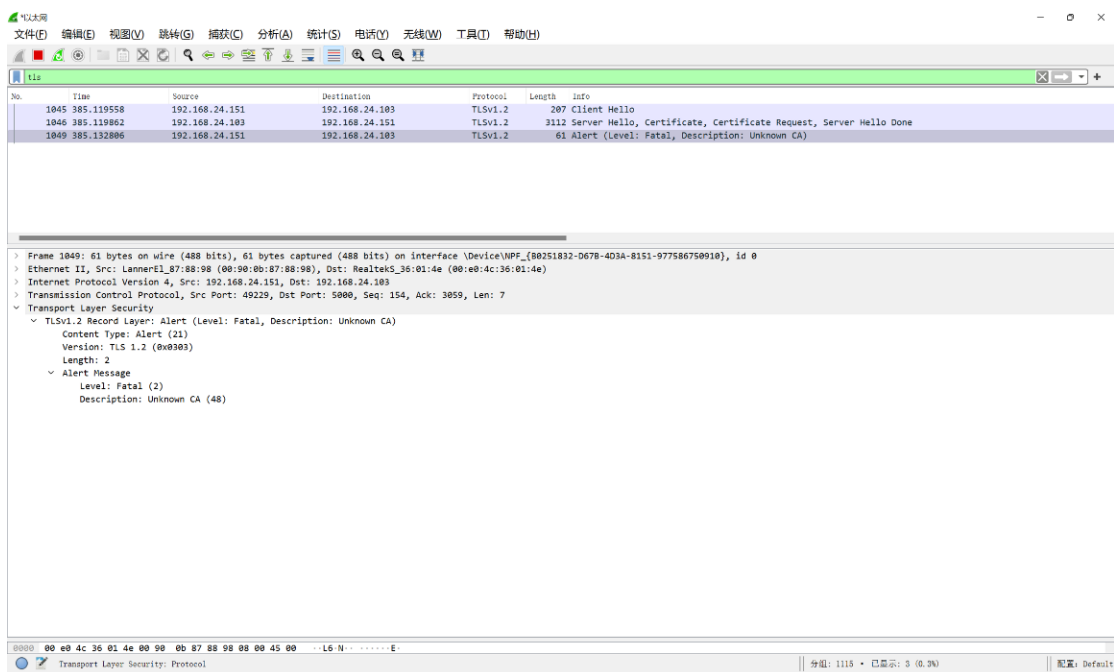
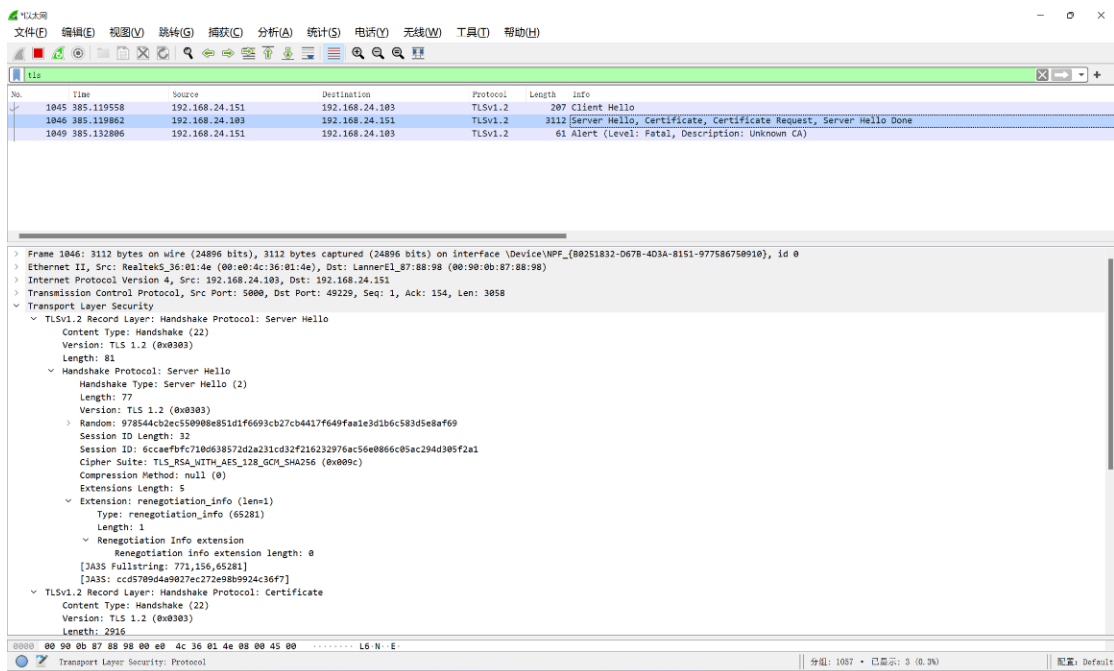
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## 8.4 WINNF.FT.C.SCS.4



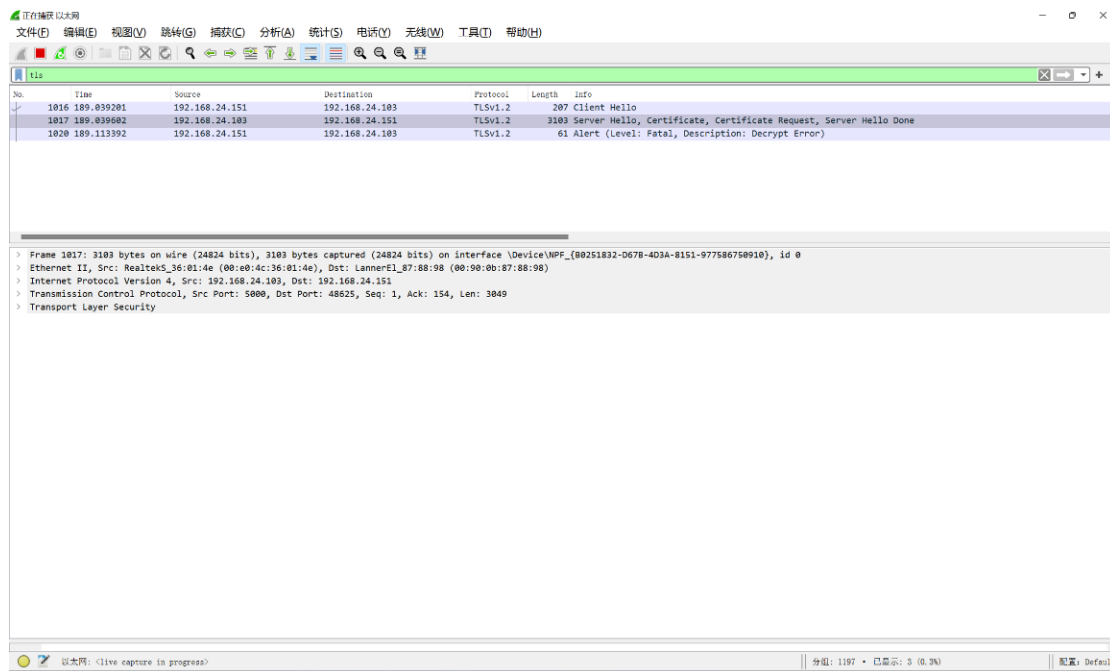
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## 8.5 WINNF.FT.C.SCS.5



No.	Time	Source	Destination	Protocol	Length	Info
1016	189.039201	192.168.24.151	192.168.24.103	TLSv1.2	207	Client Hello
1017	189.039602	192.168.24.103	192.168.24.151	TLSv1.2	3103	Server Hello, Certificate, Certificate Request, Server Hello Done
1020	189.113392	192.168.24.151	192.168.24.103	TLSv1.2	61	Alert (Level: Fatal, Description: Decrypt Error)

Frame 1017: 3103 bytes on wire (24824 bits), 3103 bytes captured (24824 bits) on interface \Device\NPF\_{80251832-D678-403A-8151-977586750910}, id 0  
> Ethernet II, Src: Realtek5\_36:01:4e (00:e0:4c:36:01:4e), Dst: LanerE1\_87:88:98 (00:90:0b:87:88:98)  
> Internet Protocol Version 4, Src: 192.168.24.103, Dst: 192.168.24.151  
> Transmission Control Protocol, Src Port: 5000, Dst Port: 48625, Seq: 1, Ack: 154, Len: 3049  
> Transport Layer Security



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## 9 Test Data For Standalone CBSD

### 9.1 CBSD Registration Process

#### 9.1.1 WINNF.FT.C.REG.1

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: <ul style="list-style-type: none"> <li>UUT has successfully completed SAS Discovery and Authentication with the SAS Test Harness</li> <li>UUT is in the Unregistered state</li> </ul>	--	--
2	CBSD sends correct Registration request information, as specified in [n.5], to the SAS Test Harness: <ul style="list-style-type: none"> <li>The required userId, fcld and cbsdSerialNumber registration parameters shall be sent from the CBSD and conform to proper format and acceptable ranges.</li> <li>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.</li> </ul> <p>Note: It is outside the scope of this document to test the Registration information that is supplied via another means.</p>	■ Pass	□ Fail
3	SAS Test Harness sends a CBSD Registration Response as follows: <ul style="list-style-type: none"> <li>cbsdId = C</li> <li>measReportConfig shall not be included</li> <li>responseCode = 0</li> </ul>	--	--
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 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"> <li>UUT shall not transmit RF</li> </ul>	■ Pass	□ Fail



## 9.1.2 WINNF.FT.C.REG.5

#	Test Execution Steps	Results	
1	<p>Ensure the following conditions are met for test entry:</p> <ul style="list-style-type: none"> <li>UUT has successfully completed SAS Discovery and Authentication with SAS Test Harness</li> <li>UUT is in the Unregistered state</li> <li>All of the required and REG-Conditional parameters shall be configured and CPI signature provided</li> </ul>	--	--
2	<p>CBSD sends Registration request to the SAS Test Harness:</p> <ul style="list-style-type: none"> <li>The required userId, fcId and cbsdSerialNumber and REG-Conditional cbsdCategory, airInterface, measCapability and cpiSignatureData registration parameters shall be sent from the CBSD and conform to proper format and acceptable ranges.</li> <li>Any optional registration parameters that may be included in the message shall be verified that they conform to proper format and are within acceptable ranges.</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
3	<p>SAS Test Harness sends a CBSD Registration Response as follows:</p> <ul style="list-style-type: none"> <li>cbsdId = C</li> <li>measReportConfig shall not be included.</li> <li>responseCode = 0</li> </ul>	--	--
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 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"> <li>UUT shall not transmit RF</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail



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## 9.1.3 WINNF.FT.C.REG.8

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: <ul style="list-style-type: none"> <li>UUT has successfully completed SAS Discovery and Authentication with SAS Test Harness</li> <li>UUT is in the Unregistered state</li> </ul>	--	--
2	CBSD sends a Registration request to SAS Test Harness.	--	--
3	SAS Test Harness rejects the request by sending a CBSD Registration Response as follows: <ul style="list-style-type: none"> <li>SAS response does not include cbsdId</li> <li>responseCode = 102</li> </ul>	--	--
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 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"> <li>UUT shall not transmit RF</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail



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## 9.1.4 WINNF.FT.C.REG.10

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: <ul style="list-style-type: none"> <li>UUT has successfully completed SAS Discovery and Authentication with SAS Test Harness</li> <li>UUT is in the Unregistered state</li> </ul>	--	--
2	CBSD sends a Registration request to SAS Test Harness.	--	--
3	SAS Test Harness rejects the request by sending a CBSD Registration Response as follows: <ul style="list-style-type: none"> <li>SAS response does not include cbsdId</li> <li>responseCode = 200</li> </ul>	--	--
4	After completion of step 3, SAS Test Harness will not provide any positive response (responseCode=200) 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: <ul style="list-style-type: none"> <li>UUT shall not transmit RF</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail



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## 9.1.5 WINNF.FT.C.REG.12

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: <ul style="list-style-type: none"> <li>UUT has successfully completed SAS Discovery and Authentication with SAS Test Harness</li> <li>UUT is in the Unregistered state</li> </ul>	--	--
2	CBSD sends a Registration request to SAS Test Harness.	--	--
3	SAS Test Harness rejects the request by sending a CBSD Registration Response as follows: <ul style="list-style-type: none"> <li>SAS response does not include cbsdId</li> <li>responseCode = 103</li> </ul>	--	--
4	After completion of step 3, SAS Test Harness will not provide any positive response (responseCode=103) 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: <ul style="list-style-type: none"> <li>UUT shall not transmit RF</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail



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## 9.1.6 WINNF.FT.C.REG.14

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: <ul style="list-style-type: none"> <li>UUT has successfully completed SAS Discovery and Authentication with SAS Test Harness</li> <li>UUT is in the Unregistered state</li> </ul>	--	--
2	CBSD sends a Registration request to SAS Test Harness.	--	--
3	SAS Test Harness rejects the request by sending a CBSD Registration Response as follows: <ul style="list-style-type: none"> <li>SAS response does not include cbsdId</li> <li>responseCode = 101</li> </ul>	--	--
4	After completion of step 3, SAS Test Harness will not provide any positive response (responseCode=101) 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: <ul style="list-style-type: none"> <li>UUT shall not transmit RF</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail



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## 9.1.7 WINNF.FT.C.REG.16

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: <ul style="list-style-type: none"> <li>UUT has successfully completed SAS Discovery and Authentication with SAS Test Harness</li> <li>UUT is in the Unregistered state</li> </ul>	--	--
2	CBSD sends a Registration request to SAS Test Harness.	--	--
3	SAS Test Harness rejects the request by sending a CBSD Registration Response as follows: <ul style="list-style-type: none"> <li>SAS response does not include cbsdId</li> <li>responseCode = 100</li> </ul>	--	--
4	After completion of step 3, SAS Test Harness will not provide any positive response (responseCode=100) 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: <ul style="list-style-type: none"> <li>UUT shall not transmit RF</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail



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## 9.1.8 WINNF.FT.C.REG.18

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: <ul style="list-style-type: none"> <li>UUT has successfully completed SAS Discovery and Authentication with SAS Test Harness</li> <li>UUT is in the Unregistered state</li> </ul>	--	--
2	CBSD sends a Registration request to SAS Test Harness.	--	--
3	SAS Test Harness rejects the request by sending a CBSD Registration Response as follows: <ul style="list-style-type: none"> <li>SAS response does not include cbsdId</li> <li>responseCode = 201</li> </ul>	--	--
4	After completion of step 3, SAS Test Harness will not provide any positive response (responseCode=201) 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: <ul style="list-style-type: none"> <li>UUT shall not transmit RF</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail



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## 9.2 CBSD Spectrum Grant Process

### 9.2.1 WINNF.FT.C.GRA.1

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: ● UUT has registered successfully with SAS Test Harness, with cbsdId = C	--	--
2	UUT sends valid Grant Request.	■ Pass	□ Fail
3	SAS Test Harness sends a Grant Response message, including ● cbsdId=C - responseCode = 400	--	--
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 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

### 9.2.2 WINNF.FT.C.GRA.2

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: ● UUT has registered successfully with SAS Test Harness, with cbsdId = C	--	--
2	UUT sends valid Grant Request.	■ Pass	□ Fail
3	SAS Test Harness sends a Grant Response message, including - cbsdId=C - responseCode = 401	--	--
4	After completion of step 3, SAS Test Harness will not provide any positive response (responseCode=401) 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



## 9.3 CBSD HeartBeat Process

## 9.3.1 WINNF.FT.C.HBT.1

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: ● UUT has registered successfully with SAS Test Harness, with cbsdId = C	--	--
2	UUT sends a message: ● If message is type Spectrum Inquiry Request, go to step 3, or ● If message is type Grant Request, go to step 5	--	--
3	UUT sends Spectrum Inquiry Request. Validate: ● cbsdId = C ● List of frequencyRange objects sent by UUT are within the CBRS frequency range	■ Pass	□ Fail
4	SAS Test Harness sends a Spectrum Inquiry Response message, including the following parameters: ● cbsdId = C ● availableChannel is an array of availableChannel objects ● responseCode = 0	--	--
5	UUT sends Grant Request message. Validate: ● cbsdId = C ● maxEIRP is at or below the limit appropriate for CBSD category as defined by Part 96 ● operationFrequencyRange, F, sent by UUT is a valid range within the CBRS band	■ Pass	□ Fail
6	SAS Test Harness sends a Grant Response message, including the parameters: ● cbsdId = C ● grantId = G = a valid grant ID ● grantExpireTime = UTC time greater than duration of the test ● responseCode = 0	--	--
7	UUT sends a first Heartbeat Request message. Verify Heartbeat Request message is formatted correctly, including: ● cbsdId = C ● grantId = G ● operationState = "GRANTED"	■ Pass	□ Fail
8	SAS Test Harness sends a Heartbeat Response message, with the following parameters: ● cbsdId = C ● grantId = G ● transmitExpireTime = current UTC time + 200 seconds ● responseCode = 0	--	--
9	For further Heartbeat Request messages sent from UUT after completion of step 8, validate message is sent within latest specified heartbeatInterval, and: ● cbsdId = C ● grantId = G ● operationState = "AUTHORIZED" and SAS Test Harness responds with a Heartbeat Response message including the following parameters: ● cbsdId = C ● grantId = G ● transmitExpireTime = current UTC time + 200 seconds ● responseCode = 0	■ Pass	□ Fail



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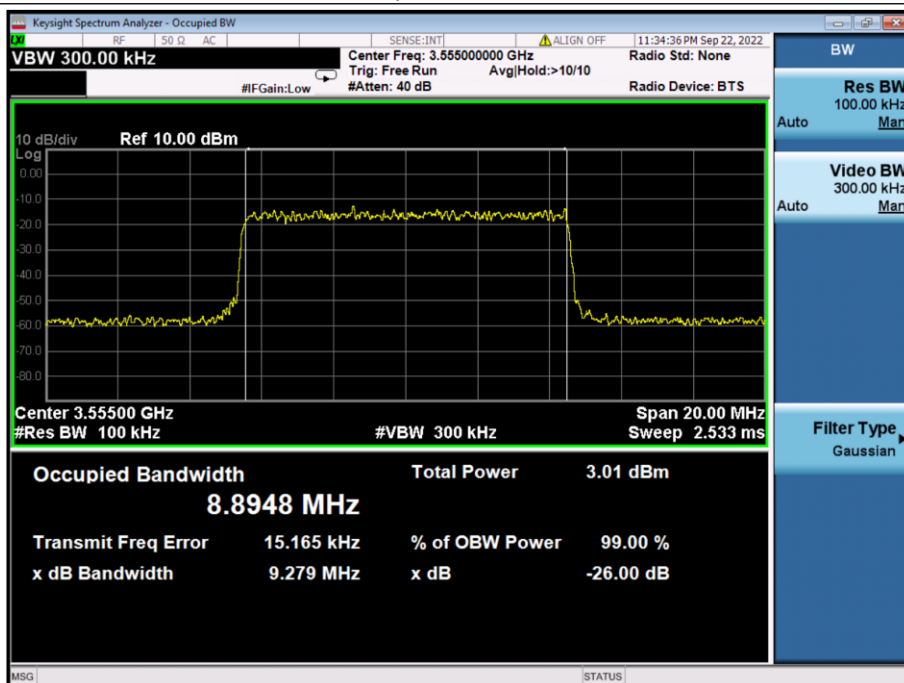
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10	Monitor the RF output of the UUT from start of test until UUT transmission commences. Verify: <ul style="list-style-type: none"><li>• UUT does not transmit at any time prior to completion of the first heartbeat response</li><li>• UUT transmits after step 8 is complete, and its transmission is limited to within the bandwidth range F.</li></ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
----	--	--	-------------------------------

Spectrum Plot



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## 9.3.2 WINNF.FT.C.HBT.3

#	Test Execution Steps	Results	
1	<p>Ensure the following conditions are met for test entry:</p> <ul style="list-style-type: none"> <li>● UUT has registered successfully with SAS Test Harness</li> <li>● UUT has a valid single grant as follows: <ul style="list-style-type: none"> <li>○ valid cbsdId = C</li> <li>○ valid grantId = G</li> <li>○ grant is for frequency range F, power P</li> <li>○ grantExpireTime = UTC time greater than duration of the test</li> </ul> </li> <li>● UUT is in AUTHORIZED state and is transmitting within the grant bandwidth F on RF interface</li> </ul>	--	--
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"> <li>● cbsdId = C</li> <li>● grantId = G</li> <li>● operationState = "AUTHORIZED"</li> </ul>	--	--
3	<p>SAS Test Harness sends a Heartbeat Response message, including the following parameters:</p> <ul style="list-style-type: none"> <li>● cbsdId = C</li> <li>● grantId = G</li> <li>● transmitExpireTime = T = Current UTC time</li> <li>● responseCode = 105 (DEREGISTER)</li> </ul>	--	--
4	After completion of step 3, SAS Test Harness shall not allow any further grants to the UUT.	--	--
5	<p>Monitor the RF output of the UUT. Verify:</p> <ul style="list-style-type: none"> <li>● UUT shall stop transmission within (T + 60 seconds) of completion of step 3</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail



## 9.3.3 WINNF.FT.C.HBT.4

#	Test Execution Steps	Results	
1	<p>Ensure the following conditions are met for test entry:</p> <ul style="list-style-type: none"> <li>● UUT has registered successfully with SAS Test Harness</li> <li>● UUT has a valid single grant as follows: <ul style="list-style-type: none"> <li>○ valid cbsdId = C</li> <li>○ valid grantId = G</li> <li>○ grant is for frequency range F, power P</li> <li>○ grantExpireTime = UTC time greater than duration of the test</li> </ul> </li> <li>● UUT is in AUTHORIZED state and is transmitting within the grant bandwidth F on RF interface</li> </ul>	--	--
2	<p>UUT sends a Heartbeat Request message. Ensure Heartbeat Request message is sent within latest specified heartbeatInterval, and is formatted correctly, including:</p> <ul style="list-style-type: none"> <li>● cbsdId = C</li> <li>● grantId = G</li> <li>● operationState = "AUTHORIZED"</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
3	<p>SAS Test Harness sends a Heartbeat Response message, including the following parameters:</p> <ul style="list-style-type: none"> <li>● cbsdId = C</li> <li>● grantId = G</li> <li>● transmitExpireTime = T = current UTC time</li> <li>● responseCode = 500 (TERMINATED_GRANT)</li> </ul>	--	--
4	After completion of step 3, SAS Test Harness shall not allow any further grants to the UUT.	--	--
5	<p>Monitor the RF output of the UUT. Verify:</p> <ul style="list-style-type: none"> <li>● UUT shall stop transmission within (T + 60 seconds) of completion of step 3</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail



## 9.3.4 WINNF.FT.C.HBT.5

#	Test Execution Steps	Results	
1	<p>Ensure the following conditions are met for test entry:</p> <ul style="list-style-type: none"> <li>● UUT has registered successfully with SAS Test Harness</li> <li>● UUT has a valid single grant as follows: <ul style="list-style-type: none"> <li>○ valid cbsdId = C</li> <li>○ valid grantId = G</li> <li>○ grant is for frequency range F, power P</li> <li>○ grantExpireTime = UTC time greater than duration of the test</li> </ul> </li> <li>● UUT is in GRANTED, but not AUTHORIZED state (i.e. has not performed its first Heartbeat Request)</li> </ul>	--	--
2	<p>UUT sends a Heartbeat Request message. Verify Heartbeat Request message is formatted correctly, including:</p> <ul style="list-style-type: none"> <li>● cbsdId = C</li> <li>● grantId = G</li> <li>● operationState = "GRANTED"</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
3	<p>SAS Test Harness sends a Heartbeat Response message, including the following parameters:</p> <ul style="list-style-type: none"> <li>● cbsdId = C</li> <li>● grantId = G</li> <li>● transmitExpireTime = T = current UTC time</li> <li>● ?responseCode = 501 (SUSPENDED_GRANT)</li> </ul>	--	--
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"> <li>● cbsdId = C</li> <li>● grantId = G</li> <li>● operationState = "GRANTED"</li> </ul> <p>B. UUT sends a Relinquishment request message. Ensure message is correctly formatted with parameters:</p> <ul style="list-style-type: none"> <li>● cbsdId = C</li> <li>● grantId = G</li> </ul> <p>Monitor the RF output of the UUT. Verify:</p> <ul style="list-style-type: none"> <li>● UUT does not transmit at any time</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail



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## 9.3.5 WINNF.FT.C.HBT.6

#	Test Execution Steps	Results	
1	<p>Ensure the following conditions are met for test entry:</p> <ul style="list-style-type: none"> <li>● UUT has registered successfully with SAS Test Harness</li> <li>● UUT has a valid single grant as follows: <ul style="list-style-type: none"> <li>○ valid cbsdId = C</li> <li>○ valid grantId = G</li> <li>○ grant is for frequency range F, power P</li> <li>○ grantExpireTime = UTC time greater than duration of the test</li> </ul> </li> <li>● UUT is in AUTHORIZED state and is transmitting within the grant bandwidth F on RF interface</li> </ul>	--	--
2	<p>UUT sends a Heartbeat Request message. Ensure Heartbeat Request message is sent within latest specified heartbeatInterval, and is formatted correctly, including:</p> <ul style="list-style-type: none"> <li>● cbsdId = C</li> <li>● grantId = G</li> <li>● operationState = "AUTHORIZED"</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
3	<p>SAS Test Harness sends a Heartbeat Response message, including the following parameters:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> cbsdId = C</li> <li><input type="checkbox"/> grantId = G</li> <li><input type="checkbox"/> transmitExpireTime = T = current UTC time</li> <li>● responseCode = 501 (SUSPENDED_GRANT)</li> </ul>	--	--
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 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"> <li>● cbsdId = C</li> <li>● grantId = G</li> <li>● operationState = "GRANTED"</li> </ul> <p>B. UUT sends a Relinquishment request message. Ensure message is correctly formatted with parameters:</p> <ul style="list-style-type: none"> <li>● cbsdId = C</li> <li>● grantId = G</li> </ul> <p>Monitor the RF output of the UUT. Verify:</p> <ul style="list-style-type: none"> <li>● UUT shall stop transmission within (T+60) seconds of completion of step 3</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail



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## 9.3.6 WINNF.FT.C.HBT.7

#	Test Execution Steps	Results	
1	<p>Ensure the following conditions are met for test entry:</p> <ul style="list-style-type: none"> <li>● UUT has registered successfully with SAS Test Harness</li> <li>● UUT has a valid single grant as follows: <ul style="list-style-type: none"> <li>○ valid cbsdId = C</li> <li>○ valid grantId = G</li> <li>○ grant is for frequency range F, power P</li> <li>○ grantExpireTime = UTC time greater than duration of the test</li> </ul> </li> <li>● UUT is in AUTHORIZED state and is transmitting within the grant bandwidth F on RF interface</li> </ul>	--	--
2	<p>UUT sends a Heartbeat Request message. Ensure Heartbeat Request message is sent within latest specified heartbeatInterval, and is formatted correctly, including:</p> <ul style="list-style-type: none"> <li>● cbsdId = C</li> <li>● grantId = G</li> <li>● operationState = "AUTHORIZED"</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
3	<p>SAS Test Harness sends a Heartbeat Response message, including the following parameters:</p> <ul style="list-style-type: none"> <li>□ cbsdId = C</li> <li>□ grantId = G</li> <li>□ transmitExpireTime = T = current UTC time</li> <li>● responseCode = 502 (UNSYNC_OP_PARAM)</li> </ul>	--	--
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"> <li>● UUT sends a Grant Relinquishment Request message. Verify message is correctly formatted with parameters: <ul style="list-style-type: none"> <li>○ cbsdId = C</li> <li>○ grantId = G</li> </ul> </li> </ul> <p>Monitor the RF output of the UUT. Verify:</p> <ul style="list-style-type: none"> <li>● UUT shall stop transmission within (T+60) seconds of completion of step 3</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail



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## 9.3.7 WINNF.FT.C.HBT.9

#	Test Execution Steps	Results	
1	<p>Ensure the following conditions are met for test entry:</p> <ul style="list-style-type: none"> <li>● UUT has registered successfully with SAS Test Harness</li> <li>● UUT has a valid single grant as follows: <ul style="list-style-type: none"> <li>○ valid cbsdId = C</li> <li>○ valid grantId = G</li> <li>○ grant is for frequency range F, power P</li> <li>○ grantExpireTime = UTC time greater than duration of the test</li> </ul> </li> <li>● UUT is in GRANTED, but not AUTHORIZED state(i.e. has not performed its first Heartbeat Request)</li> </ul>	--	--
2	<p>UUT sends a Heartbeat Request message. Ensure Heartbeat Request message is sent within latest specified heartbeatInterval, and is formatted correctly, including:</p> <ul style="list-style-type: none"> <li>● cbsdId = C</li> <li>● grantId = G</li> <li>● operationState = "GRANTED"</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
3	<p>After completion of step 2, SAS Test Harness does not respond to any further</p> <ul style="list-style-type: none"> <li>● messages from UUT to simulate loss of network connection</li> </ul>	--	--
4	<p>Monitor the RF output of the UUT from start of test to 60 seconds after step 3. Verify: At any time during the test, UUT shall not transmit on RF interface</p>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail



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## 9.3.8 WINNF.FT.C.HBT.10

#	Test Execution Steps	Results	
1	<p>Ensure the following conditions are met for test entry:</p> <ul style="list-style-type: none"> <li>● UUT has registered successfully with SAS Test Harness</li> <li>● UUT has a valid single grant as follows: <ul style="list-style-type: none"> <li>○ valid cbsdId = C</li> <li>○ valid grantId = G</li> <li>○ grant is for frequency range F, power P</li> <li>○ grantExpireTime = UTC time greater than duration of the test</li> </ul> </li> <li>● UUT is in AUTHORIZED state and is transmitting within the grant bandwidth F on RF interface</li> </ul>	--	--
2	<p>UUT sends a Heartbeat Request message. Verify Heartbeat Request message is sent within latest specified heartbeatInterval, and is formatted correctly, including:</p> <ul style="list-style-type: none"> <li>● cbsdId = C</li> <li>● grantId = G</li> <li>● operationState = "AUTHORIZED"</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
3	<p>SAS Test Harness sends a Heartbeat Response message, including the following parameters:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> cbsdId = C</li> <li><input type="checkbox"/> grantId = G</li> <li><input type="checkbox"/> transmitExpireTime = T = current UTC time + 200 seconds</li> <li>● responseCode = 0</li> </ul>	--	--
4	After completion of step 3, SAS Test Harness shall not allow any further grants to the UUT.	--	--
5	<p>Monitor the RF output of the UUT. Verify:</p> <ul style="list-style-type: none"> <li>● UUT shall stop all transmission on RF interface within (transmitExpireTime + 60 seconds), using the transmitExpireTime sent in Step 3.</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail



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## 9.4 CBSD Relinquishment Process

### 9.4.1 WINNF.FT.C.RLQ.1

#	Test Execution Steps	Results	
1	<p>Ensure the following conditions are met for test entry:</p> <ul style="list-style-type: none"> <li>UUT has successfully completed SAS Discovery and Authentication with SAS Test Harness</li> <li>UUT has successfully registered with SAS Test Harness, with cbsdId=C</li> <li>UUT has received a valid grant with grantId = G</li> <li>UUT is in Grant State AUTHORIZED and is actively transmitting within the bounds of its grant.</li> </ul> <p>Invoke trigger to relinquish UUT Grant from the SAS Test Harness</p>	--	--
2	<p>UUT sends a Relinquishment Request message. Verify message contains all required parameters properly formatted, and specifically:</p> <ul style="list-style-type: none"> <li>cbsdId = C</li> <li>grantId = G</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
3	<p>SAS Test Harness shall approve the request with a Relinquishment Response message with parameters:</p> <ul style="list-style-type: none"> <li>- cbsdId = C</li> <li>- grantId = G</li> <li>● responseCode = 0</li> </ul>	--	--
4	<p>After completion of step 3, SAS Test Harness will not provide any additional positive</p> <ul style="list-style-type: none"> <li>● response (responseCode=0) to further request messages from the UUT</li> </ul>	--	--
5	<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"> <li>UUT shall stop RF transmission at any time between triggering the relinquishment and UUT sending the relinquishment request</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail



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## 9.5 CBSD Deregistration Process

### 9.5.1 WINNF.FT.C.DRG.1

#	Test Execution Steps	Results	
1	<p>Ensure the following conditions are met for test entry:</p> <ul style="list-style-type: none"> <li>• UUT has successfully completed SAS Discovery and Authentication with SAS Test Harness</li> <li>• UUT has successfully registered with SAS Test Harness, with cbsdId=C</li> <li>• UUT has received a valid grant with grantId = G</li> <li>• UUT is in Grant State AUTHORIZED and is actively transmitting within the bounds of its grant.</li> </ul> <p>Invoke trigger to deregister UUT from the SAS Test Harness</p>	--	--
2	<p>UUT sends a Relinquishment request and receives Relinquishment response with</p> <ul style="list-style-type: none"> <li>• responseCode=0</li> </ul>	--	--
3	<ul style="list-style-type: none"> <li>• UUT sends Deregistration Request to SAS Test Harness with cbsdId = C.</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
4	<p>SAS Test Harness shall approve the request with a Deregistration Response message with parameters:</p> <ul style="list-style-type: none"> <li>• cbsdId = C</li> <li>• responseCode = 0</li> </ul>	--	--
5	<p>After completion of step 3, SAS Test Harness will not provide any additional positive</p> <ul style="list-style-type: none"> <li>• response (responseCode=0) to further request messages from the UUT.</li> </ul>	--	--
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"> <li>• UUT stopped RF transmission at any time between triggering the deregistration and either A OR B occurs:</li> </ul> <p>A. UUT sending a Registration Request message, as this is not mandatory</p> <p>B. UUT sending a Deregistration Request message</p>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail



## 9.6 CBSD Security Validation

## 9.6.1 WINNF.FT.C.SCS.1

#	Test Execution Steps	Results	
1	<ul style="list-style-type: none"> <li>UUT shall start CBSD-SAS communication with the security procedure</li> <li>The UUT shall establish a TLS handshake with the SAS Test Harness using configured certificate.</li> <li>Configure the SAS Test Harness to accept the security procedure and establish the connection</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
2	<ul style="list-style-type: none"> <li>Make sure that Mutual authentication happens between UUT and the SAS Test Harness.</li> <li>Make sure that UUT uses TLS v1.2</li> <li>Make sure that cipher suites from one of the following is selected,               <ul style="list-style-type: none"> <li>TLS_RSA_WITH_AES_128_GCM_SHA256</li> <li>TLS_RSA_WITH_AES_256_GCM_SHA384</li> <li>TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256</li> <li>TLS_ECDHE_ECDSA_WITH_AES_256_GCM_SHA384</li> <li>TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256</li> </ul> </li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> 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"> <li>UUT sends a registration request to the SAS Test Harness and the SAS Test Harness sends a Registration Response with responseCode = 0 and cbsdId.</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> 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"> <li>UUT shall not transmit RF</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail

## 9.6.2 WINNF.FT.C.SCS.2

#	Test Execution Steps	Results	
1	<ul style="list-style-type: none"> <li>UUT shall start CBSD-SAS communication with the security procedures</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
2	<ul style="list-style-type: none"> <li>Make sure that UUT uses TLS v1.2 for security establishment.</li> <li>Make sure UUT selects the correct cipher suite.</li> <li>UUT shall use CRL or OCSP to verify the validity of the server certificate.</li> <li>Make sure that Mutual authentication does not happen between UUT and the SAS Test Harness.</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
3	<ul style="list-style-type: none"> <li>UUT may retry for the security procedure which shall fail.</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
4	<ul style="list-style-type: none"> <li>SAS Test-Harness shall not receive any Registration request or any application data.</li> </ul>	--	--
5	<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"> <li>UUT shall not transmit RF</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail



## 9.6.3 WINNF.FT.C.SCS.3

#	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

## 9.6.4 WINNF.FT.C.SCS.4

#	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



## 9.6.5 WINNF.FT.C.SCS.5

#	Test Execution Steps	Results	
1	<ul style="list-style-type: none"> <li>UUT shall start CBSD-SAS communication with the security procedures</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
2	<ul style="list-style-type: none"> <li>Make sure that UUT uses TLS v1.2 for security establishment.</li> <li>Make sure UUT selects the correct cipher suite.</li> <li>UUT shall use CRL or OCSP to verify the validity of the server certificate</li> <li>Make sure that Mutual authentication does not happen between UUT and the SAS Test Harness.</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
3	<ul style="list-style-type: none"> <li>UUT may retry for the security procedure which shall fail.</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
4	<ul style="list-style-type: none"> <li>SAS Test-Harness shall not receive any Registration request or any application data.</li> </ul>	--	--
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"> <li>UUT shall not transmit RF</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail



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## 9.7 CBSD RF Power Measurement

### 9.7.1 WINNF.PT.C.HBT

#	Test Execution Steps	Results	
1	<p>Ensure the following conditions are met for test entry:</p> <ul style="list-style-type: none"> <li>UUT has successfully completed SAS Discovery and Authentication with the SAS Test Harness</li> <li>UUT has registered with the SAS, with CBSD ID = C</li> <li>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</li> <li>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</li> </ul>	--	--
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"> <li>UUT sends Heartbeat Request, including: <ul style="list-style-type: none"> <li>cbsdId = C</li> <li>grantId = G</li> </ul> </li> <li>SAS Test Harness responds with Heartbeat Response, including: <ul style="list-style-type: none"> <li>cbsdId = C</li> <li>grantId = G</li> <li>transmitExpireTime = current UTC time + 200 seconds</li> <li>responseCode = 0</li> </ul> </li> </ul>	--	--
3	<p>Tester performs power measurement on RF interface(s) of UUT, and verifies it complies with the maxEirp setting, Pi. The RF measurement method is out of scope of this document, but may include additional configuration of the UUT, as required, to fulfill the requirements of the power measurement method.</p> <ul style="list-style-type: none"> <li>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.</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail



RF measurement plot for Test Case:

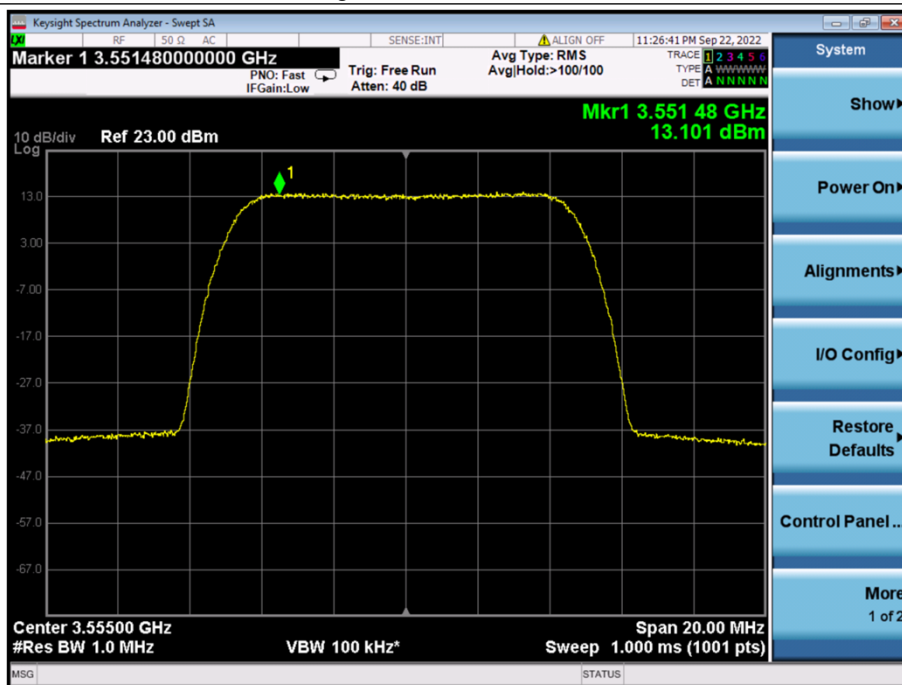
- Tester performs power measurement on RF interface(s) of UUT, and verifies it complies with the maxEirp setting, Pi. The RF measurement method is out of scope of this document, but may include additional configuration of the UUT, as required, to fulfill the requirements of the power measurement method.

Freq. (MHz)	Conducted PSD (dBm/MHz)	Antenna Gain (dBi)	Loss (dB)	Array Gain (dB)	EIRP PSD (dBm/MHz)	Limit (dBm/MHz)	Verdict
3555	13.101	13.5	3.0	3.01	32.611	34	Pass
3555	0.617	13.5	3.0	3.01	20.127	22	Pass
3555	-5.288	13.5	3.0	3.01	14.222	15	Pass

Note:

- Array Gain=10log(n), n is the antenna number, for this test the n=2
- EIRP PSD= Conducted PSD+ Antenna Gain+ Array Gain
- Loss includes cable loss and loss of attenuator

Target Power: 34 dBm/MHz



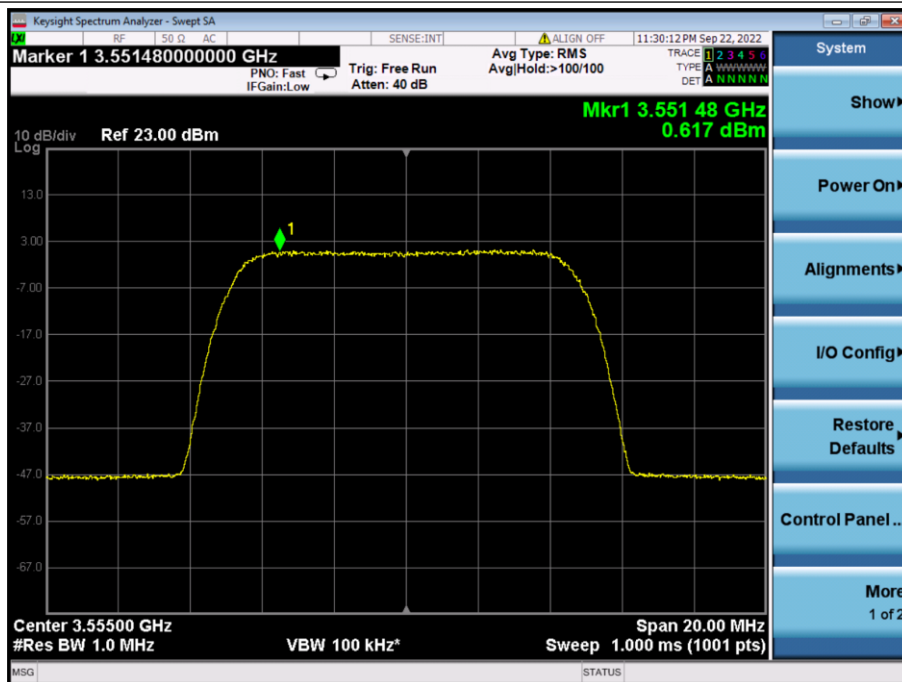
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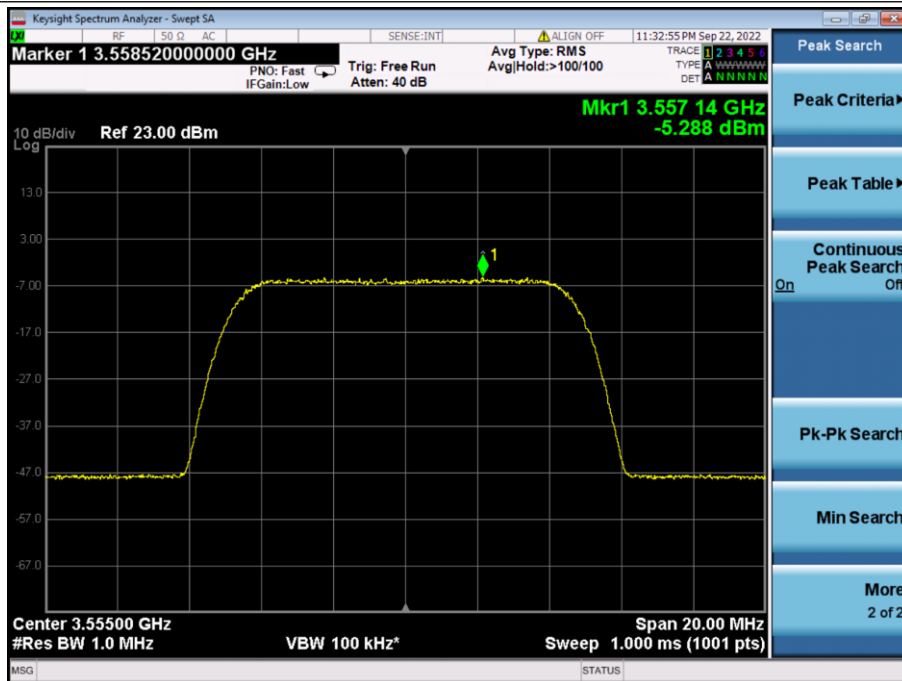
No.10, Weiye Road, Innovation Park, Kunshan, Jiangsu, China 215300  
中国·江苏·昆山市留学院创业园伟业路10号 邮编 215300

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Target Power: 22 dBm/MHz



Target Power: 15 dBm/MHz



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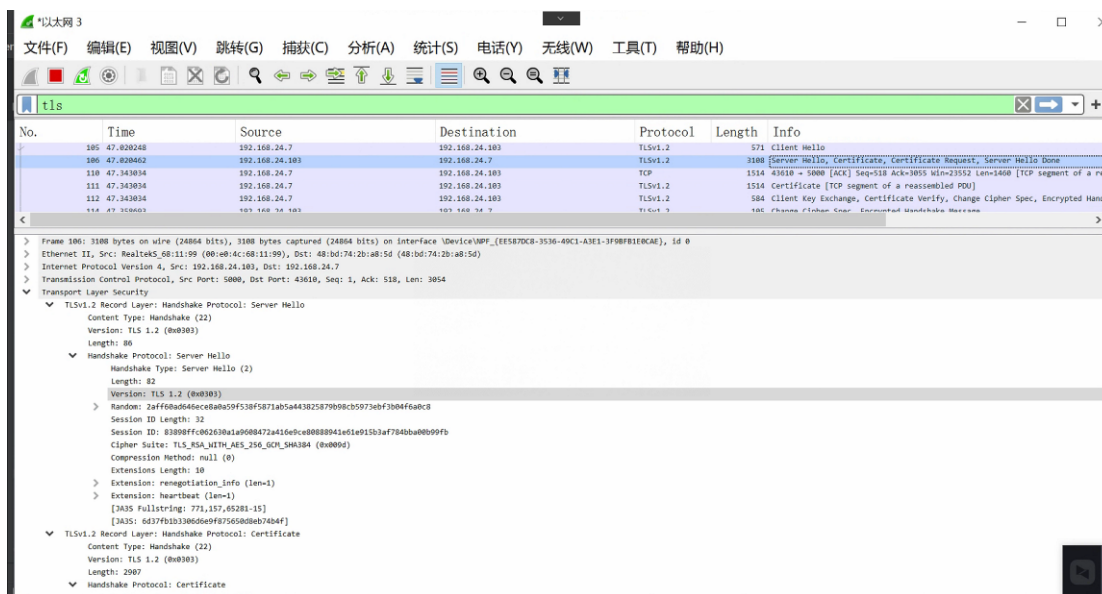
No.10, Weiye Road, Innovation Park, Kunshan, Jiangsu, China 215300  
中国·江苏·昆山市留学院创业园伟业路10号 邮编 215300

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## 10 Test Data Log For Standalone CBSD

Test data log refer to log files (Log files appendix) except for securitytest cases which shows below.

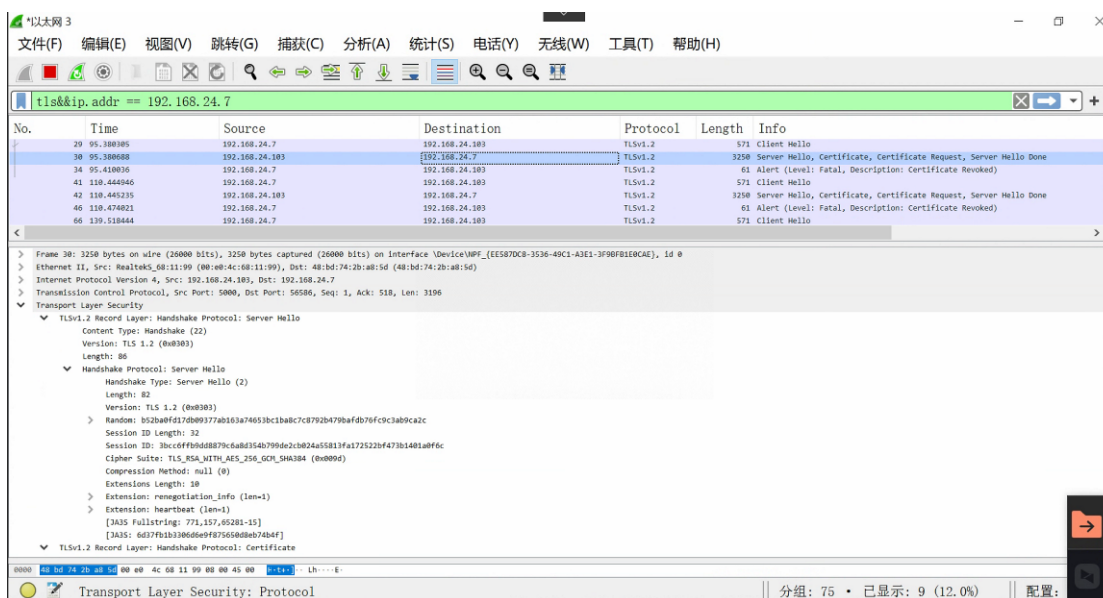
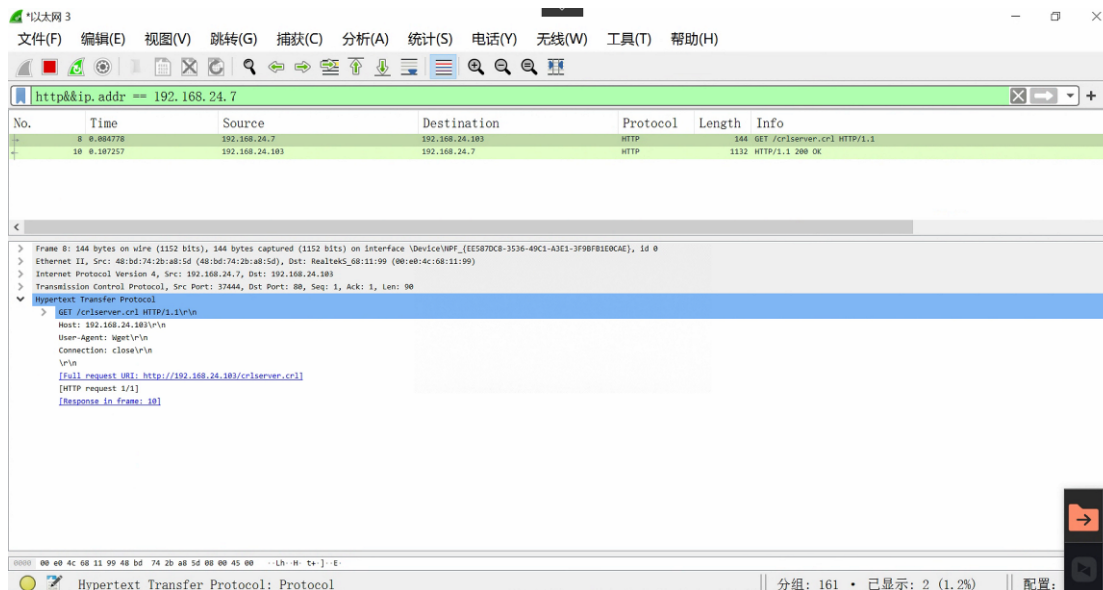
### 10.1 WINNF.FT.C.SCS.1



The screenshot displays a Wireshark capture of a TLS handshake. The packet list on the left shows several packets, with packet 100 selected. The packet details pane on the right shows the structure of the TLSv1.2 Record Layer, including the Handshake Protocol: Server Hello. The handshake details include the version (TLS 1.2), session ID length, session ID, cipher suite (TLS\_RSA\_WITH\_AES\_256\_GCM\_SHA384), and extensions. The packet bytes pane at the bottom shows the raw data of the handshake.

No.	Time	Source	Destination	Protocol	Length	Info
100	47.809248	192.168.24.7	192.168.24.103	TLSv1.2	571	Client Hello
101	47.809462	192.168.24.103	192.168.24.7	TLSv1.2	3108	Server Hello, Certificate, Certificate Request, Server Hello Done
102	47.343034	192.168.24.7	192.168.24.103	TCP	1514	43610 -> 5000 [ACK] Seq=18 Ack=955 Win=23552 Len=1408 [TCP segment of a reassembled PDU]
103	47.343034	192.168.24.7	192.168.24.103	TLSv1.2	1514	Certificate [TCP segment of a reassembled PDU]
104	47.343034	192.168.24.7	192.168.24.103	TLSv1.2	584	Client Key Exchange, Certificate Verify, Change Cipher Spec, Encrypted Handshake
105	47.343034	192.168.24.103	192.168.24.7	TLSv1.2	148	Change Cipher Spec, Encrypted Handshake

## 10.2 WINNF.FT.C.SCS.2



## 10.3 WINNF.FT.C.SCS.3

No.	Time	Source	Destination	Protocol	Length	Info
4	0.005190	192.168.24.7	192.168.24.103	TLSv1.2	571	Client Hello
5	0.005352	192.168.24.103	192.168.24.7	TLSv1.2	3115	Server Hello, Certificate, Certificate Request, Server Hello Done
6	0.059002	192.168.24.7	192.168.24.103	TLSv1.2	61	Alert (Level: Fatal, Description: Certificate Expired)
16	1.334161	192.168.24.7	192.168.24.103	TLSv1.2	571	Client Hello
17	1.334314	192.168.24.103	192.168.24.7	TLSv1.2	3115	Server Hello, Certificate, Certificate Request, Server Hello Done

Frame 5: 3115 bytes on wire (24920 bits), 3115 bytes captured (24920 bits) on Interface \Device\NPF... (E5870C8-3536-49C1-A3E1-3F90F81E0CAE), Id 0

Ethernet II, Src: Realtek5 08:00:4C:00:11:09, Dst: 48:BD:74:2B:a8:5d (48:BD:74:2B:a8:5d)

Internet Protocol Version 4, Src: 192.168.24.103, Dst: 192.168.24.7

Transmission Control Protocol, Src Port: 5800, Dst Port: 43649, Seq: 1, Ack: 518, Len: 3061

Transport Layer Security

- ✓ TLSv1.2 Record Layer: Handshake Protocol: Server Hello
  - Content Type: Handshake (22)
  - Version: TLS 1.2 (0x0303)
  - Length: 86
    - Handshake Protocol: Server Hello
      - Handshake Type: Server Hello (2)
      - Length: 82
        - Version: TLS 1.2 (0x0303)
        - Random: 030b2e59121fc5e6f96dd1d6e9c536cb74af9a9997b42b2a1e0f6739599
        - Session ID Length: 32
        - Session ID: 0320e04ccad7b043f14c7260b3f91852821a0326dc8d121ebbacc3c6ef00f00
        - Cipher Suite: TLS\_RSA\_WITH\_AES\_256\_GCM\_SHA384 (0x009d)
        - Compression Method: null (0)
        - Extensions Length: 10
          - Extension: renegotiation\_info (len=1)
          - Extension: heartbeat (len=1)
          - [3A35 Fullstring: 771,157,65201-15]
          - [3A35: 6437fb3380d0e9f875658d8eb7484f]
- ✓ TLSv1.2 Record Layer: Handshake Protocol: Certificate
  - Content Type: Handshake (22)
  - Version: TLS 1.2 (0x0303)
  - Length: 2914
    - Handshake Protocol: Certificate

## 10.4 WINNF.FT.C.SCS.4

Wireshark packet capture showing TLSv1.2 handshake details. The packet list shows a Client Hello (No. 22) and a Server Hello (No. 23). The packet details pane shows the TLSv1.2 Record Layer: Handshake Protocol: Server Hello (No. 23). The handshake details include: Content Type: Handshake (22), Version: TLS 1.2 (0x0303), Length: 86, Handshake Type: Server Hello (2), Random: 4b1d2c48945d82c946e9f829dc0e9fa5167297d31c367282651e8ff18bfbba, Session ID Length: 32, Session ID: 3a0a569f79f3797f6d6154ed512e0068a64726795248be99806c986cc5cc, Cipher Suite: TLS\_RSA\_WITH\_AES\_256\_GCM\_SHA384 (0x009d), Compression Method: null (0), Extensions Length: 10, Extension: renegotiation\_info (len=1), Extension: heartbeats (len=1), [JA3S Fullstring: 771,157,65281-15], [JA3S: 6d37fb1b38606e9f875658dbb7404f].

Wireshark packet capture showing TLSv1.2 alert details. The packet list shows a Client Hello (No. 22), a Server Hello (No. 23), and an Alert (No. 27). The packet details pane shows the TLSv1.2 Record Layer: Alert (Level: Fatal, Description: Unknown CA) (No. 27). The alert details include: Content Type: Alert (21), Version: TLS 1.2 (0x0303), Length: 2, Alert Message, Level: Fatal (2), Description: Unknown CA (48).

## 10.5 WINNF.FT.C.SCS.5

No.	Time	Source	Destination	Protocol	Length	Info
33	15.248117	192.168.24.7	192.168.24.103	TLSv1.2	571	Client Hello
34	15.249298	192.168.24.103	192.168.24.7	TLSv1.2	3188	Server Hello, Certificate, Certificate Request, Server Hello Done
35	15.249399	192.168.24.7	192.168.24.103	TLSv1.2	61	Alert (Level: Fatal, Description: Decrypt Error)
36	15.249448	192.168.24.7	192.168.24.103	TLSv1.2	571	Client Hello
37	15.249448	192.168.24.103	192.168.24.7	TLSv1.2	3188	Server Hello, Certificate, Certificate Request, Server Hello Done

Frame 34: 3188 bytes on wire (24864 bits), 3188 bytes captured (24864 bits) on Interface \Device\NPF\_{E587DCA-3536-49C1-A3E1-3F9BFB1E8CAE}, Id 0  
> Ethernet II, Src: Realtek5, 88:11:99:00:00:00, Dst: 48:bd:74:2b:a8:5d (48:bd:74:2b:a8:5d)  
> Internet Protocol Version 4, Src: 192.168.24.103, Dst: 192.168.24.7  
> Transmission Control Protocol, Src Port: 5000, Dst Port: 43743, Seq: 1, Ack: 518, Len: 3054  
> Transport Layer Security  
    Content Type: Handshake Protocol: Server Hello  
        Version: TLS 1.2 (0x0303)  
        Length: 80  
        Handshake Protocol: Server Hello  
            Handshake Type: Server Hello (2)  
            Length: 82  
            Version: TLS 1.2 (0x0303)  
            Random: 5080f6e0c30994e0c34475e9f16d5585c5d0f6720aa56e8c0b657c09f29c  
            Session ID Length: 32  
            Session ID: cba1d5a0a0b0f0e35047e345d9757248c8f5b0f657effc394d0bbaa8283f  
            Cipher Suite: TLS\_RSA\_WITH\_AES\_256\_GCM\_SHA384 (0x009d)  
            Compression Method: null (0)  
            Extensions Length: 10  
            Extension: renegotiation\_info (len=1)  
            Extension: heartbeat (len=1)  
            [JA3S Fullstring: 771,157,65281-15]  
            [JA3S: 6d37f0d3306d6e9f97565d8db74b4f]  
        Content Type: Handshake Protocol: Certificate  
            Version: TLS 1.2 (0x0303)  
            Length: 2907  
            Handshake Protocol: Certificate

## 11 Photographs

### 11.1 EUT Constructional Details (EUT Photos)

Please Refer to Integral and internal photos for details.

- End of the Report -



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