

## CBSD Test Report

**Report No.:** RFBCUN-WTW-P25050326

**FCC ID:** H8NSCU2080

**Test Model:** SCU2080 N48

**Received Date:** May 22, 2025

**Test Date:** May 28, 2025 ~ Jun. 9, 2025

**Issued Date:** Jun. 19, 2025

**Applicant:** Askey Computer Corp

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**Issued By:** Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch  
Lin Kou Laboratories

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**FCC Registration/  
Designation Number:** 281270 / TW0032



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### Release Control Record

| Issue No.            | Description      | Date Issued   |
|----------------------|------------------|---------------|
| RFBCUN-WTW-P25050326 | Original release | Jun. 19, 2025 |

## 1 Certificate of Conformity

**Product:** 5G Small Cell

**Brand:** ASKEY

**Test Model:** SCU2080 N48

**Sample Status:** Engineering sample

**Applicant:** Askey Computer Corp

**Test Date:** May. 28, 2025 ~ Jun. 9, 2025

**Standards:** WINNF-TS-0122 V1.0.2  
ONGO-TS-9001 V1.3.0

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's RF characteristics under the conditions specified in this report.

**Prepared by :** Pettie Chen , **Date:** Jun. 19, 2025  
Pettie Chen / Senior Specialist

**Approved by :** Jeremy Lin , **Date:** Jun. 19, 2025  
Jeremy Lin / Project Engineer

## 2 Summary of Test Results

| WINNF-TS-0122     |                 |            |               |
|-------------------|-----------------|------------|---------------|
| 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 WINNF 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.

Supported Features in details:

| WINNF-TS-0122 Test Case |                  |           |
|-------------------------|------------------|-----------|
| Definitions             | Test Case ID     | Supported |
| C1                      | NA               | No        |
| C2                      | NA               | No        |
| C3                      | WINNF.FT.C.REG.5 | Yes       |
| C4                      | NA               | No        |
| C5                      | NA               | No        |
| C6                      | WINNF.FT.C.REG.7 | Yes       |

## WINNF-TS-0122 Test Case

| Section    | Test Case ID      | Test Case Title                                                     | Test Result |
|------------|-------------------|---------------------------------------------------------------------|-------------|
| 6.1.4.1.1  | WINNF.FT.C.REG.1  | Multi-Step registration                                             | NA          |
| 6.1.4.1.2  | WINNF.FT.D.REG.2  | Domain Proxy Multi-Step registration                                | NA          |
| 6.1.4.1.3  | WINNF.FT.C.REG.3  | Single-Step registration for Category A CBSD                        | NA          |
| 6.1.4.1.4  | WINNF.FT.D.REG.4  | Domain Proxy Single-Step registration for Cat A CBSD                | NA          |
| 6.1.4.1.5  | WINNF.FT.C.REG.5  | Single-Step registration for CBSD with CPI signed data              | Pass        |
| 6.1.4.1.6  | WINNF.FT.D.REG.6  | Domain Proxy Single-Step registration for CBSD with CPI signed data | NA          |
| 6.1.4.1.7  | WINNF.FT.C.REG.7  | Registration due to change of an installation parameter             | Pass        |
| 6.1.4.2.1  | WINNF.FT.C.REG.8  | Missing Required parameters (responseCode 102)                      | Pass        |
| 6.1.4.2.2  | WINNF.FT.D.REG.9  | Domain Proxy Missing Required parameters (responseCode 102)         | NA          |
| 6.1.4.2.3  | WINNF.FT.C.REG.10 | Pending registration (responseCode 200)                             | Pass        |
| 6.1.4.2.4  | WINNF.FT.D.REG.11 | Domain Proxy Pending registration (responseCode 200)                | NA          |
| 6.1.4.2.5  | WINNF.FT.C.REG.12 | Invalid parameter (responseCode 103)                                | Pass        |
| 6.1.4.2.6  | WINNF.FT.D.REG.13 | Domain Proxy Invalid parameters (responseCode 103)                  | NA          |
| 6.1.4.2.7  | WINNF.FT.C.REG.14 | Blacklisted CBSD (responseCode 101)                                 | Pass        |
| 6.1.4.2.8  | WINNF.FT.D.REG.15 | Domain Proxy Blacklisted CBSD (responseCode 101)                    | NA          |
| 6.1.4.2.9  | WINNF.FT.C.REG.16 | Unsupported SAS protocol version (responseCode 100)                 | Pass        |
| 6.1.4.2.10 | WINNF.FT.D.REG.17 | Domain Proxy Unsupported SAS protocol version (responseCode 100)    | NA          |
| 6.1.4.2.11 | WINNF.FT.C.REG.18 | Group Error (responseCode 201)                                      | Pass        |
| 6.1.4.2.12 | WINNF.FT.D.REG.19 | Domain Proxy Group Error (responseCode 201)                         | NA          |
| 6.1.4.3.1  | WINNF.FT.C.REG.20 | Category A CBSD location update                                     | NA          |

| WINNF-TS-0122 Test Case |                   |                                                                               |             |
|-------------------------|-------------------|-------------------------------------------------------------------------------|-------------|
| Section                 | Test Case ID      | Test Case Title                                                               | Test Result |
| 6.3.4.2.1               | WINNF.FT.D.GRA.1  | Unsuccessful Grant responseCode=400 (INTERFERENCE)                            | Pass        |
| 6.3.4.2.2               | WINNF.FT.C.GRA.2  | Unsuccessful Grant responseCode=401 (GRANT_CONFLICT)                          | Pass        |
| 6.4.4.1.1               | WINNF.FT.C.HBT.1  | Heartbeat Success Case (first Heartbeat Response)                             | Pass        |
| 6.4.4.1.2               | WINNF.FT.D.HBT.2  | Domain Proxy Heartbeat Success Case (first Heartbeat Response)                | NA          |
| 6.4.4.2.1               | WINNF.FT.C.HBT.3  | Heartbeat responseCode=105 (DEREGISTER)                                       | Pass        |
| 6.4.4.2.2               | WINNF.FT.C.HBT.4  | Heartbeat responseCode=500 (TERMINATED_GRANT)                                 | Pass        |
| 6.4.4.2.3               | WINNF.FT.C.HBT.5  | Heartbeat responseCode=501 (SUSPENDED_GRANT) in First Heartbeat Response      | Pass        |
| 6.4.4.2.4               | WINNF.FT.C.HBT.6  | Heartbeat responseCode=501 (SUSPENDED_GRANT) in Subsequent Heartbeat Response | Pass        |
| 6.4.4.2.5               | WINNF.FT.C.HBT.7  | Heartbeat responseCode=502 (UNSYNC_OP_PARAM)                                  | Pass        |
| 6.4.4.2.6               | WINNF.FT.D.HBT.8  | Domain Proxy Heartbeat responseCode=500 (TERMINATED_GRANT)                    | NA          |
| 6.4.4.3.1               | WINNF.FT.C.HBT.9  | Heartbeat Response Absent (First Heartbeat)                                   | Pass        |
| 6.4.4.3.2               | WINNF.FT.C.HBT.10 | Heartbeat Response Absent (Subsequent Heartbeat)                              | Pass        |
| 6.4.4.4.1               | WINNF.FT.C.HBT.11 | Successful Grant Renewal in Heartbeat Test Case                               | NA          |
| 6.5.4.2.1               | WINNF.FT.C.MES.1  | Registration Response contains measReportConfig                               | NA          |
| 6.5.4.2.2               | WINNF.FT.D.MES.2  | Domain Proxy Registration Response contains measReportConfig                  | NA          |
| 6.5.4.2.3               | WINNF.FT.C.MES.3  | Grant Response contains measReportConfig                                      | NA          |
| 6.5.4.2.4               | WINNF.FT.C.MES.4  | Heartbeat Response contains measReportConfig                                  | NA          |
| 6.5.4.2.5               | WINNF.FT.D.MES.5  | Domain Proxy Heartbeat Response contains measReportConfig                     | NA          |

## WINNF-TS-0122 Test Case

| Section   | Test Case ID     | Test Case Title                                                      | Test Result |
|-----------|------------------|----------------------------------------------------------------------|-------------|
| 6.6.4.1.1 | WINNF.FT.C.RLQ.1 | Successful Relinquishment                                            | Pass        |
| 6.6.4.1.2 | WINNF.FT.D.RLQ.2 | Domain Proxy Successful Relinquishment                               | NA          |
| 6.6.4.2.1 | WINNF.FT.C.RLQ.3 | Unsuccessful Relinquishment, responseCode=102                        | NA          |
| 6.6.4.2.2 | WINNF.FT.D.RLQ.4 | Domain Proxy Unsuccessful Relinquishment, responseCode=102           | NA          |
| 6.6.4.3.1 | WINNF.FT.C.RLQ.5 | Unsuccessful Relinquishment, responseCode=103                        | NA          |
| 6.6.4.3.2 | WINNF.FT.D.RLQ.6 | Domain Proxy Unsuccessful Relinquishment, responseCode=103           | NA          |
| 6.7.4.1.1 | WINNF.FT.C.DRG.1 | Successful Deregistration                                            | Pass        |
| 6.7.4.1.2 | WINNF.FT.D.DRG.2 | Domain Proxy Successful Deregistration                               | NA          |
| 6.7.4.2.1 | WINNF.FT.C.DRG.3 | Deregistration responseCode=102                                      | NA          |
| 6.7.4.2.2 | WINNF.FT.D.DRG.4 | Domain Proxy Deregistration responseCode=102                         | NA          |
| 6.7.4.3.1 | WINNF.FT.C.DRG.5 | Deregistration responseCode=103                                      | NA          |
| 6.8.4.1.1 | WINNF.FT.C.SCS.1 | Successful TLS connection between UUT and SAS Test Harness           | Pass        |
| 6.8.4.2.1 | WINNF.FT.C.SCS.2 | TLS failure due to revoked certificate                               | Pass        |
| 6.8.4.2.2 | WINNF.FT.C.SCS.3 | TLS failure due to expired server certificate                        | Pass        |
| 6.8.4.2.3 | WINNF.FT.C.SCS.4 | TLS failure when SAS Test Harness certificate is issue by unknown CA | Pass        |
| 6.8.4.2.4 | WINNF.FT.C.SCS.5 | TLS failure when certificate at the SAS Test Harness is corrupted    | Pass        |
| 7.1.4.1.1 | WINNF.PT.C.HBT   | UUT RF Transmit Power Measurement                                    | Pass        |

Note: Section as per WINNF-TS-0122 If the product as tested complies with the specification, the UUT is deemed to comply with the standard and is deemed a "Pass" grade. If not "Fail" grade is issued. Where "NA" is stated this means the test case is not applicable.

### 2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the UUT as specified in CISPR 16-4-2:

| Measurement                     | Frequency    | Expanded Uncertainty (k=2) ( $\pm$ ) |
|---------------------------------|--------------|--------------------------------------|
| Conducted Emissions above 1 GHz | 1GHz ~ 18GHz | 1 dB                                 |

### 2.2 Modification Record

Following the FCC KDB 940660 D02 CPE-CBSD Handshake Procedures v01, when running the test cases in WINNF-TS-0122 for CPE-CBSD device type, for the last execution step appearing in WINNF-TS-0122:

1. The Pass/Fail criteria "UUT shall not transmit RF" is replaced by "CPE-CBSD UUT shall not transmit user traffic".
2. The Pass/Fail criteria "UUT shall stop transmission" is replaced by CPE-CBSD UUT shall stop transmitting user traffic"

### 3 General Information

#### 3.1 General Description of EUT

|                     |                    |
|---------------------|--------------------|
| Product             | 5G Small Cell      |
| Brand               | ASKEY              |
| Test Model          | SCU2080 N48        |
| Hardware Version    | REV0               |
| Firmware Version    | 0.47.6.145         |
| Status of EUT       | Engineering sample |
| Accessory Device    | NA                 |
| Data Cable Supplied | NA                 |

#### **Test Condition:**

| Test Item     | Environmental Conditions | Input Power  | Tested By    |
|---------------|--------------------------|--------------|--------------|
| WINNF-TS-0122 | 25deg. C, 65%RH          | 120Vac, 60Hz | Matthew Yang |

### 3.2 General Description of Applied Standards

The UUT is a BTS-CBSD product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards and references:

**Test standard:**

FCC 47 CFR Part 96

All test items have been performed and recorded as per the above standards.

**References Test Guidance:**

KDB 940660 D01 Part 96 CBRS Eqpt v03

All test items have been performed as a reference to the above KDB test guidance.

## 4 Measurement

### 4.1 CBSD Measurement

The CBSD shall validate and ensure that the Conformance and Performance Test results from compliance with SAS functional requirements.

### 4.2 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.

### 4.3 Test Environment

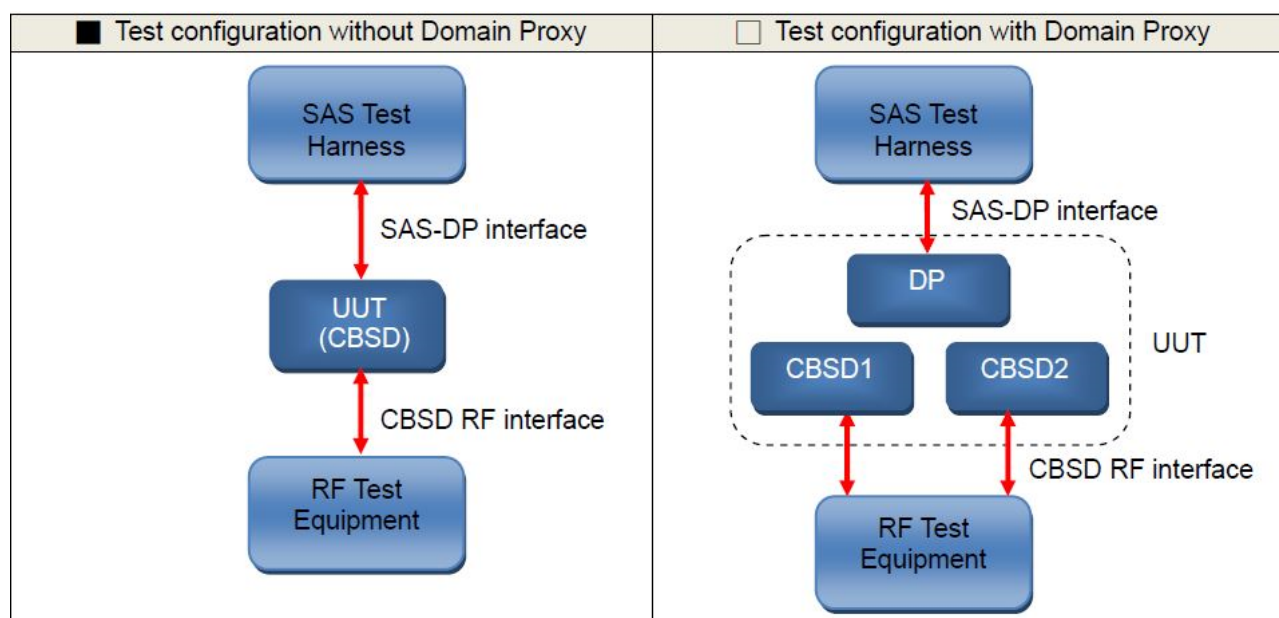
|                      |                      |
|----------------------|----------------------|
| Test Harness Version | V1.0.0.3             |
| Operating System     | Microsoft Windows 10 |
| TLS Version          | 1.2                  |
| Python               | 2.7.13               |

#### 4.4 Test Equipment

| Description & Manufacturer               | Model no.  | Serial No. | Calibrated Date | Calibrated Until |
|------------------------------------------|------------|------------|-----------------|------------------|
| ROHDE & SCHWARZ Signal Analyzer          | FSV        | E2-010642  | May 29, 2024    | May 28, 2026     |
| Temperature & Humidity Chamber<br>TERCHY | TFA 452019 | E2-010883  | Dec. 13, 2024   | Dec. 12, 2025    |
| Laptop<br>Lenovo                         | P137G      | P137G001   | NA              | NA               |

Note: 1. The test was performed in WM-OVEN Test Room.  
 2. The calibration interval of the above test instruments is 12/24 months and the calibrations are traceable to NML/ROC and NIST/USA.

#### 4.5 Test Setup



## 4.6 Test Results

### 4.6.1 CBSD Registration Process

#### 4.6.1.1 WINNF.FT.C.REG.5

☒ Test Case ID : WINNF.FT.C.REG.5
 ☐ NA

| # | 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> <li>All of the required and REG-Conditional parameters shall be configured and CPI signature provided</li> </ul>                                                                                                                                                                                                                            | --                                       | --                            |
| 2 | CBSD sends Registration request to the SAS Test Harness: <ul style="list-style-type: none"> <li>The required <i>userId</i>, <i>fcid</i> and <i>cbsdSerialNumber</i> and REG-Conditional <i>cbsdCategory</i>, <i>airInterface</i>, <i>measCapability</i> and <i>cpiSignatureData</i> 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 | <ul style="list-style-type: none"> <li>SAS Test Harness sends a CBSD Registration Response as follows:               <ul style="list-style-type: none"> <li><i>cbsdId</i> = C</li> <li><i>measReportConfig</i> shall not be included</li> <li><i>responseCode</i> = 0</li> </ul> </li> </ul>                                                                                                                                                                                                                                                                                    | --                                       | --                            |
| 4 | After completion of step 3, SAS Test Harness will not provide any positive response ( <i>responseCode</i> =0) to further request messages from the UUT.                                                                                                                                                                                                                                                                                                                                                                                                                         | <input checked="" type="checkbox"/> Pass | <input type="checkbox"/> Fail |
| 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>                                                                                                                                                                                                                                                                                                                                                                 |                                          |                               |

#### 4.6.1.2 WINNF.FT.C.REG.7

☒ Test Case ID : WINNF.FT.C.REG.7
 ☐ NA

| # | 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> </ul> | --                                          | --                               |
| 2 | UUT has successfully registered with SAS Test Harness                                                                                                                                             | --                                          | --                               |
| 3 | Change an installation parameters at the UUT (time T)<br>Tester needs to record the current time at which the parameter change is executed.                                                       | --                                          | --                               |
| 4 | Monitor the SAS-CBSD interface.<br>UUT sends a deregistrationRequest to the SAS Test Harness The deregistration request shall be sent within (T + 60 seconds) from step 3.                        | <input checked="" type="checkbox"/><br>Pass | <input type="checkbox"/><br>Fail |

#### 4.6.1.3 WINNF.FT.C.REG.8

☒ Test Case ID : WINNF.FT.C.REG.8
 ☐ NA

| # | 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 <i>cbsdId</i></li> <li><i>responseCode</i> = R = 102</li> </ul>             | --                                          | --                               |
| 4 | After completion of step 3, SAS Test Harness will not provide any positive response ( <i>responseCode</i> =0) to further request messages from the UUT.                                                                                   | --                                          | --                               |
| 5 | Monitor the RF output of the UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify: <ul style="list-style-type: none"> <li>UUT shall not transmit RF</li> </ul>                           | <input checked="" type="checkbox"/><br>Pass | <input type="checkbox"/><br>Fail |

#### 4.6.1.4 WINNF.FT.C.REG.10

☒ Test Case ID : WINNF.FT.C.REG.10
 ☐ NA

| # | 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 <i>cbsdId</i></li> <li>- <i>responseCode</i> = R = 200</li> </ul>             | --                                       | --                            |
| 4 | After completion of step 3, SAS Test Harness will not provide any positive response ( <i>responseCode</i> =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 |

#### 4.6.1.5 WINNF.FT.C.REG.12

☒ Test Case ID : WINNF.FT.C.REG.12
 ☐ NA

| # | 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 <i>cbsdId</i></li> <li>- <i>responseCode</i> = R = 103</li> </ul>             | --                                          | --                               |
| 4 | After completion of step 3, SAS Test Harness will not provide any positive response ( <i>responseCode</i> =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"/><br>Pass | <input type="checkbox"/><br>Fail |

#### 4.6.1.6 WINNF.FT.C.REG.14

☒ Test Case ID : WINNF.FT.C.REG.14
 ☐ NA

| # | 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 <i>cbsdId</i></li> <li><i>responseCode</i> = R = 101</li> </ul>             | --                                          | --                               |
| 4 | After completion of step 3, SAS Test Harness will not provide any positive response ( <i>responseCode</i> =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"/><br>Pass | <input type="checkbox"/><br>Fail |

#### 4.6.1.7 WINNF.FT.C.REG.16

☒ Test Case ID : WINNF.FT.C.REG.16
 ☐ NA

| # | 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 <i>cbsdId</i></li> <li><i>responseCode</i> = R = 100</li> </ul>             | --                                          | --                               |
| 4 | After completion of step 3, SAS Test Harness will not provide any positive response ( <i>responseCode</i> =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"/><br>Pass | <input type="checkbox"/><br>Fail |

#### 4.6.1.8 WINNF.FT.C.REG.18

☒ Test Case ID : WINNF.FT.C.REG.18
 ☐ NA

| # | 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 <i>cbsdId</i></li> <li>- <i>responseCode</i> = R = 201</li> </ul>             | --                                          | --                               |
| 4 | After completion of step 3, SAS Test Harness will not provide any positive response ( <i>responseCode</i> =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"/><br>Pass | <input type="checkbox"/><br>Fail |

#### 4.6.2 CBSD Spectrum Grant Process

##### 4.6.2.1 WINNF.FT.C.GRA.1

☒ Test Case ID : WINNF.FT.C.GRA.1
 ☐ NA

| # | Test Execution Steps                                                                                                                                                                                               | Results                                     |                                  |
|---|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|----------------------------------|
| 1 | Ensure the following conditions are met for test entry:<br><ul style="list-style-type: none"> <li>UUT has registered successfully with SAS Test Harness, with <i>cbsdId</i> = C</li> </ul>                         | --                                          | --                               |
| 2 | UUT sends valid Grant Request.                                                                                                                                                                                     | --                                          | --                               |
| 3 | SAS Test Harness sends a Grant Response message, including<br><ul style="list-style-type: none"> <li><i>cbsdId</i>=C</li> <li><i>responseCode</i> = R = 400</li> </ul>                                             | --                                          | --                               |
| 4 | After completion of step 3, SAS Test Harness will not provide any positive response ( <i>responseCode</i> =0) to further request messages from the UUT.                                                            | --                                          | --                               |
| 5 | Monitor the RF output of the UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify:<br><ul style="list-style-type: none"> <li>UUT shall not transmit RF</li> </ul> | <input checked="" type="checkbox"/><br>Pass | <input type="checkbox"/><br>Fail |

#### 4.6.2.2 WINNF.FT.C.GRA.2

☒ Test Case ID : WINNF.FT.C.GRA.2
 ☐ NA

| # | Test Execution Steps                                                                                                                                                                                            | Results                                     |                                  |
|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|----------------------------------|
| 1 | Ensure the following conditions are met for test entry: <ul style="list-style-type: none"> <li>UUT has registered successfully with SAS Test Harness, with <i>cbsdId</i> = C</li> </ul>                         | --                                          | --                               |
| 2 | UUT sends valid Grant Request.                                                                                                                                                                                  | --                                          | --                               |
| 3 | SAS Test Harness sends a Grant Response message, including <ul style="list-style-type: none"> <li><i>cbsdId</i>=C</li> <li><i>responseCode</i> = R = 401</li> </ul>                                             | --                                          | --                               |
| 4 | After completion of step 3, SAS Test Harness will not provide any positive response ( <i>responseCode</i> =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: <ul style="list-style-type: none"> <li>UUT shall not transmit RF</li> </ul> | <input checked="" type="checkbox"/><br>Pass | <input type="checkbox"/><br>Fail |

### 4.6.3 CBSD Heart Beat Process

#### 4.6.3.1 WINNF.FT.C.HBT.1

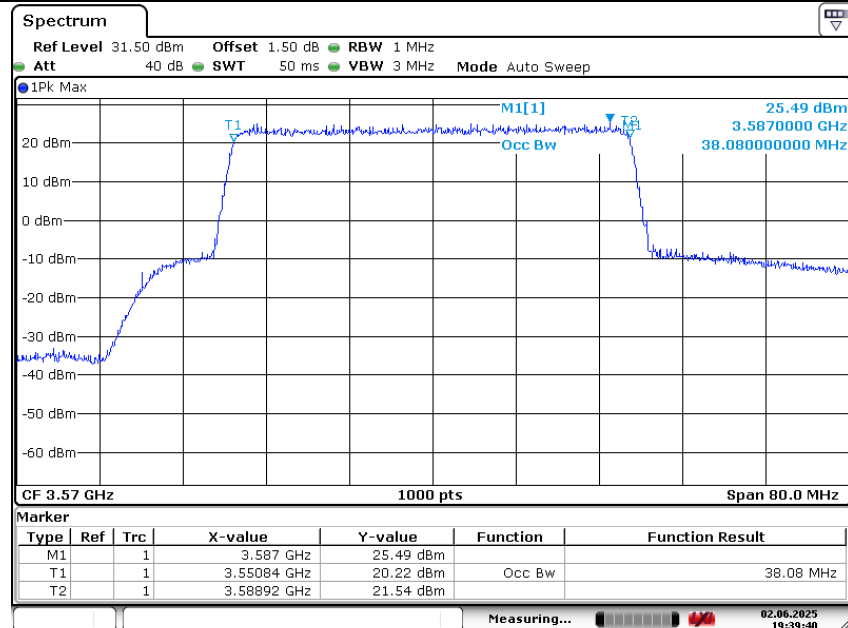
■ Test Case ID : WINNF.FT.C.HBT.1      □ NA

| #  | Test Execution Steps                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Results |        |
|----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|--------|
| 1  | Ensure the following conditions are met for test entry:<br>● UUT has registered successfully with SAS Test Harness, with <i>cbsdId</i> = C                                                                                                                                                                                                                                                                                                                                                            | --      | --     |
| 2  | UUT sends a message:<br>● If message is type Spectrum Inquiry Request, go to step 3, or<br>● If message is type Grant Request, go to step 5                                                                                                                                                                                                                                                                                                                                                           | --      | --     |
| 3  | UUT sends Spectrum Inquiry Request. Validate:<br>● <i>cbsdId</i> = C<br>● 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:<br>● <i>cbsdId</i> = C<br>● <i>availableChannel</i> is an array of availableChannel objects<br>● <i>responseCode</i> = 0                                                                                                                                                                                                                                                                              | --      | --     |
| 5  | UUT sends Grant Request message. Validate:<br>● <i>cbsdId</i> = C<br>● <i>maxEIRP</i> is at or below the limit appropriate for CBSD category as defined by Part 96<br>● <i>operationFrequencyRange</i> , 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:<br>● <i>cbsdId</i> = C<br>● <i>grantId</i> = G = a valid grant ID<br>● <i>grantExpireTime</i> = UTC time greater than duration of the test<br>● <i>responseCode</i> = 0                                                                                                                                                                                                                                                    | --      | --     |
| 7  | UUT sends a first Heartbeat Request message.<br>Verify Heartbeat Request message is formatted correctly, including:<br>● <i>cbsdId</i> = C<br>● <i>grantId</i> = G<br>● <i>operationState</i> = "GRANTED"                                                                                                                                                                                                                                                                                             | ■ Pass  | □ Fail |
| 8  | SAS Test Harness sends a Heartbeat Response message, with the following parameters:<br>● <i>cbsdId</i> = C<br>● <i>grantId</i> = G<br>● <i>transmitExpireTime</i> = current UTC time + 200 seconds<br>● <i>responseCode</i> = 0                                                                                                                                                                                                                                                                       | --      | --     |
| 9  | For further Heartbeat Request messages sent from UUT after completion of step 8, validate message is sent within latest specified heartbeatInterval, and:<br>● <i>cbsdId</i> = C<br>● <i>grantId</i> = G<br>● <i>operationState</i> = "AUTHORIZED"<br>and SAS Test Harness responds with a Heartbeat Response message including the following parameters:<br>● <i>cbsdId</i> = C<br>● <i>grantId</i> = G<br>● <i>transmitExpireTime</i> = current UTC time + 200 seconds<br>● <i>responseCode</i> = 0 | ■ Pass  | □ Fail |
| 10 | Monitor the RF output of the UUT from start of test until UUT transmission commences. Verify:<br>● UUT does not transmit at any time prior to completion of the first heartbeat response<br>● UUT transmits after step 8 is complete, and its transmission is limited to within the bandwidth range F.                                                                                                                                                                                                | ■ Pass  | □ Fail |

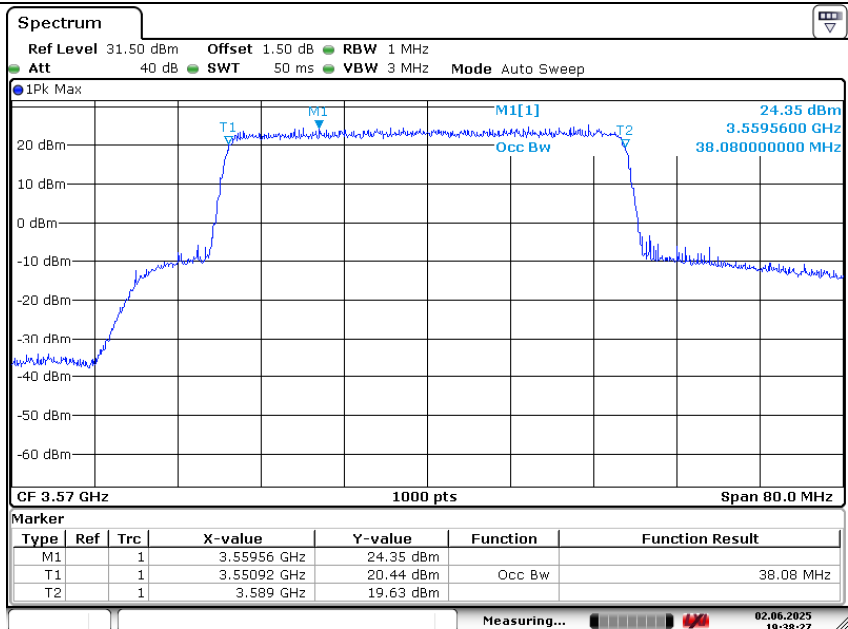
- UUT transmits after step 8 is complete, and its transmission is limited to within the bandwidth range F.

| Channel | Freq.<br>(MHz) | OCP 99 Band Width (MHz) |           |
|---------|----------------|-------------------------|-----------|
|         |                | F = 40MHz               |           |
|         |                | Chain (0)               | Chain (1) |
| Middle  | 3570           | 38.08                   | 38.08     |

Spectrum Plot  
Chain (0 ~ 1)



Date: 2.JUN.2025 19:39:41



Date: 2.JUN.2025 19:38:27

#### 4.6.3.2 WINNF.FT.C.HBT.3

■ Test Case ID : WINNF.FT.C.HBT.3      □ NA

| # | 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 <i>cbsdId</i> = C</li> <li>○ valid <i>grantId</i> = G</li> <li>○ grant is for frequency range F, power P</li> <li>○ <i>grantExpireTime</i> = 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.<br/>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>● <i>cbsdId</i> = C</li> <li>● <i>grantId</i> = G</li> <li>● <i>operationState</i> = "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>● <i>cbsdId</i> = C</li> <li>● <i>grantId</i> = G</li> <li>● <i>transmitExpireTime</i> = T = Current UTC time</li> <li>● <i>responseCode</i> = 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 |

#### 4.6.3.3 WINNF.FT.C.HBT.4

☒ Test Case ID : WINNF.FT.C.HBT.4
 ☐ NA

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

#### 4.6.3.4 WINNF.FT.C.HBT.5

■ Test Case ID : WINNF.FT.C.HBT.5      □ NA

| # | 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 <i>cbsdId</i> = C</li> <li>○ valid <i>grantId</i> = G</li> <li>○ grant is for frequency range F, power P</li> <li>○ <i>grantExpireTime</i> = 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.<br/>Verify Heartbeat Request message is formatted correctly, including:</p> <ul style="list-style-type: none"> <li>● <i>cbsdId</i> = C</li> <li>● <i>grantId</i> = G</li> <li>● <i>operationState</i> = "GRANTED"</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | ■<br>Pass | □<br>Fail |
| 3 | <p>SAS Test Harness sends a Heartbeat Response message, including the following parameters:</p> <ul style="list-style-type: none"> <li>● <i>cbsdId</i> = C</li> <li>● <i>grantId</i> = G</li> <li>● <i>transmitExpireTime</i> = T = current UTC time</li> <li>? <i>responseCode</i> = 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>● <i>cbsdId</i> = C</li> <li>● <i>grantId</i> = G</li> <li>● <i>operationState</i> = "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>● <i>cbsdId</i> = C</li> <li>● <i>grantId</i> = 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> | ■<br>Pass | □<br>Fail |

#### 4.6.3.5 WINNF.FT.C.HBT.6

■ Test Case ID : WINNF.FT.C.HBT.6      □ NA

| # | 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 <i>cbsdId</i> = C</li> <li>○ valid <i>grantId</i> = G</li> <li>○ grant is for frequency range F, power P</li> <li>○ <i>grantExpireTime</i> = 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>● <i>cbsdId</i> = C</li> <li>● <i>grantId</i> = G</li> <li>● <i>operationState</i> = "AUTHORIZED"</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                        | ■ Pass  | □ Fail |
| 3 | <p>SAS Test Harness sends a Heartbeat Response message, including the following parameters:</p> <ul style="list-style-type: none"> <li>● <i>cbsdId</i> = C</li> <li>● <i>grantId</i> = G</li> <li>● <i>transmitExpireTime</i> = T = current UTC time</li> <li>● <i>responseCode</i> = 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>● <i>cbsdId</i> = C</li> <li>● <i>grantId</i> = G</li> <li>● <i>operationState</i> = "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>● <i>cbsdId</i> = C</li> <li>● <i>grantId</i> = 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> | ■ Pass  | □ Fail |

#### 4.6.3.6 WINNF.FT.C.HBT.7

■ Test Case ID : WINNF.FT.C.HBT.7      □ NA

| # | 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 <i>cbsdId</i> = C</li> <li>○ valid <i>grantId</i> = G</li> <li>○ grant is for frequency range F, power P</li> <li>○ <i>grantExpireTime</i> = 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.<br/>Ensure Heartbeat Request message is sent within latest specified heartbeatInterval, and is formatted correctly, including:</p> <ul style="list-style-type: none"> <li>● <i>cbsdId</i> = C</li> <li>● <i>grantId</i> = G</li> <li>● <i>operationState</i> = "AUTHORIZED"</li> </ul>                                                                                                                                                                                                                                                       | ■<br>Pass | □<br>Fail |
| 3 | <p>SAS Test Harness sends a Heartbeat Response message, including the following parameters:</p> <ul style="list-style-type: none"> <li>● <i>cbsdId</i> = C</li> <li>● <i>grantId</i> = G</li> <li>● <i>transmitExpireTime</i> = T = current UTC time</li> <li>● <i>responseCode</i> = 502 (UNSYNC_OP_PARAM)</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:</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>○ <i>cbsdId</i> = C</li> <li>○ <i>grantId</i> = 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>                                                                                        | ■<br>Pass | □<br>Fail |

#### 4.6.3.7 WINNF.FT.C.HBT.9

☒ Test Case ID : WINNF.FT.C.HBT.9
 ☐ NA

| # | Test Execution Steps                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Results                                     |                                  |
|---|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|----------------------------------|
| 1 | Ensure the following conditions are met for test entry: <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 <i>cbsdId</i> = C</li> <li>○ valid <i>grantId</i> = G</li> <li>○ grant is for frequency range F, power P</li> <li>○ <i>grantExpireTime</i> = 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 | UUT sends a Heartbeat Request message.<br>Ensure Heartbeat Request message is sent within latest specified heartbeatInterval, and is formatted correctly, including: <ul style="list-style-type: none"> <li>● <i>cbsdId</i> = C</li> <li>● <i>grantId</i> = G</li> <li>● <i>operationState</i> = "GRANTED"</li> </ul>                                                                                                                                                                                                                                                                             | <input checked="" type="checkbox"/><br>Pass | <input type="checkbox"/><br>Fail |
| 3 | After completion of step 2, SAS Test Harness does not respond to any further messages from UUT to simulate loss of network connection                                                                                                                                                                                                                                                                                                                                                                                                                                                             | --                                          | --                               |
| 4 | Monitor the RF output of the UUT from start of test to 60 seconds after step 3. Verify: <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"/><br>Pass | <input type="checkbox"/><br>Fail |

#### 4.6.3.8 WINNF.FT.C.HBT.10

■ Test Case ID : WINNF.FT.C.HBT.10    □ NA

| # | 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 <i>cbsdId</i> = C</li> <li>○ valid <i>grantId</i> = G</li> <li>○ grant is for frequency range F, power P</li> <li>○ <i>grantExpireTime</i> = 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.<br/>Verify Heartbeat Request message is sent within latest specified heartbeatInterval, and is formatted correctly, including:</p> <ul style="list-style-type: none"> <li>● <i>cbsdId</i> = C</li> <li>● <i>grantId</i> = G</li> <li>● <i>operationState</i> = "AUTHORIZED"</li> </ul>                                                                                                                                                                                                                                                       | ■<br>Pass | □<br>Fail |
| 3 | <p>SAS Test Harness sends a Heartbeat Response message, including the following parameters:</p> <ul style="list-style-type: none"> <li>● <i>cbsdId</i> = C</li> <li>● <i>grantId</i> = G</li> <li>● <i>transmitExpireTime</i> = T = current UTC time + 200 seconds</li> <li>● <i>responseCode</i> = 0</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 RF output of the UUT. Verify:</p> <ul style="list-style-type: none"> <li>● UUT shall stop all transmission on RF interface within (<i>transmitExpireTime</i> + 60 seconds), using the <i>transmitExpireTime</i> sent in Step 3.</li> </ul>                                                                                                                                                                                                                                                                                                                              | ■<br>Pass | □<br>Fail |

#### 4.6.4 CBSD Relinquishment Process

##### 4.6.4.1 WINNF.FT.C.RLQ.1

☒ Test Case ID : WINNF.FT.C.RLQ.1
 ☐ NA

| # | 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 <i>cbsdId</i>=C</li> <li>● UUT has received a valid grant with <i>grantId</i> = G</li> <li>● UUT is in Grant State AUTHORIZED and is actively transmitting within the bounds of its grant.</li> </ul> Invoke trigger to relinquish UUT Grant from the SAS Test Harness | --                                       | --                            |
| 2 | UUT sends a Relinquishment Request message. Verify message contains all required parameters properly formatted, and specifically: <ul style="list-style-type: none"> <li>● <i>cbsdId</i> = C</li> <li>● <i>grantId</i> = G</li> </ul>                                                                                                                                                                                                                                                                                                | <input checked="" type="checkbox"/> Pass | <input type="checkbox"/> Fail |
| 3 | SAS Test Harness shall approve the request with a Relinquishment Response message with parameters: <ul style="list-style-type: none"> <li>- <i>cbsdId</i> = C</li> <li>- <i>grantId</i> = G</li> <li>- <i>responseCode</i> = 0</li> </ul>                                                                                                                                                                                                                                                                                            | --                                       | --                            |
| 4 | After completion of step 3, SAS Test Harness will not provide any additional positive response ( <i>responseCode</i> =0) to further request messages from the UUT                                                                                                                                                                                                                                                                                                                                                                    | --                                       | --                            |
| 5 | Monitor the RF output of 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 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 |

#### 4.6.5 CBSD Deregistration Process

##### 4.6.5.1 WINNF.FT.C.DRG.1

■ Test Case ID : WINNF.FT.C.DRG.1      □ NA

| # | 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 <i>cbsdId</i>=C</li> <li>● UUT has received a valid grant with <i>grantId</i> = 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 | UUT sends a Relinquishment request and receives Relinquishment response with <i>responseCode</i> =0                                                                                                                                                                                                                                                                                                                                                                                                                                          | --        | --        |
| 3 | UUT sends Deregistration Request to SAS Test Harness with <i>cbsdId</i> = C.                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | ■<br>Pass | □<br>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>● <i>cbsdId</i> = C</li> <li>● <i>responseCode</i> = 0</li> </ul>                                                                                                                                                                                                                                                                                                                           | --        | --        |
| 5 | After completion of step 3, SAS Test Harness will not provide any additional positive response ( <i>responseCode</i> =0) to further request messages from the UUT.                                                                                                                                                                                                                                                                                                                                                                           | --        | --        |
| 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: <ul style="list-style-type: none"> <li>A. UUT sending a Registration Request message, as this is not mandatory</li> <li>B. UUT sending a Deregistration Request message</li> </ul> </li> </ul>                                                   | ■<br>Pass | □<br>Fail |

## 4.6.6 CBSD Security Validation

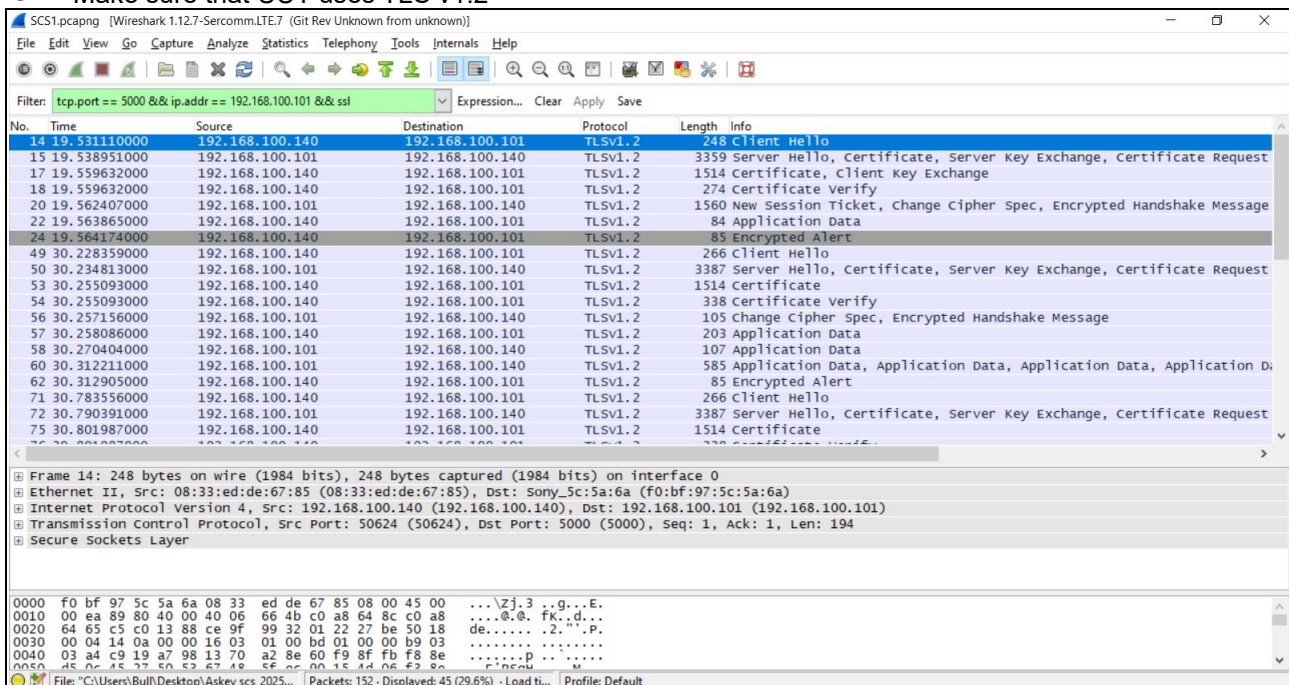
### 4.6.6.1 WINNF.FT.C.SCS.1

Test Case ID : WINNF.FT.C.SCS.1 ☐ NA

| # | 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 <i>responseCode</i> = 0 and <i>cbsdId</i>.</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 |

Wireshark Capture Example for Test Case :

- Make sure that UUT uses TLS v1.2



The image shows a Wireshark capture of a TLS v1.2 handshake. The filter is set to 'tcp.port == 5000 && ip.addr == 192.168.100.101 && ssl'. The capture shows a Client Hello (Frame 14) and a Server Hello (Frame 15) exchange. The Client Hello is 248 bytes on wire (1984 bits) and the Server Hello is 3359 bytes on wire (26872 bits). The handshake is successful, and the connection is established.

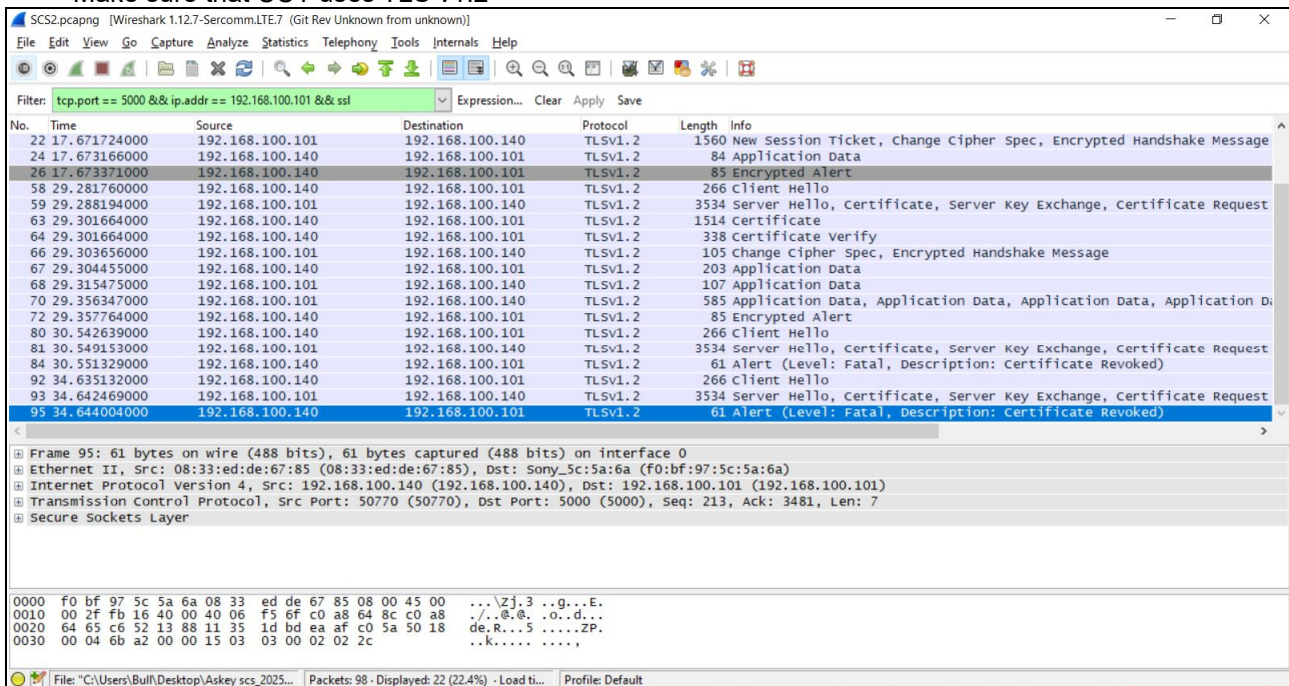
#### 4.6.6.2 WINNF.FT.C.SCS.2

Test Case ID : WINNF.FT.C.SCS.2 ☐ NA

| # | 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 | UUT may retry for the security procedure which shall fail.                                                                                                                                                                                                                                                                                                       | <input checked="" type="checkbox"/> Pass | <input type="checkbox"/> Fail |
| 4 | SAS Test-Harness shall not receive any Registration request or any application data.                                                                                                                                                                                                                                                                             | --                                       | --                            |
| 5 | Monitor the RF output of the UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify: <ul style="list-style-type: none"> <li>UUT shall not transmit RF</li> </ul>                                                                                                                                                  | <input checked="" type="checkbox"/> Pass | <input type="checkbox"/> Fail |

Wireshark Capture Example for Test Case :

- Make sure that UUT uses TLS v1.2



The screenshot shows a Wireshark capture of a TLS v1.2 handshake between two hosts (192.168.100.101 and 192.168.100.140). The filter is set to 'tcp.port == 5000 && ip.addr == 192.168.100.101 && ssl'. The capture shows the following key frames:

- Frame 22: New Session Ticket, Change Cipher Spec, Encrypted Handshake Message (1560 bytes).
- Frame 24: Application Data (84 bytes).
- Frame 26: Encrypted Alert (85 bytes).
- Frame 58: Client Hello (266 bytes).
- Frame 59: Server Hello, Certificate, Server Key Exchange, Certificate Request (3534 bytes).
- Frame 63: Certificate (1514 bytes).
- Frame 64: Certificate Verify (338 bytes).
- Frame 66: Change Cipher Spec, Encrypted Handshake Message (105 bytes).
- Frame 67: Application Data (203 bytes).
- Frame 68: Application Data (107 bytes).
- Frame 70: Application Data, Application Data, Application Data, Application Data (585 bytes).
- Frame 72: Encrypted Alert (85 bytes).
- Frame 80: Client Hello (266 bytes).
- Frame 81: Server Hello, Certificate, Server Key Exchange, Certificate Request (3534 bytes).
- Frame 84: Alert (Level: Fatal, Description: Certificate Revoked) (61 bytes).
- Frame 92: Client Hello (266 bytes).
- Frame 93: Server Hello, Certificate, Server Key Exchange, Certificate Request (3534 bytes).
- Frame 95: Alert (Level: Fatal, Description: Certificate Revoked) (61 bytes).

The packet details for Frame 95 show:

- Frame 95: 61 bytes on wire (488 bits), 61 bytes captured (488 bits) on interface 0
- Ethernet II, Src: 08:33:ed:de:67:85 (08:33:ed:de:67:85), Dst: Sony\_5c:5a:6a (f0:bf:97:5c:5a:6a)
- Internet Protocol Version 4, Src: 192.168.100.140 (192.168.100.140), Dst: 192.168.100.101 (192.168.100.101)
- Transmission Control Protocol, Src Port: 50770 (50770), Dst Port: 5000 (5000), Seq: 213, Ack: 3481, Len: 7
- Secure Sockets Layer

The packet bytes show the alert message structure:

```

0000 f0 bf 97 5c 5a 6a 08 33 ed de 67 85 08 00 45 00 ... \zj.3 ..g...E.
0010 00 2f fb 16 40 00 40 06 f5 6f c0 a8 64 8c c0 a8 ../.@.@. .o.d...
0020 64 65 c6 52 13 88 11 35 1d bd ea af c0 5a 50 18 de.R...5 .....ZP.
0030 00 04 6b a2 00 00 15 03 03 00 02 02 2c ..k.....,
  
```

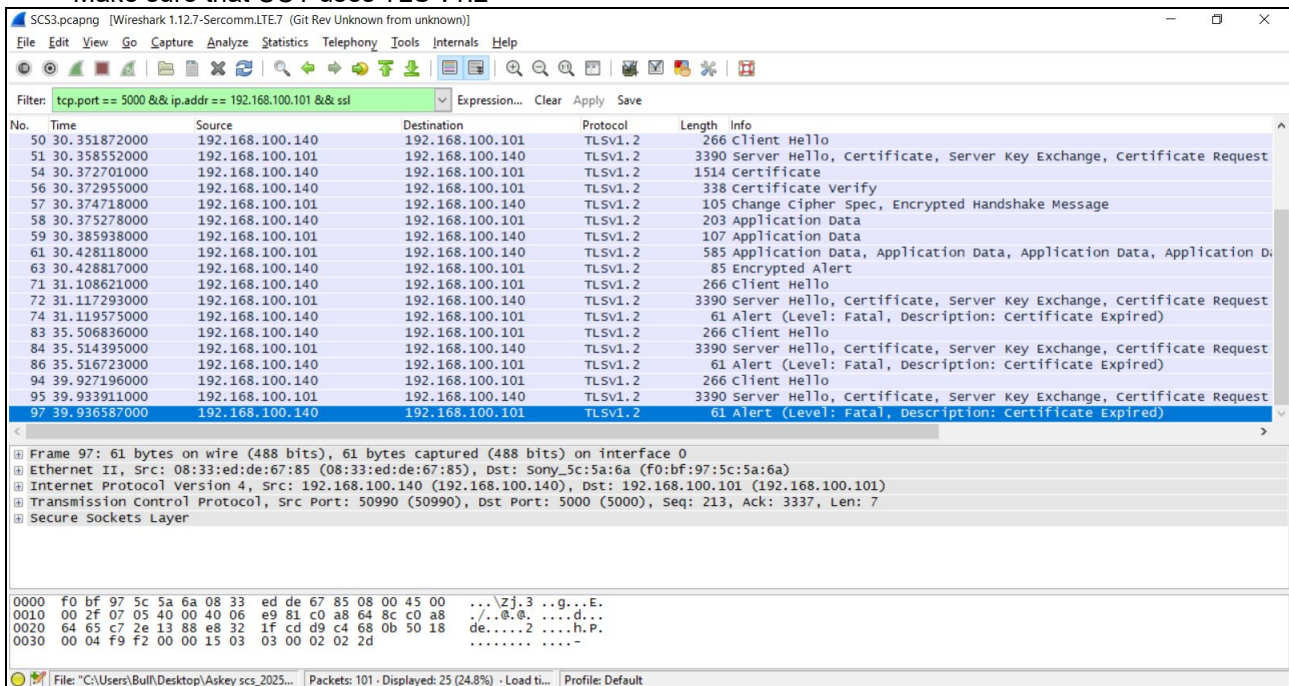
#### 4.6.6.3 WINNF.FT.C.SCS.3

■ Test Case ID : WINNF.FT.C.SCS.3 ☐ NA

| # | Test Execution Steps                                                                                                                                                                                                                                                                                 | Results                                  |                               |
|---|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|-------------------------------|
| 1 | ● UUT shall start CBSD-SAS communication with the security procedures                                                                                                                                                                                                                                | <input checked="" type="checkbox"/> Pass | <input type="checkbox"/> Fail |
| 2 | ● Make sure that UUT uses TLS v1.2 for security establishment.<br>● Make sure UUT selects the correct cipher suite.<br>● UUT shall use CRL or OCSP to verify the validity of the server certificate.<br>● Make sure that Mutual authentication does not happen between UUT and the SAS Test Harness. | <input checked="" type="checkbox"/> Pass | <input type="checkbox"/> Fail |
| 3 | UUT may retry for the security procedure which shall fail.                                                                                                                                                                                                                                           | <input checked="" type="checkbox"/> Pass | <input type="checkbox"/> 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:<br>● UUT shall not transmit RF                                                                                                                                   | <input checked="" type="checkbox"/> Pass | <input type="checkbox"/> Fail |

Wireshark Capture Example for Test Case :

- Make sure that UUT uses TLS v1.2



SCS3.pcapng [Wireshark 1.12.7-Sercomm.LTE.7 (Git Rev Unknown from unknown)]

Filter: tcp.port == 5000 && ip.addr == 192.168.100.101 && ssl

| No. | Time         | Source          | Destination     | Protocol | Length | Info                                                                   |
|-----|--------------|-----------------|-----------------|----------|--------|------------------------------------------------------------------------|
| 50  | 30.351872000 | 192.168.100.140 | 192.168.100.101 | TLSv1.2  | 266    | Client Hello                                                           |
| 51  | 30.358552000 | 192.168.100.101 | 192.168.100.140 | TLSv1.2  | 3390   | Server Hello, Certificate, Server Key Exchange, Certificate Request    |
| 54  | 30.372701000 | 192.168.100.140 | 192.168.100.101 | TLSv1.2  | 1514   | Certificate                                                            |
| 56  | 30.372955000 | 192.168.100.140 | 192.168.100.101 | TLSv1.2  | 338    | Certificate Verify                                                     |
| 57  | 30.374718000 | 192.168.100.101 | 192.168.100.140 | TLSv1.2  | 105    | Change Cipher Spec, Encrypted Handshake Message                        |
| 58  | 30.375278000 | 192.168.100.140 | 192.168.100.101 | TLSv1.2  | 203    | Application Data                                                       |
| 59  | 30.385938000 | 192.168.100.101 | 192.168.100.140 | TLSv1.2  | 107    | Application Data                                                       |
| 61  | 30.428118000 | 192.168.100.101 | 192.168.100.140 | TLSv1.2  | 585    | Application Data, Application Data, Application Data, Application Data |
| 63  | 30.428817000 | 192.168.100.140 | 192.168.100.101 | TLSv1.2  | 85     | Encrypted Alert                                                        |
| 71  | 31.108621000 | 192.168.100.140 | 192.168.100.101 | TLSv1.2  | 266    | Client Hello                                                           |
| 72  | 31.117293000 | 192.168.100.101 | 192.168.100.140 | TLSv1.2  | 3390   | Server Hello, Certificate, Server Key Exchange, Certificate Request    |
| 74  | 31.119575000 | 192.168.100.140 | 192.168.100.101 | TLSv1.2  | 61     | Alert (Level: Fatal, Description: Certificate Expired)                 |
| 83  | 35.506836000 | 192.168.100.140 | 192.168.100.101 | TLSv1.2  | 266    | Client Hello                                                           |
| 84  | 35.514395000 | 192.168.100.101 | 192.168.100.140 | TLSv1.2  | 3390   | Server Hello, Certificate, Server Key Exchange, Certificate Request    |
| 86  | 35.516723000 | 192.168.100.140 | 192.168.100.101 | TLSv1.2  | 61     | Alert (Level: Fatal, Description: Certificate Expired)                 |
| 94  | 39.927196000 | 192.168.100.140 | 192.168.100.101 | TLSv1.2  | 266    | Client Hello                                                           |
| 95  | 39.933911000 | 192.168.100.101 | 192.168.100.140 | TLSv1.2  | 3390   | Server Hello, Certificate, Server Key Exchange, Certificate Request    |
| 97  | 39.936587000 | 192.168.100.140 | 192.168.100.101 | TLSv1.2  | 61     | Alert (Level: Fatal, Description: Certificate Expired)                 |

Frame 97: 61 bytes on wire (488 bits), 61 bytes captured (488 bits) on interface 0

Ethernet II, Src: 08:33:ed:de:67:85 (08:33:ed:de:67:85), Dst: Sony\_5c:5a:6a (f0:bf:97:5c:5a:6a)

Internet Protocol Version 4, Src: 192.168.100.140 (192.168.100.140), Dst: 192.168.100.101 (192.168.100.101)

Transmission Control Protocol, Src Port: 50990 (50990), Dst Port: 5000 (5000), Seq: 213, Ack: 3337, Len: 7

Secure Sockets Layer

0000 f0 bf 97 5c 5a 6a 08 33 ed de 67 85 08 00 45 00 ... \zj.3 ..g...E.

0010 00 2f 07 05 40 00 40 06 e9 81 c0 a8 64 8c c0 a8 ... /..@. @. ....d...

0020 64 65 c7 2e 13 88 e8 32 1f cd d9 c4 68 0b 50 18 de.....2 ....h.P.

0030 00 04 f9 f2 00 00 15 03 03 00 02 02 2d ..... -

File: "C:\Users\Bull\Desktop\Askey scs\_2025... Packets: 101 - Displayed: 25 (24.8%) - Load ti... Profile: Default

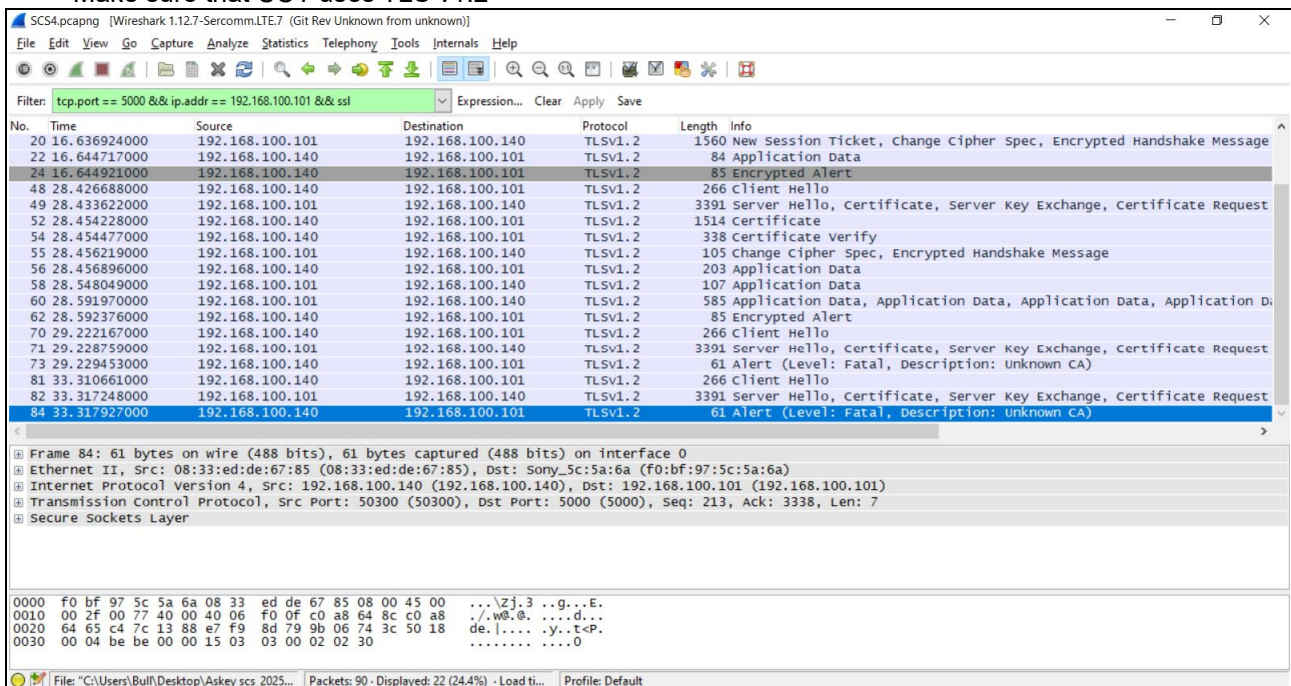
#### 4.6.6.4 WINNF.FT.C.SCS.4

Test Case ID : WINNF.FT.C.SCS.4 ☐ NA

| # | 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 | UUT may retry for the security procedure which shall fail.                                                                                                                                                                                                                                                                                                      | <input checked="" type="checkbox"/> Pass | <input type="checkbox"/> Fail |
| 4 | SAS Test-Harness shall not receive any Registration request or any application data.                                                                                                                                                                                                                                                                            | --                                       | --                            |
| 5 | Monitor the RF output of the UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify: <ul style="list-style-type: none"> <li>UUT shall not transmit RF</li> </ul>                                                                                                                                                 | <input checked="" type="checkbox"/> Pass | <input type="checkbox"/> Fail |

Wireshark Capture Example for Test Case :

- Make sure that UUT uses TLS v1.2



The image shows a Wireshark capture of a TLS v1.2 handshake and subsequent alert messages. The filter is set to 'tcp.port == 5000 && ip.addr == 192.168.100.101 && ssl'. The packet list shows several TLSv1.2 messages, including 'New Session Ticket, Change cipher Spec, Encrypted Handshake Message', 'Application Data', 'Encrypted Alert', 'Client Hello', 'Server Hello, Certificate, Server Key Exchange, Certificate Request', 'Certificate', 'Certificate Verify', 'Change cipher Spec, Encrypted Handshake Message', 'Application Data', and 'Alert (Level: Fatal, Description: Unknown CA)'. The packet details pane shows the structure of the 'Alert' message, indicating a fatal error due to an unknown CA.

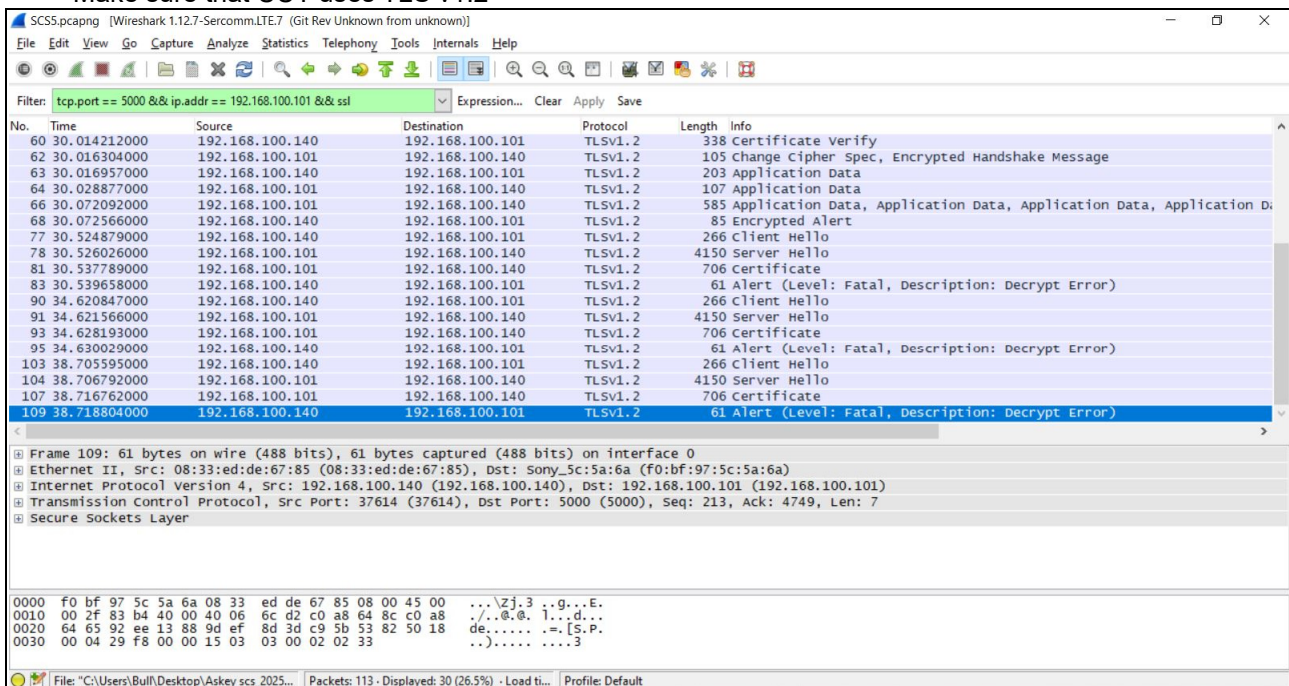
#### 4.6.6.5 WINNF.FT.C.SCS.5

Test Case ID : WINNF.FT.C.SCS.5 ☐ NA

| # | 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 | UUT may retry for the security procedure which shall fail.                                                                                                                                                                                                                                                                                                      | <input checked="" type="checkbox"/> Pass | <input type="checkbox"/> Fail |
| 4 | SAS Test-Harness shall not receive any Registration request or any application data.                                                                                                                                                                                                                                                                            | --                                       | --                            |
| 5 | Monitor the RF output of the UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify: <ul style="list-style-type: none"> <li>UUT shall not transmit RF</li> </ul>                                                                                                                                                 | <input checked="" type="checkbox"/> Pass | <input type="checkbox"/> Fail |

Wireshark Capture Example for Test Case :

- Make sure that UUT uses TLS v1.2



The image shows a Wireshark capture of a TLS v1.2 handshake between a client (192.168.100.101) and a server (192.168.100.140). The capture includes the following packets:

- 60: Certificate Verify (338 bytes)
- 62: Change Cipher Spec (105 bytes)
- 63: Application Data (203 bytes)
- 64: Application Data (107 bytes)
- 66: Application Data (585 bytes)
- 68: Encrypted Alert (85 bytes)
- 77: Client Hello (266 bytes)
- 78: Server Hello (4150 bytes)
- 81: Certificate (706 bytes)
- 83: Alert (Level: Fatal, Description: Decrypt Error) (61 bytes)
- 90: Client Hello (266 bytes)
- 91: Server Hello (4150 bytes)
- 93: Certificate (706 bytes)
- 95: Alert (Level: Fatal, Description: Decrypt Error) (61 bytes)
- 103: Client Hello (266 bytes)
- 104: Server Hello (4150 bytes)
- 107: Certificate (706 bytes)
- 109: Alert (Level: Fatal, Description: Decrypt Error) (61 bytes)

The bottom of the image shows the packet details for the alert message (Frame 109):

```

Frame 109: 61 bytes on wire (488 bits), 61 bytes captured (488 bits) on interface 0
Ethernet II, Src: 08:33:ed:de:67:85 (08:33:ed:de:67:85), Dst: Sony_Sc:5a:6a (f0:bf:97:5c:5a:6a)
Internet Protocol Version 4, Src: 192.168.100.140 (192.168.100.140), Dst: 192.168.100.101 (192.168.100.101)
Transmission Control Protocol, Src Port: 37614 (37614), Dst Port: 5000 (5000), Seq: 213, Ack: 4749, Len: 7
Secure Sockets Layer

```

#### 4.6.7 CBSD RF Power Measurement

##### 4.6.7.1 WINNF.PT.C.HBT.1

■ Test Case ID : WINNF.PT.C.HBT.1      □ NA

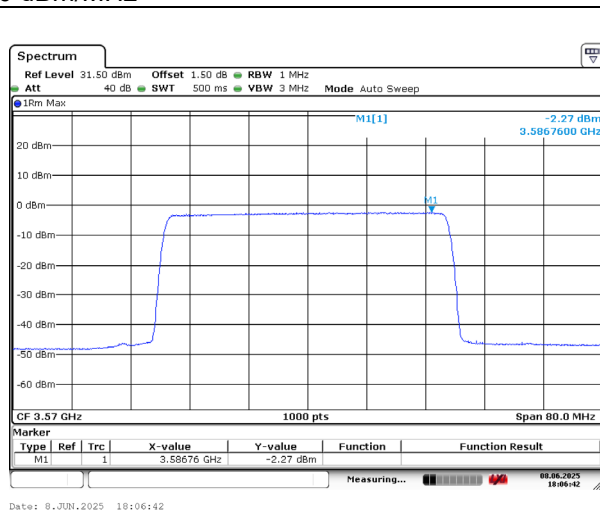
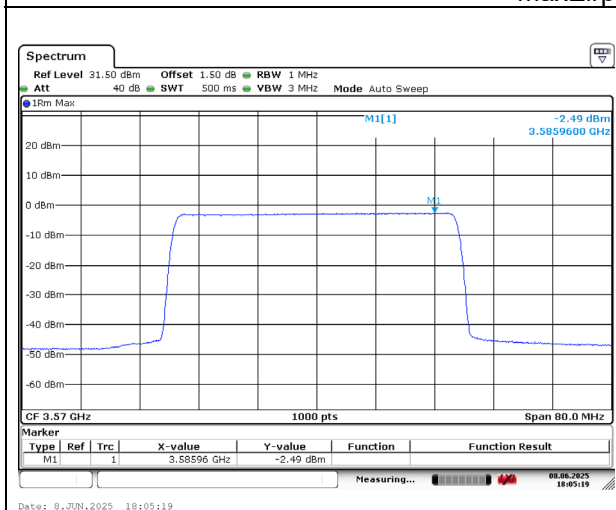
| # | Test Execution Steps                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 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> </ul> <p><i>Note: in order for the UUT to request a grant with the parameters {lowFrequency, highFrequency, maxEirp}, the SAS Test Harness may need to provide appropriate guidance in the availableChannel object of the spectrumInquiry response message, and the operationParam object of the grant response message. Alternately, the UUT vendor may provide the ability to set those parameters on the UUT so that the UUT will request a grant with those parameters</i></p> | --                                       | --                            |
| 2 | <p>UUT and SAS Test Harness perform a series of Heartbeat Request/Response cycles, which continues until the other test steps are complete. Messaging for each cycle is as follows:</p> <ul style="list-style-type: none"> <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> <p><i>Note: it may be required for the vendor to provide a method or configuration to bring the UUT to a mode which is required by the measurement methodology. Any such mode is vendor-specific and depends upon UUT behavior and the measurement methodology.</i></p>                                                                                                                                                                                                                                                                                                                                                                                      | <input checked="" type="checkbox"/> Pass | <input type="checkbox"/> Fail |

# RF measurement plot for Test Case:

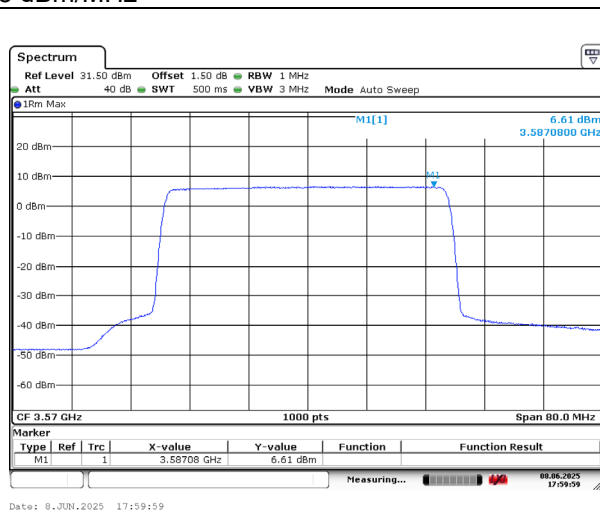
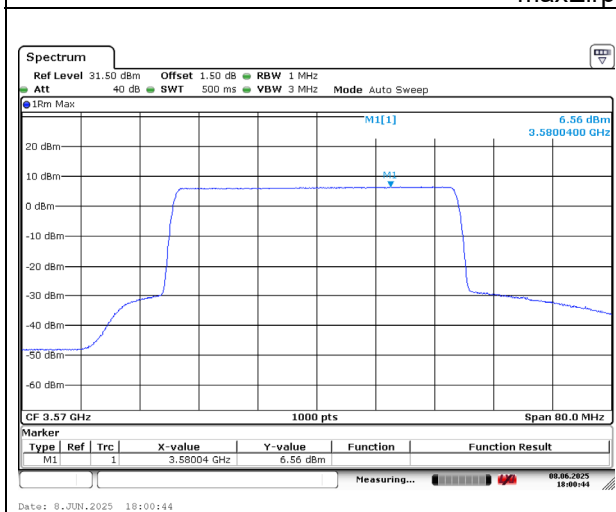
- Tester performs power measurement on RF interface(s) of UUT, and verifies it complies with the maxEirp setting, Pi. The RF measurement method is out of scope of this document, but may include additional configuration of the UUT, as required, to fulfill the requirements of the power measurement method.

| Channel | Freq. (MHz) | 40MHz                             |         |           |                | Limit | Pass / Fail |
|---------|-------------|-----------------------------------|---------|-----------|----------------|-------|-------------|
|         |             | Conducted Power Density (dBm/MHz) |         | Gain(dBi) | 14.57          |       |             |
|         |             | Chain 0                           | Chain 1 | Total     | EIRP (dBm/MHz) |       |             |
| Middle  | 3570        | -2.49                             | -2.27   | 0.63      | 15.20          | 20    | Pass        |
| Middle  | 3570        | 6.56                              | 6.61    | 9.60      | 24.17          | 28    | Pass        |
| Middle  | 3570        | 14.42                             | 14.41   | 17.43     | 32.00          | 36    | Pass        |

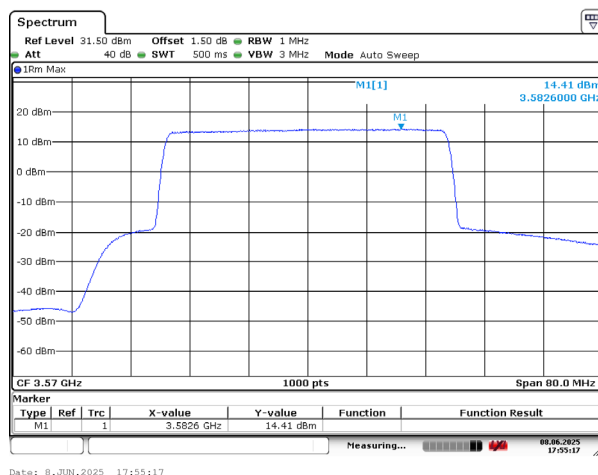
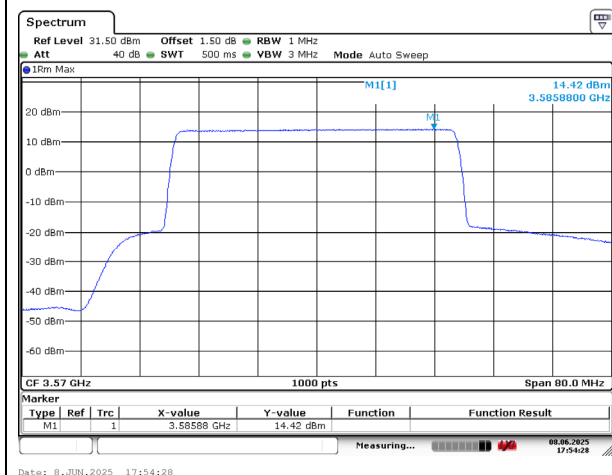
## maxEirp = 20 dBm/MHz



## maxEirp = 28 dBm/MHz



maxEirp = 36 dBm/MHz



## 5 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo).

## 6 WinnForum Logs

Please refer to the attached file (Test Logs).

## Appendix – Information of the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

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**Web Site:** <http://ee.bureauveritas.com.tw>

The address and road map of all our labs can be found in our web site also.

--- END ---