

CBSD Test Report

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Test Model: SCO5165P

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Test Date: Mar. 02, 2024 ~ Apr. 23, 2024

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Applicant: Sercomm Corp.

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**FCC Registration/
Designation Number:** 788550 / TW0003



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Release Control Record

Issue No.	Description	Date Issued
RFBEIH-WTW-P23120633	Original release	May 14, 2024

1 Certificate of Conformity

Product: Bridgestone HP, Canopy 5GOD1

Brand: Sercomm, Mosolabs

Test Model: SCO5165P

Sample Status: Engineering sample

Applicant: Sercomm Corp.

Test Date: Mar. 02, 2024 ~ Apr. 23, 2024

Standards: WINNF-TS-0122 V1.0.2
CBRSA-TS-9001 V1.1.0

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:** May 14, 2024
Pettie Chen / Senior Specialist

Approved by : Jeremy Lin , **Date:** May 14, 2024
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 CBS/D/DP UUT to the requirements developed by WInnForum and supporting FCC/DoD requirements.
2. Field/Performance Test (PT): Test to check the capability of the CBS/D/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	WINNF.FT.C.REG.1	Yes
C2	NA	No
C3	WINNF.FT.C.REG.5	Yes
C4	NA	No
C5	NA	No
C6	NA	No

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	Pass
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	NA
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

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Bridgestone HP, Canopy 5GOD1
Brand	Sercomm, Mosolabs
Test Model	SCO5165P
Status of EUT	Engineering sample
Accessory Device	48Vdc from PoE
Data Cable Supplied	NA

Note:

1. All models are listed as below.

Product	Brand	Model	Difference
Bridgestone HP	Sercomm	SCO5165P	For marketing purpose.
Canopy 5GOD1	Mosolabs		

2. List of Accessory:

Item	Brand	Model	Specification
POE	PHIHONG	POE60U-BTA	Input Power: 100-240Vac ~, 1.5A, 50-60Hz Output Power: 56Vdc, 0.535A, 30W
AC Power Cord	-	-	1.8m non-shielded cord

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 v02

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 Environment

Test Condition:

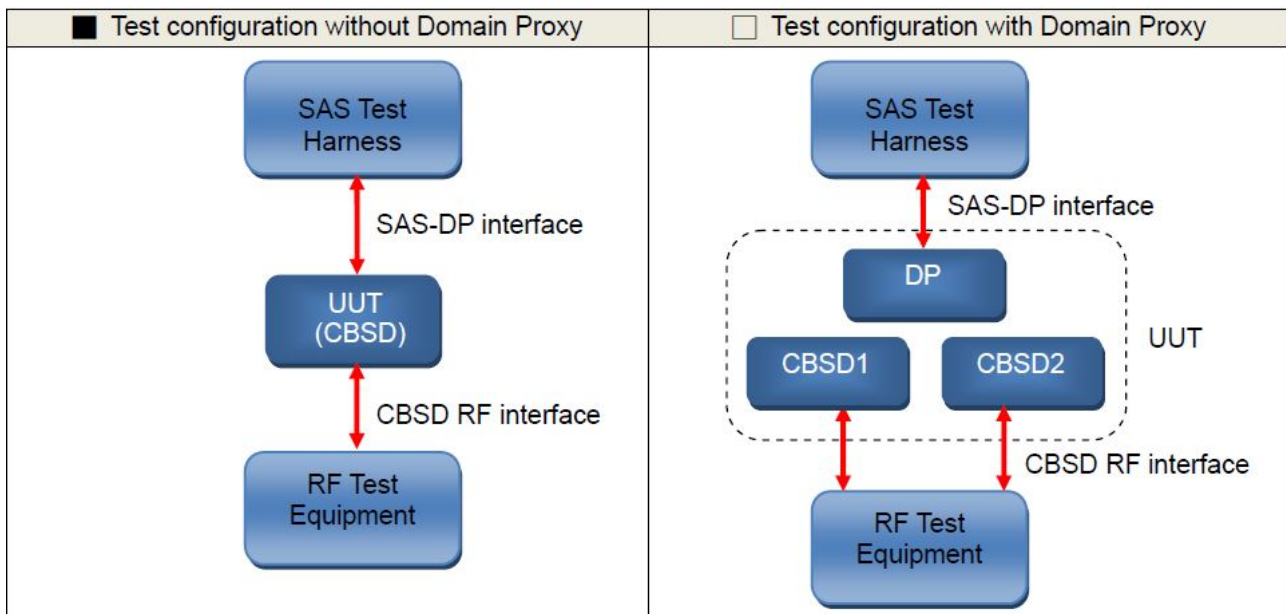
Test Item	Environmental Conditions	Input Power	Tested By
WINNF-TS-0122	24deg. C, 65%RH	120Vac, 60Hz	Matthew Yang

4.5 Test Equipment

Description & Manufacturer	Model no.	Serial No.	Calibrated Date	Calibrated Until
ROHDE & SCHWARZ Signal Analyzer	FSV	E2-010642	May 16, 2023	May 15, 2024
Temperature & Humidity Chamber TERCHY	TFA 452019	E2-010886	Dec. 14, 2023	Dec. 13, 2024
Laptop Lenovo	P137G	P137G001	NA	NA

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

4.6 Test Setup



4.7 Test Results

4.7.1 CBSD Registration Process

4.7.1.1 WINNF.FT.C.REG.1

Test Case ID : WINNF.FT.C.REG.1
 NA

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: <ul style="list-style-type: none"> ● UUT has successfully completed SAS Discovery and Authentication with the SAS Test Harness ● UUT is in the Unregistered state 	--	--
2	CBSD sends correct Registration request information, as specified in [n.5], to the SAS Test Harness: <ul style="list-style-type: none"> ● The required <code>userId</code>, <code>fcld</code> and <code>cbsdSerialNumber</code> registration parameters shall be sent from the CBSD and conform to proper format and acceptable ranges. ● Any REG-conditional or optional registration parameters that may be included in the message shall be verified that they conform to proper format and are within acceptable ranges. Note: It is outside the scope of this document to test the Registration information that is supplied via another means.	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
3	SAS Test Harness sends a CBSD Registration Response as follows: <ul style="list-style-type: none"> ● <code>cbsdId = C</code> ● <code>measReportConfig</code> shall not be included ● <code>responseCode = 0</code> 	--	--
4	After completion of step 3, SAS Test Harness will not provide any positive response (<code>responseCode=0</code>) 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"> ● UUT shall not transmit RF 	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail

4.7.1.2 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"> ● UUT has successfully completed SAS Discovery and Authentication with SAS Test Harness ● UUT is in the Unregistered state ● All of the required and REG-Conditional parameters shall be configured and CPI signature provided 	--	--
2	CBSD sends Registration request to the SAS Test Harness: <ul style="list-style-type: none"> ● The required <code>userId</code>, <code>fcld</code> and <code>cbsdSerialNumber</code> and REG-Conditional <code>cbsdCategory</code>, <code>airInterface</code>, <code>measCapability</code> and <code>cpiSignatureData</code> registration parameters shall be sent from the CBSD and conform to proper format and acceptable ranges. ● 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. 	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
3	SAS Test Harness sends a CBSD Registration Response as follows: <ul style="list-style-type: none"> ● <code>cbsdId = C</code> ● <code>measReportConfig</code> shall not be included ● <code>responseCode = 0</code> 	--	--
4	After completion of step 3, SAS Test Harness will not provide any positive response (<code>responseCode=0</code>) 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"> ● UUT shall not transmit RF 		

4.7.1.3 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"> ● UUT has successfully completed SAS Discovery and Authentication with SAS Test Harness ● UUT is in the Unregistered state 	--	--
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"> ● SAS response does not include cbsdId ● responseCode = R = 102 	--	--
4	After completion of step 3, SAS Test Harness will not provide any positive response (<i>responseCode=0</i>) 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"> ● UUT shall not transmit RF 	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail

4.7.1.4 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"> ● UUT has successfully completed SAS Discovery and Authentication with SAS Test Harness ● UUT is in the Unregistered state 	--	--
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"> ● SAS response does not include cbsdId ● responseCode = R = 200 	--	--
4	After completion of step 3, SAS Test Harness will not provide any positive response (<i>responseCode=0</i>) 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"> ● UUT shall not transmit RF 	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail

4.7.1.5 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"> ● UUT has successfully completed SAS Discovery and Authentication with SAS Test Harness ● UUT is in the Unregistered state 	--	--
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"> ● SAS response does not include cbsdId ● responseCode = R = 103 	--	--
4	After completion of step 3, SAS Test Harness will not provide any positive response (<i>responseCode=0</i>) 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"> ● UUT shall not transmit RF 	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail

4.7.1.6 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"> ● UUT has successfully completed SAS Discovery and Authentication with SAS Test Harness ● UUT is in the Unregistered state 	--	--
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"> ● SAS response does not include cbsdId ● responseCode = R = 101 	--	--
4	After completion of step 3, SAS Test Harness will not provide any positive response (<i>responseCode=0</i>) 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"> ● UUT shall not transmit RF 	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail

4.7.1.7 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"> ● UUT has successfully completed SAS Discovery and Authentication with SAS Test Harness ● UUT is in the Unregistered state 	--	--
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"> ● SAS response does not include cbsdId ● responseCode = R = 100 	--	--
4	After completion of step 3, SAS Test Harness will not provide any positive response (<i>responseCode=0</i>) 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"> ● UUT shall not transmit RF 	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail

4.7.1.8 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"> ● UUT has successfully completed SAS Discovery and Authentication with SAS Test Harness ● UUT is in the Unregistered state 	--	--
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"> ● SAS response does not include cbsdId ● responseCode = R = 201 	--	--
4	After completion of step 3, SAS Test Harness will not provide any positive response (<i>responseCode=0</i>) 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"> ● UUT shall not transmit RF 	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail

4.7.2 CBSD Spectrum Grant Process

4.7.2.1 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: <ul style="list-style-type: none"> ● UUT has registered successfully with SAS Test Harness, with <i>cbsdId</i> = C 	--	--
2	UUT sends valid Grant Request.	--	--
3	SAS Test Harness sends a Grant Response message, including <ul style="list-style-type: none"> ● <i>cbsdId</i>=C ● <i>responseCode</i> = R = 400 	--	--
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"> ● UUT shall not transmit RF 	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail

4.7.2.2 WINNF.FT.C.GRA.2

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

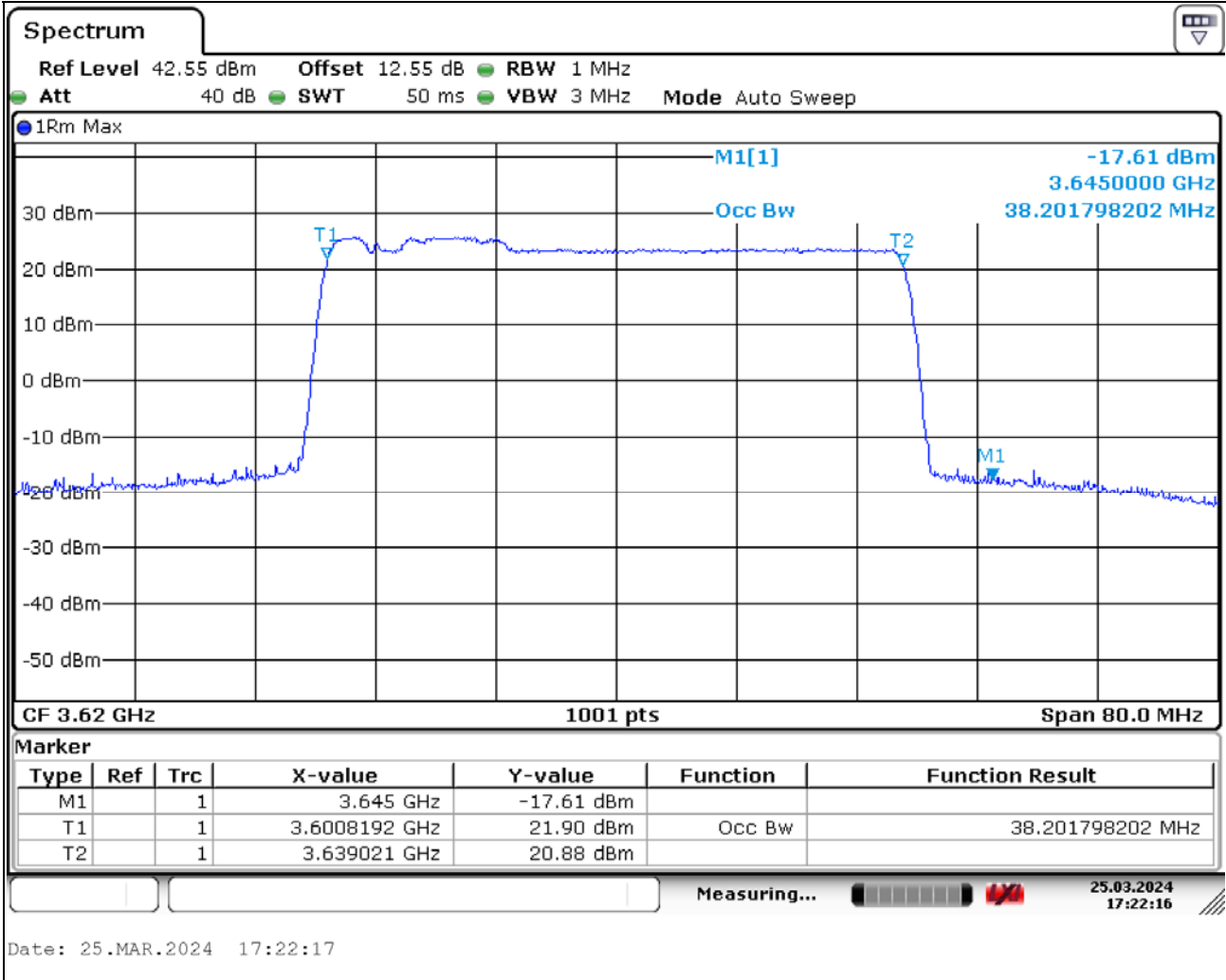
#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: <ul style="list-style-type: none"> ● UUT has registered successfully with SAS Test Harness, with <i>cbsdId</i> = C 	--	--
2	UUT sends valid Grant Request.	--	--
3	SAS Test Harness sends a Grant Response message,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

4.7.3 CBSD Heart Beat Process

4.7.3.1 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: <ul style="list-style-type: none"> UUT has registered successfully with SAS Test Harness, with <i>cbsdId</i> = C 	--	--
2	UUT sends a message: <ul style="list-style-type: none"> If message is type Spectrum Inquiry Request, go to step 3, or If message is type Grant Request, go to step 5 	--	--
3	UUT sends Spectrum Inquiry Request. Validate: <ul style="list-style-type: none"> <i>cbsdId</i> = C List of frequencyRange objects sent by UUT are within the CBRS frequency range 	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
4	SAS Test Harness sends a Spectrum Inquiry Response message, including the following parameters: <ul style="list-style-type: none"> <i>cbsdId</i> = C <i>availableChannel</i> is an array of availableChannel objects <i>responseCode</i> = 0 	--	--
5	UUT sends Grant Request message. Validate: <ul style="list-style-type: none"> <i>cbsdId</i> = C <i>maxEIRP</i> is at or below the limit appropriate for CBSD category as defined by Part 96 <i>operationFrequencyRange</i>, F, sent by UUT is a valid range within the CBRS band 	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
6	SAS Test Harness sends a Grant Response message, including the parameters: <ul style="list-style-type: none"> <i>cbsdId</i> = C <i>grantId</i> = G = a valid grant ID <i>grantExpireTime</i> = UTC time greater than duration of the test <i>responseCode</i> = 0 	--	--
7	UUT sends a first Heartbeat Request message. Verify Heartbeat Request message is formatted correctly, including: <ul style="list-style-type: none"> <i>cbsdId</i> = C <i>grantId</i> = G <i>operationState</i> = "GRANTED" 	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
8	SAS Test Harness sends a Heartbeat Response message, with the following parameters: <ul style="list-style-type: none"> <i>cbsdId</i> = C <i>grantId</i> = G <i>transmitExpireTime</i> = current UTC time + 200 seconds <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: <ul style="list-style-type: none"> <i>cbsdId</i> = C <i>grantId</i> = G <i>operationState</i> = "AUTHORIZED" and SAS Test Harness responds with a Heartbeat Response message including the following parameters: <ul style="list-style-type: none"> <i>cbsdId</i> = C <i>grantId</i> = G <i>transmitExpireTime</i> = current UTC time + 200 seconds <i>responseCode</i> = 0 	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
10	Monitor the RF output of the UUT from start of test until UUT transmission commences. Verify: <ul style="list-style-type: none"> UUT does not transmit at any time prior to completion of the first heartbeat response UUT transmits after step 8 is complete, and its transmission is limited to within the bandwidth range F. 	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail



4.7.3.2 WINNF.FT.C.HBT.3

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

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

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

4.7.3.4 WINNF.FT.C.HBT.5

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

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

4.7.3.5 WINNF.FT.C.HBT.6

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

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

4.7.3.6 WINNF.FT.C.HBT.7

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

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

4.7.3.7 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"> ● UUT has registered successfully with SAS Test Harness ● UUT has a valid single grant as follows: <ul style="list-style-type: none"> ○ valid <i>cbsdId</i> = C ○ valid <i>grantId</i> = G ○ grant is for frequency range F, power P ○ <i>grantExpireTime</i> = UTC time greater than duration of the test ● UUT is in GRANTED, but not AUTHORIZED state(i.e. has not performed its first Heartbeat Request) 	--	--
2	UUT sends a Heartbeat Request message. Ensure Heartbeat Request message is sent within latest specified heartbeatInterval, and is formatted correctly, including: <ul style="list-style-type: none"> ● <i>cbsdId</i> = C ● <i>grantId</i> = G ● <i>operationState</i> = "GRANTED" 	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> 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"> ● At any time during the test, UUT shall not transmit on RF interface 	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail

4.7.3.8 WINNF.FT.C.HBT.10

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

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

4.7.4 CBSD Relinquishment Process

4.7.4.1 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"> ● UUT has successfully completed SAS Discovery and Authentication with SAS Test Harness ● UUT has successfully registered with SAS Test Harness, with <i>cbsdId=C</i> ● UUT has received a valid grant with <i>grantId = G</i> ● UUT is in Grant State AUTHORIZED and is actively transmitting within the bounds of its grant. 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"> ● <i>cbsdId = C</i> ● <i>grantId = G</i> 	<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"> - <i>cbsdId = C</i> - <i>grantId = G</i> - <i>responseCode = 0</i> 	--	--
4	After completion of step 3, SAS Test Harness will not provide any additional positive response (<i>responseCode=0</i>) 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"> ● UUT shall stop RF transmission at any time between triggering the relinquishment and UUT sending the relinquishment request 	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail

4.7.5 CBSD Deregistration Process

4.7.5.1 WINNF.FT.C.DRG.1

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

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

4.7.6 CBSD Security Validation

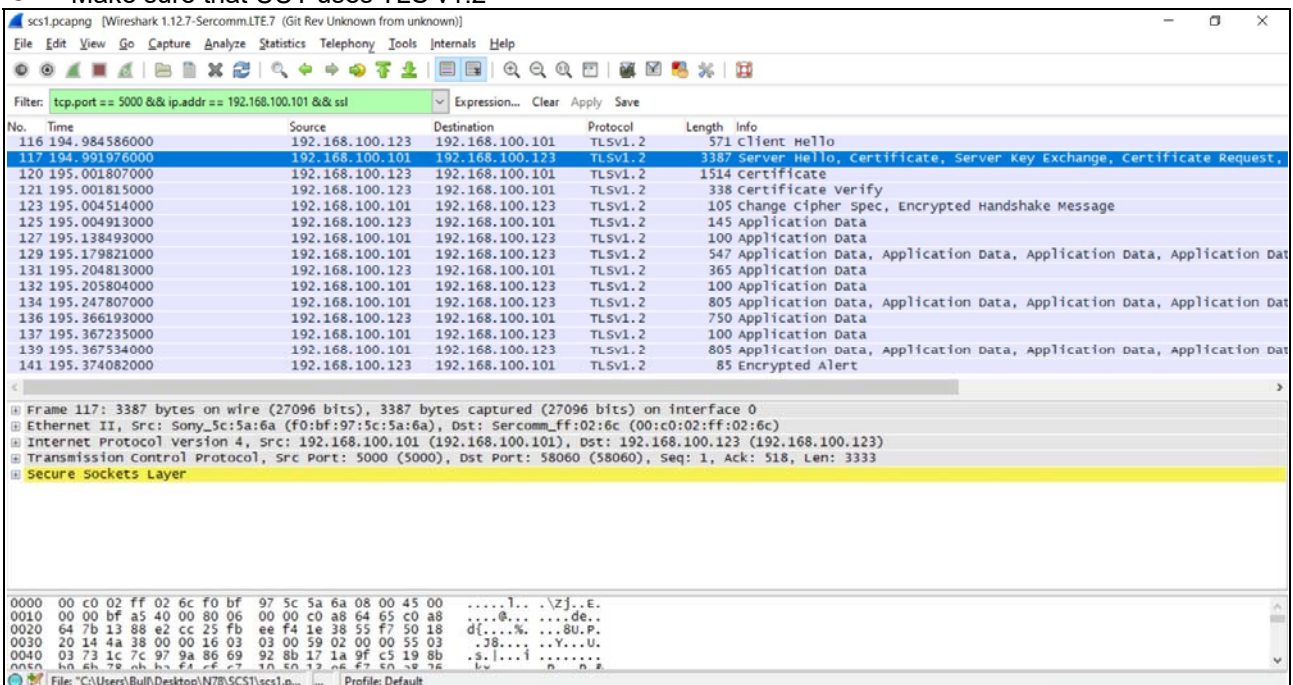
4.7.6.1 WINNF.FT.C.SCS.1

Test Case ID : WINNF.FT.C.SCS.1 NA

#	Test Execution Steps	Results	
1	<ul style="list-style-type: none"> UUT shall start CBSD-SAS communication with the security procedure The UUT shall establish a TLS handshake with the SAS Test Harness using configured certificate. Configure the SAS Test Harness to accept the security procedure and establish the connection 	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
2	<ul style="list-style-type: none"> Make sure that Mutual authentication happens between UUT and the SAS Test Harness. Make sure that UUT uses TLS v1.2 Make sure that cipher suites from one of the following is selected, <ul style="list-style-type: none"> TLS_RSA_WITH_AES_128_GCM_SHA256 TLS_RSA_WITH_AES_256_GCM_SHA384 TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256 TLS_ECDHE_ECDSA_WITH_AES_256_GCM_SHA384 TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256 	<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"> 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>cbstdId</i>. 	<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"> 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



The screenshot shows a Wireshark capture of a TLS handshake. The packet list pane highlights frame 117, which is a TLSv1.2 packet containing a Server Hello, Certificate, Server key exchange, and Certificate Request. The packet details pane shows the following layers:

- Ethernet II, Src: Sony_5c:5a:6a (f0:bf:97:5c:5a:6a), Dst: Sercomm_ff:02:6c (00:c0:02:ff:02:6c)
- Internet Protocol Version 4, Src: 192.168.100.101 (192.168.100.101), Dst: 192.168.100.123 (192.168.100.123)
- Transmission Control Protocol, Src Port: 5000 (5000), Dst Port: 58060 (58060), Seq: 1, Ack: 518, Len: 3333
- Secure Sockets Layer

The packet bytes pane shows the raw data of the captured frame, including hex and ASCII representations.

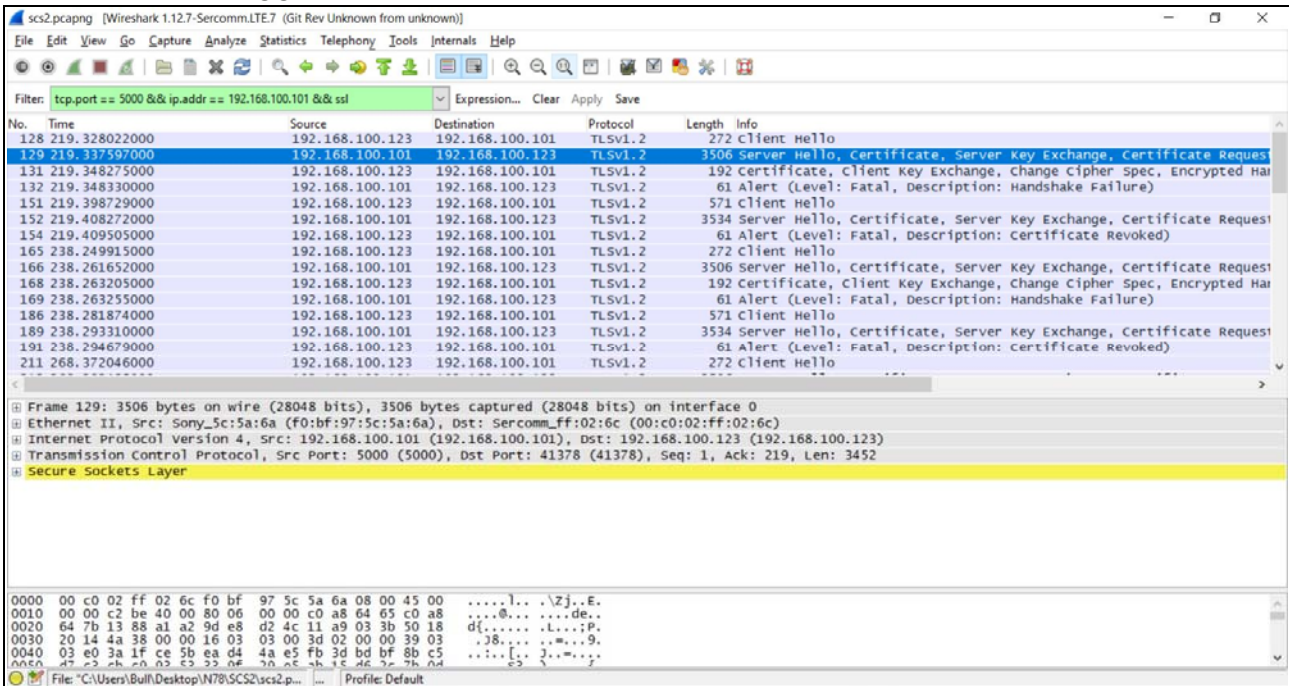
4.7.6.2 WINNF.FT.C.SCS.2

Test Case ID : WINNF.FT.C.SCS.2 NA

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



The screenshot shows a Wireshark capture of a TLS handshake. The filter is set to `tcp.port == 5000 && ip.addr == 192.168.100.101 && ssl`. The packet list shows the following sequence of events:

- 128: Client Hello (272 bytes)
- 129: Server Hello, Certificate, Server Key Exchange, Certificate Request (3506 bytes)
- 131: Certificate, Client Key Exchange, Change Cipher Spec, Encrypted Handshake (192 bytes)
- 132: Alert (Level: Fatal, Description: Handshake Failure) (61 bytes)
- 151: Client Hello (571 bytes)
- 152: Server Hello, Certificate, Server Key Exchange, Certificate Request (3534 bytes)
- 154: Alert (Level: Fatal, Description: certificate revoked) (61 bytes)
- 165: Client Hello (272 bytes)
- 166: Server Hello, Certificate, Server Key Exchange, Certificate Request (3506 bytes)
- 168: Certificate, Client Key Exchange, Change Cipher Spec, Encrypted Handshake (192 bytes)
- 169: Alert (Level: Fatal, Description: Handshake Failure) (61 bytes)
- 186: Client Hello (571 bytes)
- 189: Server Hello, Certificate, Server Key Exchange, Certificate Request (3534 bytes)
- 191: Alert (Level: Fatal, Description: certificate revoked) (61 bytes)
- 211: Client Hello (272 bytes)

The packet details for frame 129 show the following layers:

- Ethernet II, Src: Sony_5c:5a:6a (f0:bf:97:5c:5a:6a), Dst: Sercomm_ff:02:6c (00:c0:02:ff:02:6c)
- Internet Protocol Version 4, Src: 192.168.100.101 (192.168.100.101), Dst: 192.168.100.123 (192.168.100.123)
- Transmission Control Protocol, Src Port: 5000 (5000), Dst Port: 41378 (41378), Seq: 1, Ack: 219, Len: 3452
- Secure Sockets Layer

The hex dump at the bottom shows the raw data of the captured packet.

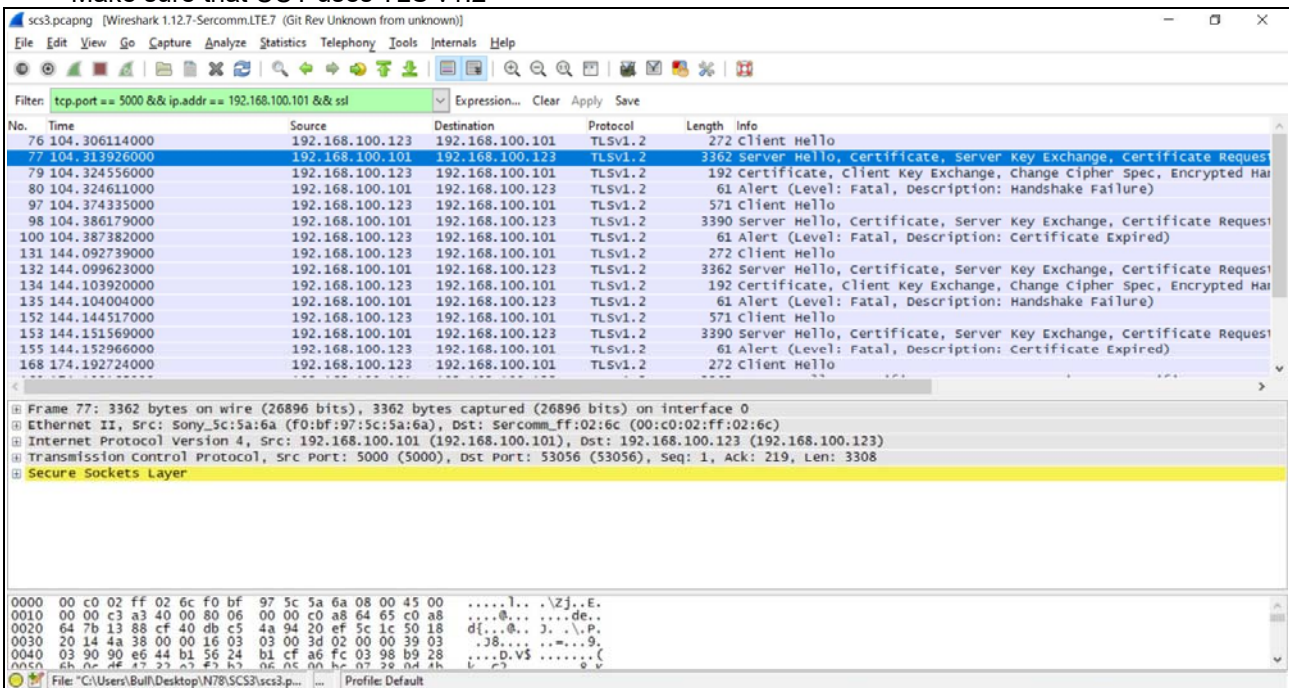
4.7.6.3 WINNF.FT.C.SCS.3

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

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



The screenshot shows a Wireshark capture of a TLS handshake. The filter is set to 'tcp.port == 5000 && ip.addr == 192.168.100.101 && ssl'. The packet list shows several frames, with frame 77 (3362 bytes) being the 'Server Hello, Certificate, Server Key Exchange, Certificate Request' frame. The packet details for frame 77 show the 'Secure Sockets Layer' protocol. The packet bytes pane shows the raw data of the frame.

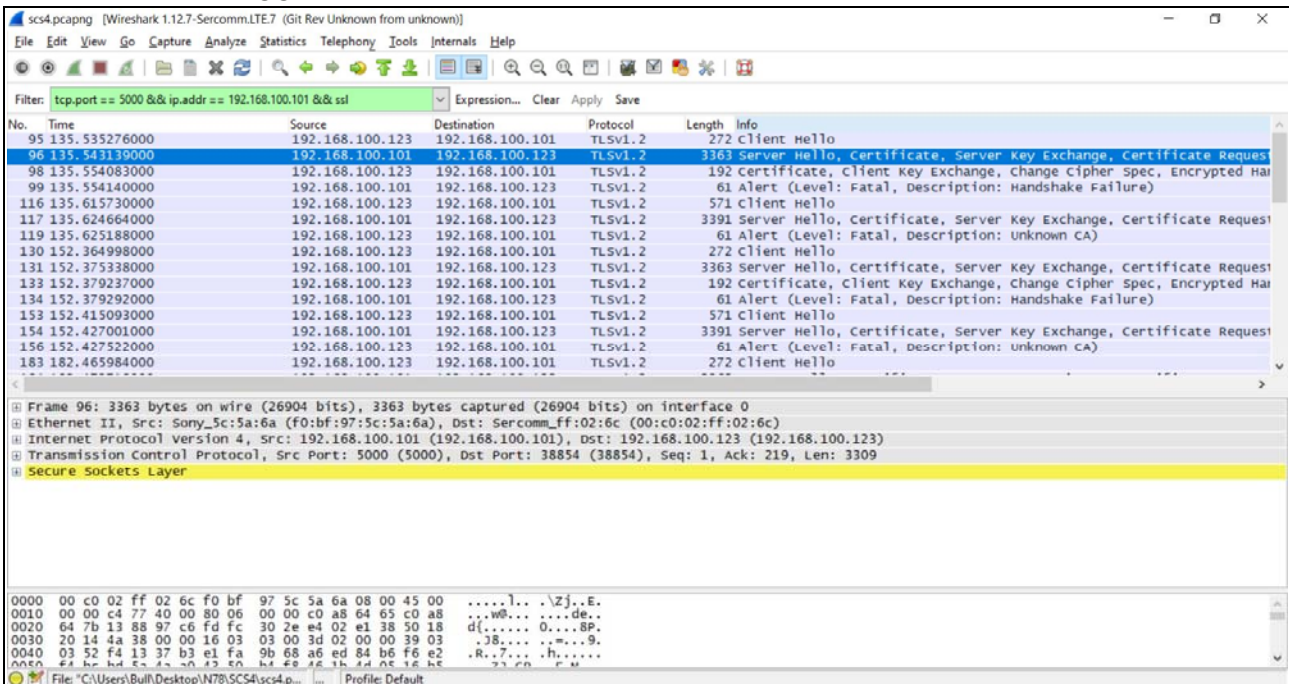
4.7.6.4 WINNF.FT.C.SCS.4

Test Case ID : WINNF.FT.C.SCS.4 NA

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



The screenshot shows a Wireshark capture of a TLSv1.2 handshake. The filter is set to 'tcp.port == 5000 && ip.addr == 192.168.100.101 && ssl'. The packet list shows several frames, with frame 96 selected. The packet details pane shows the following layers:

- Ethernet II, Src: Sony_5c:5a:6a (f0:bf:97:5c:5a:6a), Dst: Sercomm_ff:02:6c (00:c0:02:ff:02:6c)
- Internet Protocol Version 4, Src: 192.168.100.101 (192.168.100.101), Dst: 192.168.100.123 (192.168.100.123)
- Transmission Control Protocol, Src Port: 5000 (5000), Dst Port: 38854 (38854), Seq: 1, Ack: 219, Len: 3309
- Secure Sockets Layer

The raw data pane shows the hex and ASCII representation of the captured bytes.

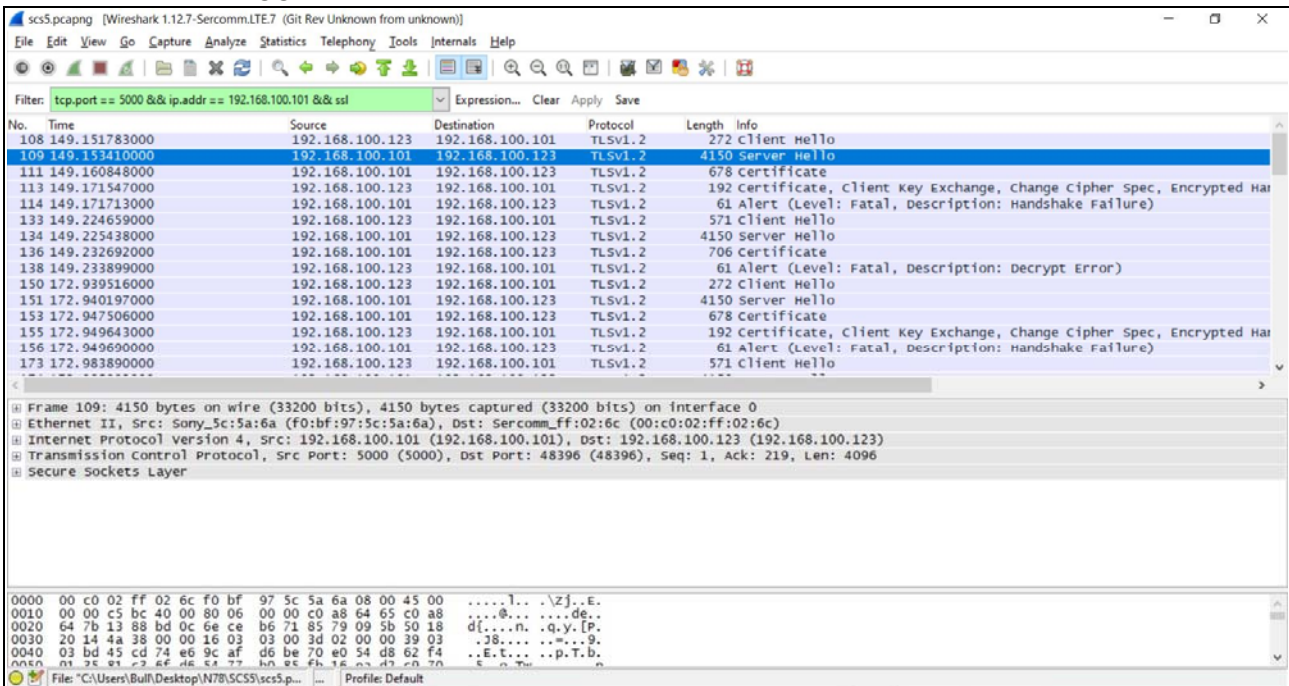
4.7.6.5 WINNF.FT.C.SCS.5

Test Case ID : WINNF.FT.C.SCS.5 NA

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



The screenshot 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 the following frames:

- 108: client Hello (272 bytes)
- 109: Server Hello (4150 bytes)
- 111: certificate (678 bytes)
- 113: 192 certificate, Client Key Exchange, change Cipher Spec, encrypted Har (192 bytes)
- 114: 61 Alert (Level: Fatal, Description: Handshake Failure)
- 133: 571 client Hello
- 134: 4150 server Hello
- 136: 706 certificate
- 138: 61 Alert (Level: Fatal, Description: Decrypt Error)
- 150: 272 client Hello
- 151: 4150 Server Hello
- 153: 678 certificate
- 155: 192 Certificate, Client Key Exchange, Change Cipher Spec, Encrypted Har (192 bytes)
- 156: 61 Alert (Level: Fatal, Description: Handshake Failure)
- 173: 571 client Hello

The packet details for frame 109 (Server Hello) are expanded, showing the Secure Sockets Layer details.

4.7.7 CBSD RF Power Measurement

4.7.7.1 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"> ● UUT has successfully completed SAS Discovery and Authentication with the SAS Test Harness ● UUT has registered with the SAS, with CBSID = C ● UUT has a single valid grant G with parameters {lowFrequency = FL, highFrequency = FH, maxEirp = Pi}, with grant in AUTHORIZED state, and grantExpireTime set to a value far past the duration of this test case <p><i>Note: in order for the UUT to request a grant with the parameters {lowFrequency, highFrequency, maxEirp}, the SAS Test Harness may need to provide appropriate guidance in the availableChannel object of the spectrumInquiry response message, and the operationParam object of the grant response message. Alternately, the UUT vendor may provide the ability to set those parameters on the UUT so that the UUT will request a grant with those parameters</i></p>	--	--
2	<p>UUT and SAS Test Harness perform a series of Heartbeat Request/Response cycles, which continues until the other test steps are complete. Messaging for each cycle is as follows:</p> <ul style="list-style-type: none"> ● UUT sends Heartbeat Request, including: <ul style="list-style-type: none"> ○ cbsdId = C ○ grantId = G ● SAS Test Harness responds with Heartbeat Response, including: <ul style="list-style-type: none"> ○ cbsdId = C ○ grantId = G ○ transmitExpireTime = current UTC time + 200 seconds ○ responseCode = 0 	--	--
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:

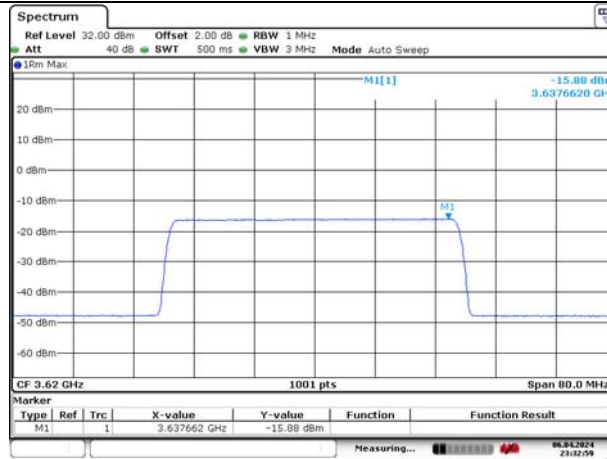
- Tester performs power measurement on RF interface(s) of UUT, and verifies it complies with the maxEirp setting, Pi. The RF measurement method is out of scope of this document, but may include additional configuration of the UUT, as required, to fulfill the requirements of the power measurement method.

Channel	Freq. (MHz)	40MHz				Limit	Pass / Fail
		Conducted Power Density (dBm/MHz)		Gain(dBi)	11.8		
		Chain 0	Chain 1	Total	EIRP (dBm/MHz)	maxEirp(dBm)=Pi	
Middle	3620	-16.30	-15.88	-13.10	-1.3	0	Pass
Middle	3620	0.73	0.51	3.63	15.43	16	Pass
Middle	3620	15.31	14.06	17.74	29.54	32	Pass

maxEirp = 0 dBm/MHz

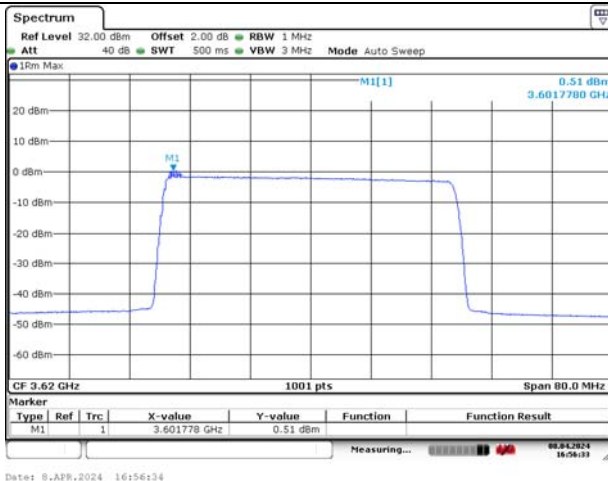
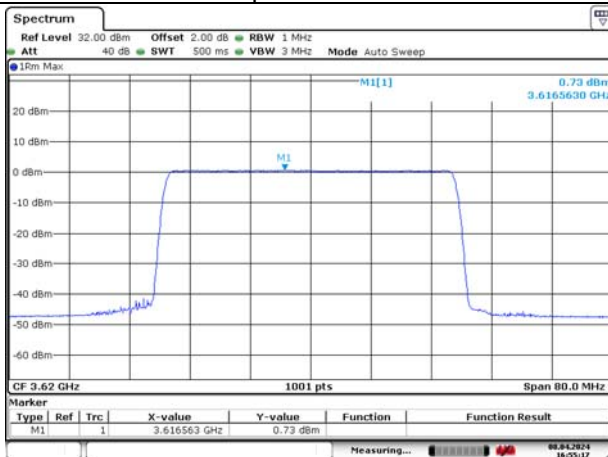


Date: 6.APR.2024 23:34:09

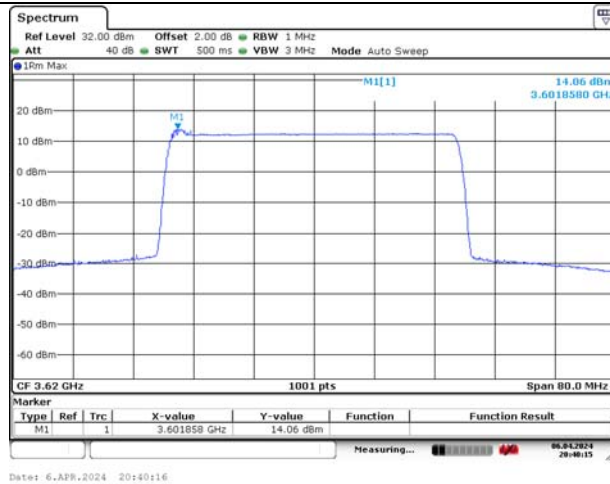
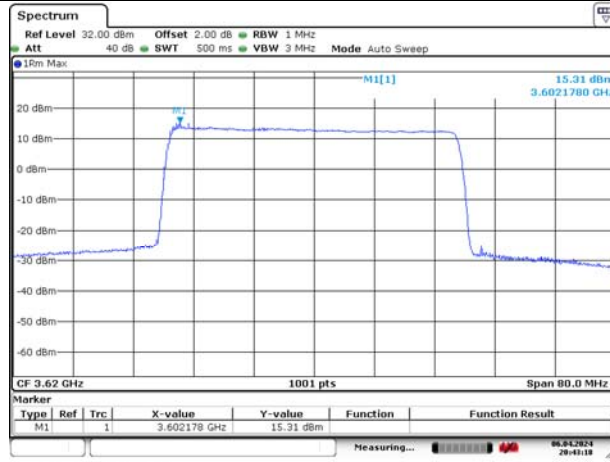


Date: 6.APR.2024 23:32:59

maxEirp = 16 dBm/MHz



maxEirp = 32 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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The address and road map of all our labs can be found in our web site also.

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