

CBSD Test Report

Report No.: RFBEIH-WTW-P21110117-1

FCC ID: P27-SCO4255PA10

Test Model: SCO4255P-BC-A10

Received Date: Nov. 16, 2021

Test Date: Dec. 03, 2021 ~ Jan. 11, 2022

Issued Date: Jan. 20, 2022

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-P21110117-1	Original release	Jan. 20, 2022

1 Certificate of Conformity

Product: Englewood HGO

Brand: Sercomm

Test Model: SCO4255P-BC-A10

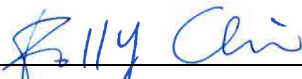
Sample Status: Engineering sample

Applicant: Sercomm Corp.

Test Date: Dec. 3, 2021 ~ Jan. 11, 2022

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 :  , **Date:** Jan. 20, 2022
Polly Chien / Specialist

Approved by :  , **Date:** Jan. 20, 2022
Jeremy Lin / Project Engineer

2 Summary of Test Results

WINNF-TS-0122			
Classes	Test Case Items	Pass Items	Pass Rate (%)
FT(CBSD, DP/CBSD)	26	26	100
PT(CBSD, DP/CBSD)	1	1	100
Total	27	27	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	WINNF.FT.C.REG.1	Yes
C2	NA	No
C3	WINNF.FT.C.REG.5	Yes
C4	WINNF.FT.C.MES.1	Yes
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	Pass
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	Englewood HGO
Brand	Sercomm
Test Model	SCO4255P-BC-A10
Hardware Version	2.0
Firmware Version	TEST4921@211223
Status of EUT	Engineering sample
Antenna Type	Refer to Note as below
Antenna Connector	Refer to Note as below
Accessory Device	Adapter
Data Cable Supplied	NA

Note:

- The EUT provides 4 completed transmitters and 4 receivers. The antennas provided to the EUT, please refer to the following table:

TX Antenna	Antenna Type	Antenna Connector	Antenna Gain (dBi)	Frequency Range
0	Patch array	IPEX	9.8	3550MHz - 3700MHz
1				
2				
3				

*The above Antenna information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications, the laboratory shall not be held responsible.

- The EUT uses following Adapter and PoE. (The PoE is for support unit only.)

Adapter	
Brand	MOSO POWER SUPPLY TECHNOLOGY CO.,LTD
Model	MS-T2500R120-030N0-N
Part Number	SB007-N0
AC Input	100Vac-240Vac
DC Output	12Vdc/2.5A
DC Cable	1.5m non-shielded cable

PoE (support unit only)	
Brand	ChenZhou Frecom Electronics Co., Ltd.
Model	PGOB24D01-560054
AC Input	100-240V, 0.7A, 50/60Hz
DC Output	56V, 0.536A
DC Cable	1.5m non-shielded cable

Test Condition:

Test Item	Environmental Conditions	Input Power	Tested By
WINNF-TS-0122	24deg. 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 was 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

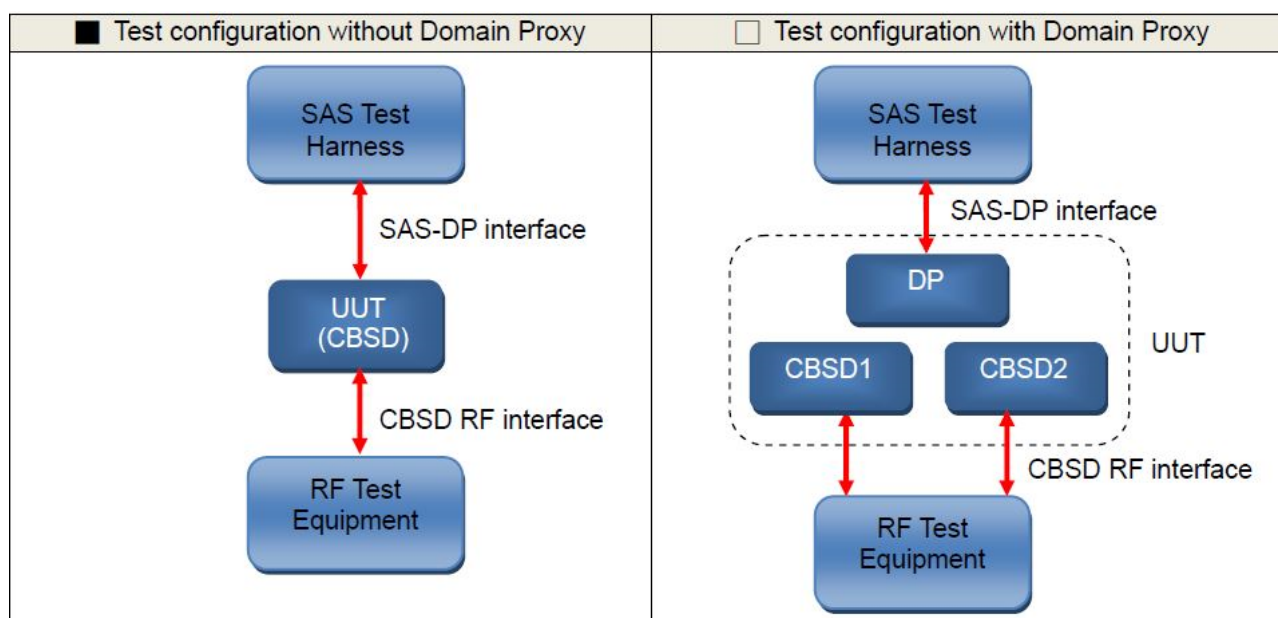
Test Harness Version	V1.0.0.3
Operating System	Microsoft Windows 10
TLS Version	1.2
Python	2.7.13

4.4 Test Equipment

Description & Manufacturer	Model no.	Serial No.	Calibrated Date	Calibrated Until
ROHDE & SCHWARZ Signal Analyzer	FSV	E2-010642	May. 28, 2021	May. 27, 2022
Temperature & Humidity Chamber TERCHY	5098.00	E2-010117	Jan. 07, 2021	Jan. 06, 2022
			Jan. 07, 2022	Jan. 06, 2023
Laptop Lenovo	L470	PF-11H9B8	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.

4.5 Test Setup



4.6 Test Results

4.6.1 CBSD Registration Process

4.6.1.1 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: ● 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: ● The required <i>userId</i>, <i>fcld</i> and <i>cbsdSerialNumber</i> 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.	☒ Pass	☐ Fail
3	● SAS Test Harness sends a CBSD Registration Response as follows: - <i>cbsdId</i> = C - <i>measReportConfig</i> shall not be included - <i>responseCode</i> = 0	--	--
4	After completion of step 3, SAS Test Harness will not provide any positive response (<i>responseCode</i> =0) to further request messages from the UUT.	--	--
5	Monitor the RF output of the UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify: ● UUT shall not transmit RF	☒ Pass	☐ Fail

4.6.1.2 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: ● 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: ● 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. ● 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.	☒ Pass	☐ Fail
3	● SAS Test Harness sends a CBSD Registration Response as follows: - <i>cbsdId</i> = C - <i>measReportConfig</i> shall not be included - <i>responseCode</i> = 0	--	--
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.	☒ Pass	☐ 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: ● UUT shall not transmit RF		

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: • 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: - SAS response does not include <i>cbsdId</i> - <i>responseCode</i> = R = 102	--	--
4	After completion of step 3, SAS Test Harness will not provide any positive response (<i>responseCode</i> =0) to further request messages from the UUT.	--	--
5	Monitor the RF output of the UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify: • UUT shall not transmit RF	☒ Pass	☐ Fail

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: ● 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: - SAS response does not include <i>cbsdId</i> - <i>responseCode</i> = R = 200	--	--
4	After completion of step 3, SAS Test Harness will not provide any positive response (<i>responseCode</i> =0) to further request messages from the UUT.	--	--
5	Monitor the RF output of the UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify: ● UUT shall not transmit RF	☒ Pass	☐ Fail

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: • 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: - SAS response does not include <i>cbsdId</i> - <i>responseCode</i> = R = 103	--	--
4	After completion of step 3, SAS Test Harness will not provide any positive response (<i>responseCode</i> =0) to further request messages from the UUT.	--	--
5	Monitor the RF output of the UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify: • UUT shall not transmit RF	☒ Pass	☐ Fail

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: • 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: - SAS response does not include <i>cbsdId</i> - <i>responseCode</i> = R = 101	--	--
4	After completion of step 3, SAS Test Harness will not provide any positive response (<i>responseCode</i> =0) to further request messages from the UUT.	--	--
5	Monitor the RF output of the UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify: • UUT shall not transmit RF	☒ Pass	☐ Fail

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: - 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: - SAS response does not include <i>cbsdId</i> <i>responseCode</i> = R = 100	--	--
4	After completion of step 3, SAS Test Harness will not provide any positive response (<i>responseCode</i> =0) to further request messages from the UUT.	--	--
5	Monitor the RF output of the UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify: UUT shall not transmit RF	☒ Pass	☐ Fail

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: ● 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: - SAS response does not include <i>cbsdId</i> - <i>responseCode</i> = R = 201	--	--
4	After completion of step 3, SAS Test Harness will not provide any positive response (<i>responseCode</i> =0) to further request messages from the UUT.	--	--
5	Monitor the RF output of the UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify: ● UUT shall not transmit RF	☒ Pass	☐ Fail

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: UUT has registered successfully with SAS Test Harness, with <i>cbsdId</i> = C	--	--
2	UUT sends valid Grant Request.	--	--
3	SAS Test Harness sends a Grant Response message, including <i>cbsdId</i>=C <i>responseCode</i> = R = 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: UUT shall not transmit RF	☒ Pass	☐ 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: UUT has registered successfully with SAS Test Harness, with <i>cbsdId</i> = C	--	--
2	UUT sends valid Grant Request.	--	--
3	SAS Test Harness sends a Grant Response message, including <i>cbsdId</i>=C <i>responseCode</i> = R = 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: UUT shall not transmit RF	☒ Pass	☐ 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: ● UUT has registered successfully with SAS Test Harness, with <i>cbsdId</i> = C	--	--
2	UUT sends a message: ● If message is type Spectrum Inquiry Request, go to step 3, or ● If message is type Grant Request, go to step 5	--	--
3	UUT sends Spectrum Inquiry Request. Validate: ● <i>cbsdId</i> = C ● List of frequencyRange objects sent by UUT are within the CBRS frequency range	■ Pass	□ Fail
4	SAS Test Harness sends a Spectrum Inquiry Response message, including the following parameters: ● <i>cbsdId</i> = C ● <i>availableChannel</i> is an array of availableChannel objects ● <i>responseCode</i> = 0	--	--
5	UUT sends Grant Request message. Validate: ● <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	■ Pass	□ Fail
6	SAS Test Harness sends a Grant Response message, including the parameters: ● <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: ● <i>cbsdId</i> = C ● <i>grantId</i> = G ● <i>operationState</i> = "GRANTED"	■ Pass	□ Fail
8	SAS Test Harness sends a Heartbeat Response message, with the following parameters: ● <i>cbsdId</i> = C ● <i>grantId</i> = G ● <i>transmitExpireTime</i> = current UTC time + 200 seconds ● <i>responseCode</i> = 0	--	--
9	For further Heartbeat Request messages sent from UUT after completion of step 8, validate message is sent within latest specified heartbeatInterval, and: ● <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: ● <i>cbsdId</i> = C ● <i>grantId</i> = G ● <i>transmitExpireTime</i> = current UTC time + 200 seconds ● <i>responseCode</i> = 0	■ Pass	□ Fail
10	Monitor the RF output of the UUT from start of test until UUT transmission commences. Verify: ● 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.	■ Pass	□ Fail

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



4.6.3.2 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: ● UUT has registered successfully with SAS Test Harness ● UUT has a valid single grant as follows: ○ 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: ● <i>cbsdId</i> = C ● <i>grantId</i> = G ● <i>operationState</i> = "AUTHORIZED"	☒ Pass	☐ Fail
3	SAS Test Harness sends a Heartbeat Response message, including the following parameters: ● <i>cbsdId</i> = C ● <i>grantId</i> = G ● <i>transmitExpireTime</i> = T = Current UTC time ● <i>responseCode</i> = 105 (DEREGISTER)	--	--
4	After completion of step 3, SAS Test Harness shall not allow any further grants to the UUT.	--	--
5	Monitor the RF output of the UUT. Verify: ● UUT shall stop transmission within (T + 60 seconds) of completion of step 3	☒ Pass	☐ Fail

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: ● UUT has registered successfully with SAS Test Harness ● UUT has a valid single grant as follows: ○ 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: ● <i>cbsdId</i> = C ● <i>grantId</i> = G ● <i>operationState</i> = "AUTHORIZED"	■ Pass	□ Fail
3	SAS Test Harness sends a Heartbeat Response message, including the following parameters: ● <i>cbsdId</i> = C ● <i>grantId</i> = G ● <i>transmitExpireTime</i> = T = current UTC time ● <i>responseCode</i> = 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: ● UUT shall stop transmission within (T + 60 seconds) of completion of step 3	■ Pass	□ Fail

4.6.3.4 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: ● UUT has registered successfully with SAS Test Harness ● UUT has a valid single grant as follows: ○ 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: ● <i>cbsdId</i> = C ● <i>grantId</i> = G ● <i>operationState</i> = "GRANTED"	☒ Pass	☐ Fail
3	SAS Test Harness sends a Heartbeat Response message, including the following parameters: ● <i>cbsdId</i> = C ● <i>grantId</i> = G ● <i>transmitExpireTime</i> = T = current UTC time ? <i>responseCode</i> = 501 (SUSPENDED GRANT)	--	--
4	After completion of step 3, SAS Test Harness shall not allow any further grants to the UUT.	--	--
5	Monitor the SAS-CBSD interface. Verify either A OR B occurs: A. UUT sends a Heartbeat Request message. Ensure message is sent within latest specified heartbeatInterval, and is correctly formatted with parameters: ● <i>cbsdId</i> = C ● <i>grantId</i> = G ● <i>operationState</i> = "GRANTED" B. UUT sends a Relinquishment request message. Ensure message is correctly formatted with parameters: ● <i>cbsdId</i> = C ● <i>grantId</i> = G Monitor the RF output of the UUT. Verify: ● UUT does not transmit at any time	☒ Pass	☐ Fail

4.6.3.5 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: ● UUT has registered successfully with SAS Test Harness ● UUT has a valid single grant as follows: ○ 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: ● <i>cbsdId</i> = C ● <i>grantId</i> = G ● <i>operationState</i> = "AUTHORIZED"	☒ Pass	☐ Fail
3	SAS Test Harness sends a Heartbeat Response message, including the following parameters: ● <i>cbsdId</i> = C ● <i>grantId</i> = G ● <i>transmitExpireTime</i> = T = current UTC time ● <i>responseCode</i> = 501 (SUSPENDED_GRANT)	--	--
4	After completion of step 3, SAS Test Harness shall not allow any further grants to the UUT.	--	--
5	Monitor the SAS-CBSD interface. Verify either A OR B occurs: A. UUT sends a Heartbeat Request message. Ensure message is sent within latest specified heartbeatInterval, and is correctly formatted with parameters: ● <i>cbsdId</i> = C ● <i>grantId</i> = G ● <i>operationState</i> = "GRANTED" B. UUT sends a Relinquishment request message. Ensure message is correctly formatted with parameters: ● <i>cbsdId</i> = C ● <i>grantId</i> = G Monitor the RF output of the UUT. Verify: ● UUT shall stop transmission within (T+60) seconds of completion of step 3	☒ 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	Ensure the following conditions are met for test entry: ● UUT has registered successfully with SAS Test Harness ● UUT has a valid single grant as follows: ○ 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: ● <i>cbsdId</i> = C ● <i>grantId</i> = G ● <i>operationState</i> = "AUTHORIZED"	■ Pass	□ Fail
3	SAS Test Harness sends a Heartbeat Response message, including the following parameters: ● <i>cbsdId</i> = C ● <i>grantId</i> = G ● <i>transmitExpireTime</i> = T = current UTC time ● <i>responseCode</i> = 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: ● UUT sends a Grant Relinquishment Request message. Verify message is correctly formatted with parameters: ○ <i>cbsdId</i> = C ○ <i>grantId</i> = G Monitor the RF output of the UUT. Verify: ● UUT shall stop transmission within (T+60) seconds of completion of step 3	■ Pass	□ 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: ● UUT has registered successfully with SAS Test Harness ● UUT has a valid single grant as follows: ○ 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: ● <i>cbsdId</i> = C ● <i>grantId</i> = G ● <i>operationState</i> = "GRANTED"	■ Pass	□ Fail
3	After completion of step 2, SAS Test Harness does not respond to any further messages from UUT to simulate loss of network connection	--	--
4	Monitor the RF output of the UUT from start of test to 60 seconds after step 3. Verify: ● At any time during the test, UUT shall not transmit on RF interface	■ Pass	□ Fail

4.6.3.8 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: ● UUT has registered successfully with SAS Test Harness ● UUT has a valid single grant as follows: ○ 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 heartbeatInterval, and is formatted correctly, including: ● <i>cbsdId</i> = C ● <i>grantId</i> = G ● <i>operationState</i> = "AUTHORIZED"	■ Pass	□ Fail
3	SAS Test Harness sends a Heartbeat Response message, including the following parameters: ● <i>cbsdId</i> = C ● <i>grantId</i> = G ● <i>transmitExpireTime</i> = T = current UTC time + 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: ● UUT shall stop all transmission on RF interface within (<i>transmitExpireTime</i> + 60 seconds), using the <i>transmitExpireTime</i> sent in Step 3.	■ Pass	□ Fail

4.6.4 CBSD Measurement Report

4.6.4.1 WINNF.FT.C.MES.1

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

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: ● UUT has successfully completed SAS Discovery and Authentication with SAS Test Harness	--	--
2	UUT sends a Registration Request message. Validate the Registration Request message is formatted correctly, including: <i>userId</i> is present and correct ● <i>fcld</i> is present and correct ● <i>cbsdSerialNumber</i> is present and correct ● <i>measCapability</i> = "RECEIVED_POWER_WITHOUT_GRANT"	■ Pass	□ Fail
3	SAS Test Harness sends a Registration Response message, with the following parameters: ● <i>cbsdId</i> = C = valid <i>cbsdId</i> for this UUT ● <i>measReportConfig</i> = "RECEIVED_POWER_WITHOUT_GRANT" ● <i>responseCode</i> = 0	--	--
4	UUT sends a message: ● If message is type Spectrum Inquiry Request, go to step 5, or ● If message is type Grant Request, go to step 7	--	--
5	UUT sends message type Spectrum Inquiry Request. Verify message contains all required parameters properly formatted, and specifically: ● <i>cbsdId</i> = C ● <i>measReport</i> is present, and is a properly formatted <i>rcvdPowerMeasReport</i> .	■ Pass	□ Fail
6	SAS Test Harness sends a Spectrum Inquiry Response, with the following parameters: ● <i>cbsdId</i> = C ● <i>availableChannel</i> is an array of <i>availableChannel</i> objects ● <i>responseCode</i> = 0	--	--
7	UUT sends message type Grant Request message. Verify message contains all required parameters properly formatted, and specifically: ● <i>cbsdId</i> = C ● <i>measReport</i> is present, and is a properly formatted <i>rcvdPowerMeasReport</i> .	■ Pass	□ Fail

4.6.5 CBSD Relinquishment Process

4.6.5.1 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: ● UUT has successfully completed SAS Discovery and Authentication with SAS Test Harness ● UUT has successfully registered with SAS Test Harness, with <i>cbsdId</i>=C ● UUT has received a valid grant with <i>grantId</i> = G ● UUT is in Grant State AUTHORIZED and is actively transmitting within the bounds of its grant. 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: ● <i>cbsdId</i> = C ● <i>grantId</i> = G	■ Pass	□ Fail
3	SAS Test Harness shall approve the request with a Relinquishment Response message with parameters: - <i>cbsdId</i> = C - <i>grantId</i> = G - <i>responseCode</i> = 0	--	--
4	After completion of step 3, SAS Test Harness will not provide any additional positive response (<i>responseCode</i>=0) to further request messages from the UUT	--	--
5	Monitor the RF output of the UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify: ● UUT shall stop RF transmission at any time between triggering the relinquishment and UUT sending the relinquishment request	■ Pass	□ Fail

4.6.6 CBSD Deregistration Process

4.6.6.1 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: - UUT has successfully completed SAS Discovery and Authentication with SAS Test Harness - UUT has successfully registered with SAS Test Harness, with <i>cbsdId</i>=C - UUT has received a valid grant with <i>grantId</i> = G - UUT is in Grant State AUTHORIZED and is actively transmitting within the bounds of its grant. Invoke trigger to deregister UUT from the SAS Test Harness	--	--
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.	☒ Pass	☐ Fail
4	SAS Test Harness shall approve the request with a Deregistration Response message with parameters: <i>cbsdId</i> = C <i>responseCode</i> = 0	--	--
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	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: - UUT stopped RF transmission at any time between triggering the deregistration and either A OR B occurs: A. UUT sending a Registration Request message, as this is not mandatory B. UUT sending a Deregistration Request message	☒ Pass	☐ Fail

4.6.7 CBSD Security Validation

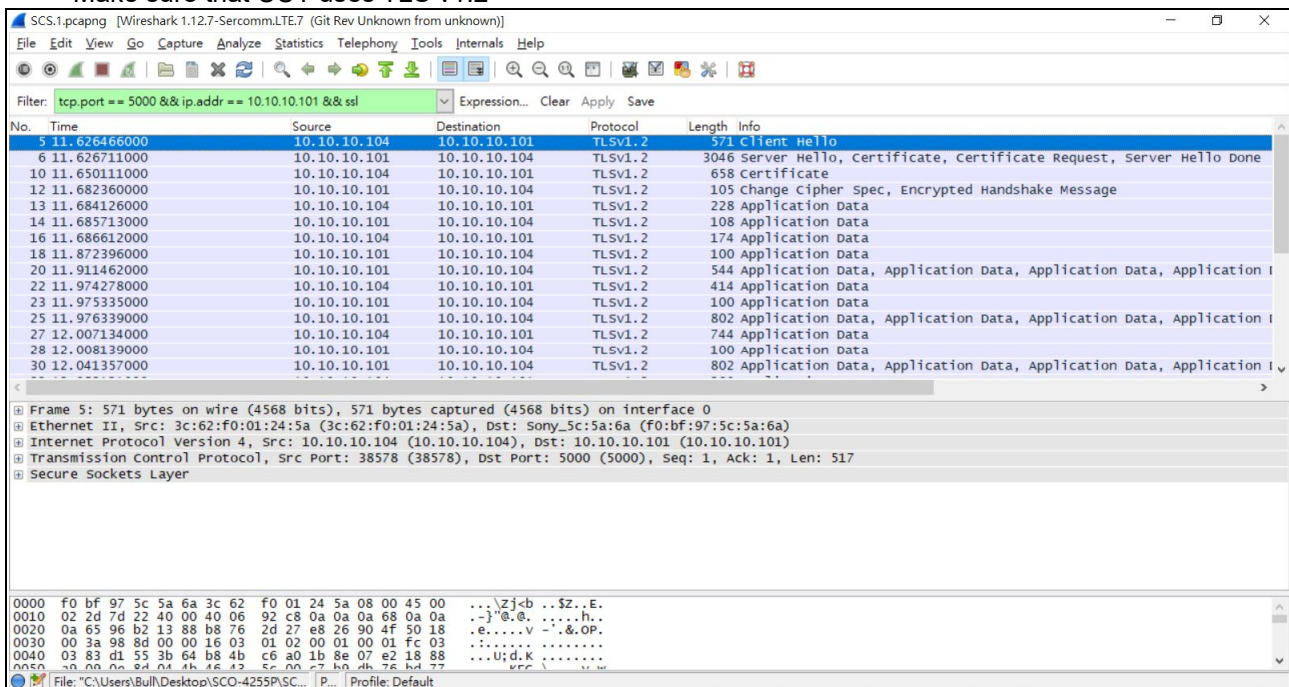
4.6.7.1 WINNF.FT.C.SCS.1

Test Case ID : WINNF.FT.C.SCS.1 ☐ NA

#	Test Execution Steps	Results	
1	- UUT shall start CBSD-SAS communication with the security procedure - The UUT shall establish a TLS handshake with the SAS Test Harness using configured certificate. - Configure the SAS Test Harness to accept the security procedure and establish the connection	☒ Pass	☐ Fail
2	- Make sure that Mutual authentication happens between UUT and the SAS Test Harness. - Make sure that UUT uses TLS v1.2 - Make sure that cipher suites from one of the following is selected, - TLS_RSA_WITH_AES_128_GCM_SHA256 - TLS_RSA_WITH_AES_256_GCM_SHA384 - TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256 - TLS_ECDHE_ECDSA_WITH_AES_256_GCM_SHA384 - TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256	☒ Pass	☐ Fail
3	A successful registration is accomplished using one of the test cases described in section 6.1.4.1, depending on CBSD capability. 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>.	☒ Pass	☐ Fail
4	Monitor the RF output of the UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify: UUT shall not transmit RF	☒ Pass	☐ Fail

Wireshark Capture Example for Test Case :

- Make sure that UUT uses TLS v1.2



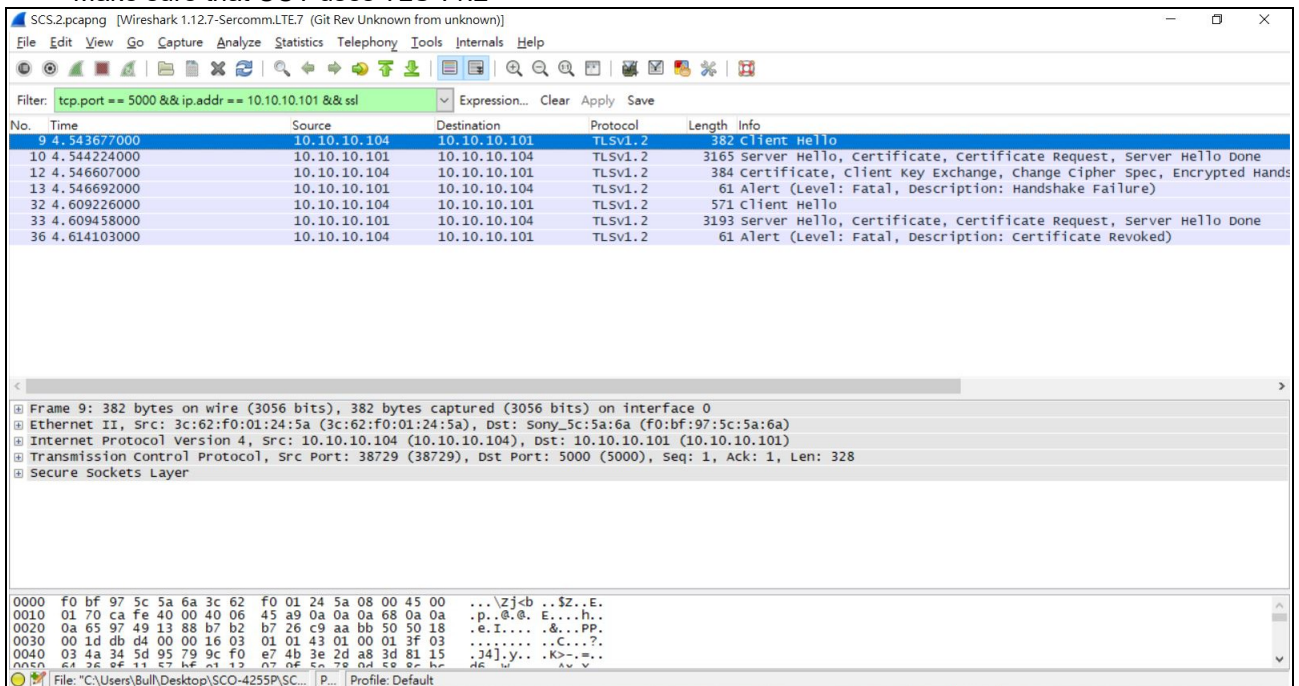
4.6.7.2 WINNF.FT.C.SCS.2

Test Case ID : WINNF.FT.C.SCS.2 ☐ NA

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

Wireshark Capture Example for Test Case :

- Make sure that UUT uses TLS v1.2



Wireshark capture example showing TLS v1.2 handshake between 10.10.10.104 and 10.10.10.101. The capture shows a Client Hello, Server Hello, Certificate, Client Key Exchange, Change Cipher Spec, Encrypted Handshake, and a Fatal Alert (Handshake Failure).

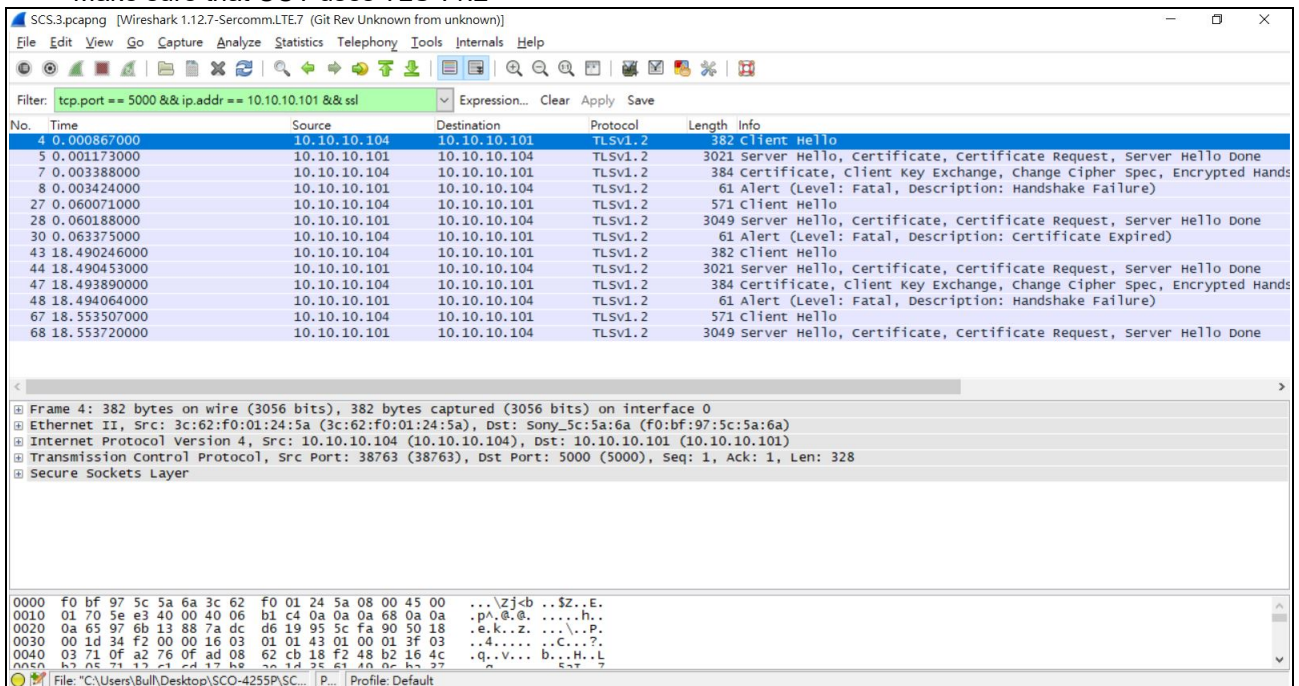
4.6.7.3 WINNF.FT.C.SCS.3

Test Case ID : WINNF.FT.C.SCS.3 ☐ NA

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

Wireshark Capture Example for Test Case :

- Make sure that UUT uses TLS v1.2



SCS.3.pcapng [Wireshark 1.12.7-Sercomm.LTE.7 (Git Rev Unknown from unknown)]

File Edit View Go Capture Analyze Statistics Telephony Tools Internals Help

Filter: tcp.port == 5000 && ip.addr == 10.10.10.101 && ssl Expression... Clear Apply Save

No.	Time	Source	Destination	Protocol	Length	Info
4	0.000867000	10.10.10.104	10.10.10.101	TLSv1.2	382	Client Hello
5	0.001173000	10.10.10.101	10.10.10.104	TLSv1.2	3021	Server Hello, Certificate, Certificate Request, Server Hello Done
7	0.003388000	10.10.10.104	10.10.10.101	TLSv1.2	384	Certificate, Client Key Exchange, Change Cipher Spec, Encrypted Handshake
8	0.003424000	10.10.10.101	10.10.10.104	TLSv1.2	61	Alert (Level: Fatal, Description: Handshake Failure)
27	0.060071000	10.10.10.104	10.10.10.101	TLSv1.2	571	Client Hello
28	0.060188000	10.10.10.101	10.10.10.104	TLSv1.2	3049	Server Hello, Certificate, Certificate Request, Server Hello Done
30	0.063375000	10.10.10.104	10.10.10.101	TLSv1.2	61	Alert (Level: Fatal, Description: Certificate Expired)
43	18.490246000	10.10.10.104	10.10.10.101	TLSv1.2	382	Client Hello
44	18.490453000	10.10.10.101	10.10.10.104	TLSv1.2	3021	Server Hello, Certificate, Certificate Request, Server Hello Done
47	18.493890000	10.10.10.104	10.10.10.101	TLSv1.2	384	Certificate, Client Key Exchange, Change Cipher Spec, Encrypted Handshake
48	18.494064000	10.10.10.101	10.10.10.104	TLSv1.2	61	Alert (Level: Fatal, Description: Handshake Failure)
67	18.553507000	10.10.10.104	10.10.10.101	TLSv1.2	571	Client Hello
68	18.553720000	10.10.10.101	10.10.10.104	TLSv1.2	3049	Server Hello, Certificate, Certificate Request, Server Hello Done

Frame 4: 382 bytes on wire (3056 bits), 382 bytes captured (3056 bits) on interface 0

Ethernet II, Src: 3c:62:f0:01:24:5a (3c:62:f0:01:24:5a), Dst: Sony_5c:5a:6a (f0:bf:97:5c:5a:6a)

Internet Protocol Version 4, Src: 10.10.10.104 (10.10.10.104), Dst: 10.10.10.101 (10.10.10.101)

Transmission Control Protocol, Src Port: 38763 (38763), Dst Port: 5000 (5000), Seq: 1, Ack: 1, Len: 328

Secure Sockets Layer

0000 f0 bf 97 5c 5a 6a 3c 62 f0 01 24 5a 08 00 45 00 ... \zj-cb ..\$Z..E.

0010 01 70 5e e3 40 00 40 06 b1 c4 0a 0a 0a 68 0a 0a .pA.@.@.h.

0020 0a 65 97 6b 13 88 7a dc d6 19 95 5c fa 90 50 18 .e.k..z.P.

0030 00 1d 34 f2 00 00 16 03 01 01 43 01 00 01 3f 03 ..4.v... ..C...P.

0040 03 71 0f a2 76 0f ad 08 62 cb 18 f2 48 b2 16 4c .q.v... b...H..L

0050 b2 05 71 12 c1 cd 17 b8 20 1d 25 61 40 0c b3 27 .o... ..Sat 7

File: "C:\Users\Bull\Desktop\SCO-4255P\SCS.3.pcapng" Profile: Default

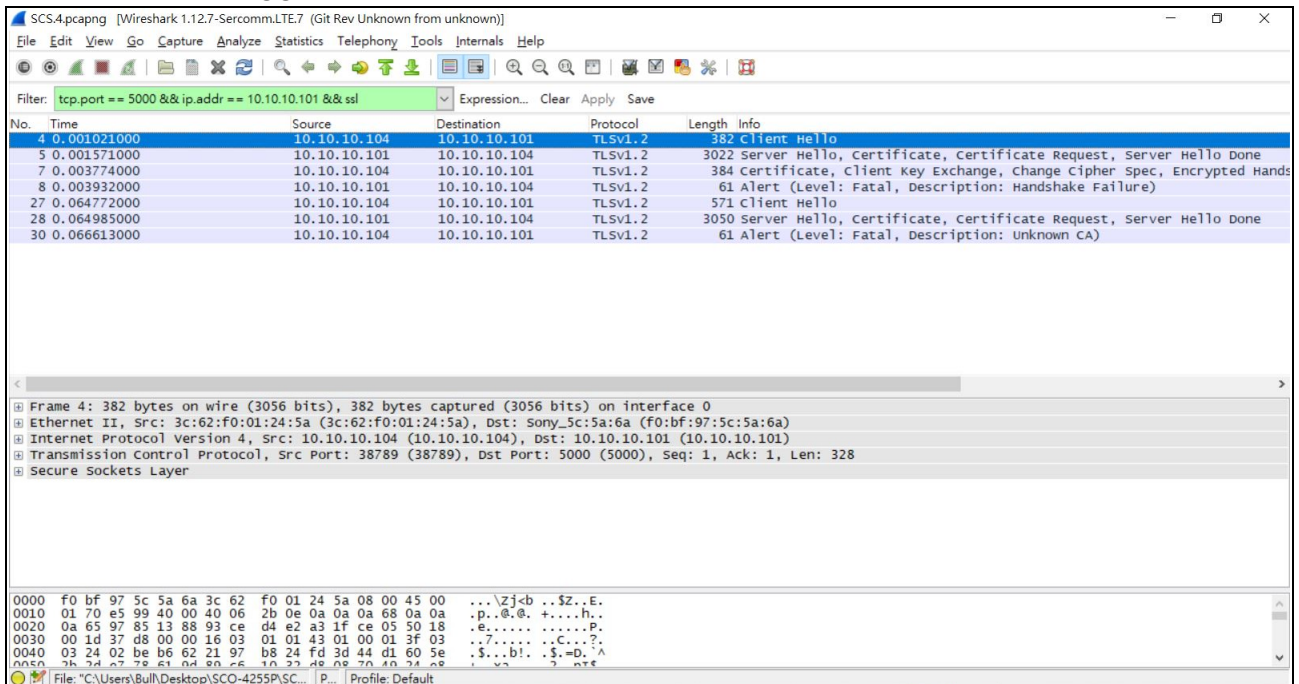
4.6.7.4 WINNF.FT.C.SCS.4

Test Case ID : WINNF.FT.C.SCS.4 ☐ NA

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

Wireshark Capture Example for Test Case :

- Make sure that UUT uses TLS v1.2



SCS.4.pcapng [Wireshark 1.12.7-Sercomm.LTE.7 (Git Rev Unknown from unknown)]

File Edit View Go Capture Analyze Statistics Telephony Tools Internals Help

Filter: tcp.port == 5000 && ip.addr == 10.10.10.101 && ssl Expression... Clear Apply Save

No.	Time	Source	Destination	Protocol	Length	Info
4	0.001021000	10.10.10.104	10.10.10.101	TLSv1.2	382	Client Hello
5	0.001571000	10.10.10.101	10.10.10.104	TLSv1.2	3022	Server Hello, Certificate, Certificate Request, Server Hello Done
7	0.003774000	10.10.10.104	10.10.10.101	TLSv1.2	384	certificate, Client Key Exchange, Change Cipher Spec, Encrypted Handshake
8	0.003932000	10.10.10.101	10.10.10.104	TLSv1.2	61	Alert (Level: Fatal, Description: Handshake Failure)
27	0.064772000	10.10.10.104	10.10.10.101	TLSv1.2	571	client Hello
28	0.064985000	10.10.10.101	10.10.10.104	TLSv1.2	3050	Server Hello, Certificate, Certificate Request, Server Hello Done
30	0.066613000	10.10.10.104	10.10.10.101	TLSv1.2	61	Alert (Level: Fatal, Description: unknown CA)

Frame 4: 382 bytes on wire (3056 bits), 382 bytes captured (3056 bits) on interface 0

Ethernet II, Src: 3c:62:f0:01:24:5a (3c:62:f0:01:24:5a), Dst: Sony_5c:5a:6a (f0:bf:97:5c:5a:6a)

Internet Protocol Version 4, Src: 10.10.10.104 (10.10.10.104), Dst: 10.10.10.101 (10.10.10.101)

Transmission Control Protocol, Src Port: 38789 (38789), Dst Port: 5000 (5000), Seq: 1, Ack: 1, Len: 328

Secure Sockets Layer

0000 f0 bf 97 5c 5a 6a 3c 62 f0 01 24 5a 08 00 45 00 ...Zj-cb..\$.E.
0010 01 70 e5 99 40 00 00 06 2b 0e 0a 0a 0a 68 0a 0a .p..@.+.h..
0020 0a 65 97 85 13 88 93 ce d4 e2 a3 1f ce 05 50 18 .e.....P..
0030 00 1d 37 d8 00 00 16 03 01 01 43 01 00 01 3f 03 ..7.....C...?
0040 03 24 02 be b6 62 21 97 b8 24 fd 3d 44 d1 60 5e \$....b!..\$.=D.^
0050 2b 24 a7 7e e1 04 80 ce 10 27 d8 08 70 10 28 a8 .+...?ntf

File: "C:\Users\Bull\Desktop\SCO-4255P(SC...)" Profile: Default

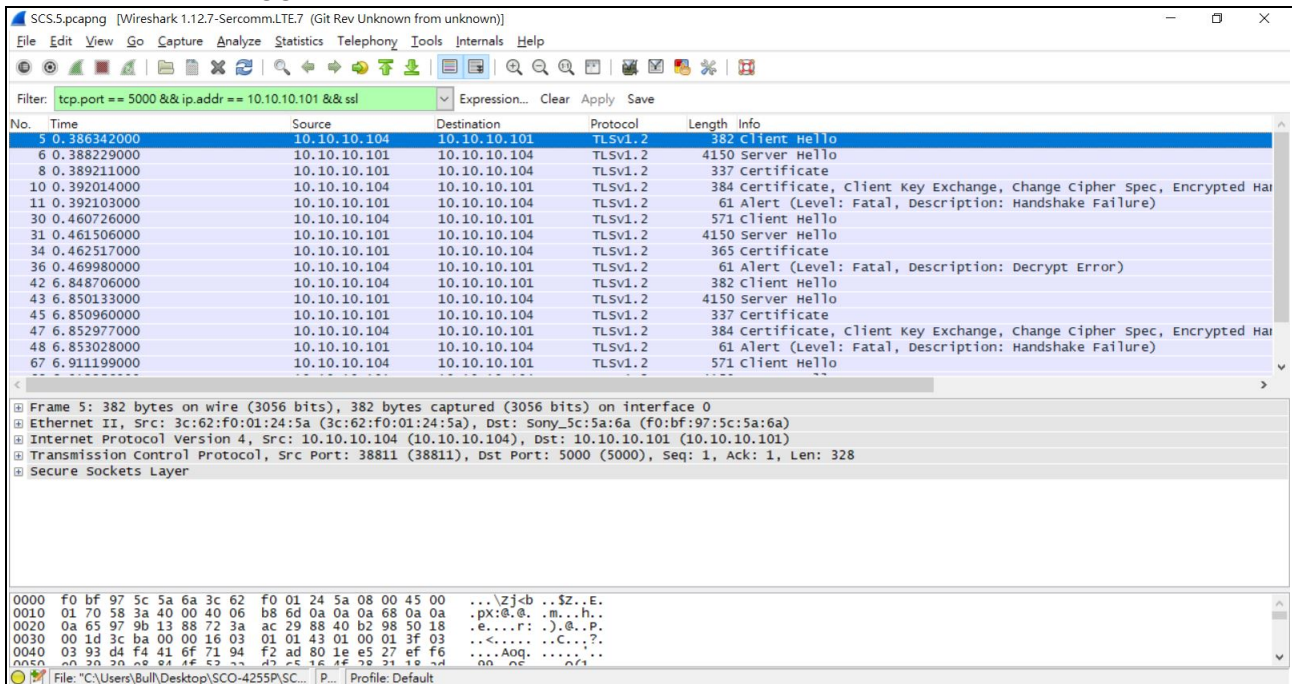
4.6.7.5 WINNF.FT.C.SCS.5

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

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

Wireshark Capture Example for Test Case :

- Make sure that UUT uses TLS v1.2



SCS.5.pcapng [Wireshark 1.12.7-Sercomm.LTE.7 (Git Rev Unknown from unknown)]

File Edit View Go Capture Analyze Statistics Telephony Tools Internals Help

Filter: tcp.port == 5000 && ip.addr == 10.10.10.101 && ssl Expression... Clear Apply Save

No.	Time	Source	Destination	Protocol	Length	Info
5	0.386342000	10.10.10.104	10.10.10.101	TLSv1.2	382	Client Hello
6	0.388229000	10.10.10.101	10.10.10.104	TLSv1.2	4150	Server Hello
8	0.389211000	10.10.10.101	10.10.10.104	TLSv1.2	337	certificate
10	0.392014000	10.10.10.104	10.10.10.101	TLSv1.2	384	certificate, Client Key Exchange, change Cipher Spec, Encrypted Handshake
11	0.392103000	10.10.10.101	10.10.10.104	TLSv1.2	61	Alert (Level: Fatal, Description: Handshake Failure)
30	0.460726000	10.10.10.104	10.10.10.101	TLSv1.2	571	client Hello
31	0.461506000	10.10.10.101	10.10.10.104	TLSv1.2	4150	Server Hello
34	0.462517000	10.10.10.101	10.10.10.104	TLSv1.2	365	certificate
36	0.469980000	10.10.10.104	10.10.10.101	TLSv1.2	61	Alert (Level: Fatal, Description: Decrypt Error)
42	6.848706000	10.10.10.104	10.10.10.101	TLSv1.2	382	client Hello
43	6.850133000	10.10.10.101	10.10.10.104	TLSv1.2	4150	Server Hello
45	6.850960000	10.10.10.101	10.10.10.104	TLSv1.2	337	certificate
47	6.852977000	10.10.10.104	10.10.10.101	TLSv1.2	384	certificate, Client Key Exchange, change Cipher Spec, Encrypted Handshake
48	6.853028000	10.10.10.101	10.10.10.104	TLSv1.2	61	Alert (Level: Fatal, Description: Handshake Failure)
67	6.911199000	10.10.10.104	10.10.10.101	TLSv1.2	571	client Hello

Frame 5: 382 bytes on wire (3056 bits), 382 bytes captured (3056 bits) on interface 0

Ethernet II, Src: 3c:62:f0:01:24:5a (3c:62:f0:01:24:5a), Dst: Sony_5c:5a:6a (f0:bf:97:5c:5a:6a)

Internet Protocol Version 4, Src: 10.10.10.104 (10.10.10.104), Dst: 10.10.10.101 (10.10.10.101)

Transmission Control Protocol, Src Port: 38811 (38811), Dst Port: 5000 (5000), Seq: 1, Ack: 1, Len: 328

Secure Sockets Layer

0000 f0 bf 97 5c 5a 6a 3c 62 f0 01 24 5a 08 00 45 00 ...Zjcb..\$.E.
 0010 01 70 58 3a 40 00 40 06 b8 6d 0a 0a 0a 68 0a 0a .px:0.0..m..h..
 0020 0a 65 97 9b 13 88 72 3a ac 29 88 40 b2 98 50 18 .e....r:.)@.P..
 0030 00 1d 3c ba 00 00 16 03 01 01 43 01 00 01 3f 03 <.....C...?..
 0040 03 93 d4 f4 41 6f 71 94 f2 ad 80 1e e5 27 ef f6 ...Aog.?
 0050 00 20 20 0e 04 4f 52 22 47 c5 16 4f 79 21 1e 2dn/

File: "C:\Users\Bull\Desktop\SCO-4255P(SCS.5) [P...]" Profile: Default

4.6.8 CBSD RF Power Measurement

4.6.8.1 WINNF.PT.C.HBT.1

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

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: ● UUT has successfully completed SAS Discovery and Authentication with the SAS Test Harness ● UUT has registered with the SAS, with CBSD ID = C ● UUT has a single valid grant G with parameters {lowFrequency = FL, highFrequency = FH, maxEirp = Pi}, with grant in AUTHORIZED state, and grantExpireTime set to a value far past the duration of this test case <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>	--	--
2	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: ● UUT sends Heartbeat Request, including: ○ cbsdId = C ○ grantId = G ● SAS Test Harness responds with Heartbeat Response, including: ○ cbsdId = C ○ grantId = G ○ transmitExpireTime = current UTC time + 200 seconds ○ responseCode = 0	--	--
3	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. <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>	■ Pass	□ Fail

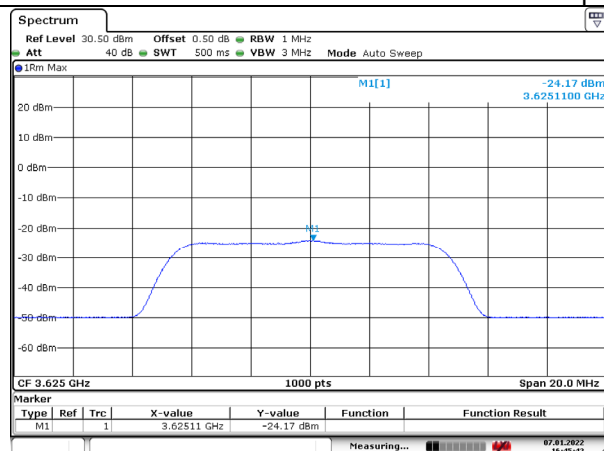
RF measurement plot for Test Case :

- 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.

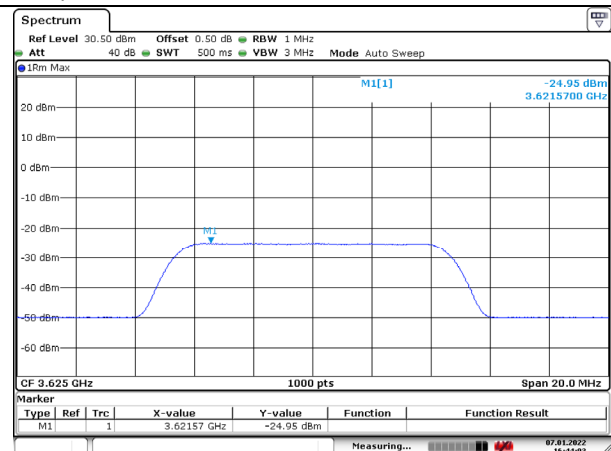
Channel	Freq. (MHz)	10MHz					Limit	Pass / Fail
		Conducted Power Density (dBm/MHz)				Directional Gain(dBi)		
		Chain 0	Chain 1	Chain 2	Chain 3	Power Density	maxEirp(dBm)=Pi	
Middle	3625	-24.17	-24.95	-25.23	-25.29	-18.86	-2	Pass
Middle	3625	-6.04	-6.25	-5.86	-6.09	-0.04	17	Pass
Middle	3625	12.36	12.22	12.62	12.11	18.35	36	Pass

Note: Directional gain = 9.8dBi +10log(4) = 15.82 dBi

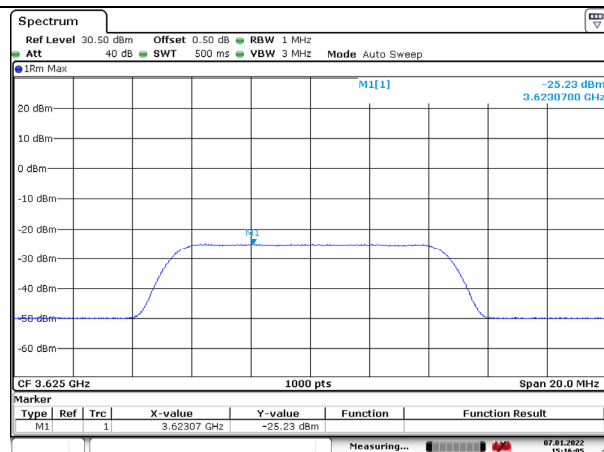
maxEirp = -2 dBm/MHz



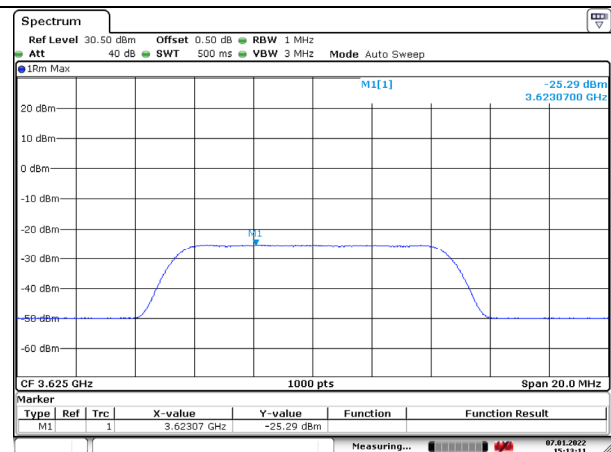
Date: 7.JAN.2022 16:45:42



Date: 7.JAN.2022 16:44:04



Date: 7.JAN.2022 15:16:05



Date: 7.JAN.2022 15:13:11