



Report No.: KSCR250200029203

Page: 1 of 54

TEST REPORT

Application No.: KSCR2502000292AT
FCC ID: ROR2001
Applicant: Blinq Networks Inc.
Address of Applicant: 140 Renfrew Drive, Suite 200, Markham, L3R 6B3, Canada
Manufacturer: Blinq Networks Inc.
Address of Manufacturer: 140 Renfrew Drive, Suite 200, Markham, L3R 6B3, Canada
Factory: VVDN Technologies Private Limited
Address of Factory: Plot No: CP-07, Sector 8, IMT Manesar, Gurugram, Haryana
Equipment Under Test (EUT):
EUT Name: PC-400i
Model No.: PC-400i
Standard(s): CBRSA-TS-9001-V1.2.1
WINNF-TS-0122-V1.0.2
FCC 47 CFR Part 96
KDB 940660 D01 V03
Date of Receipt: 2024-07-31
Date of Test: 2025-01-20 to 2025-02-20
Date of Issue: 2025-04-08

Test Result:	Pass*
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* In the configuration tested, the EUT complied with the standards specified above.

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Revision Record			
Version	Description	Date	Remark
00	Delete wifi module	2025-04-08	Based on KSCR240700144906

Authorized for issue by:				
Tested By				
		Eric Liu /Project Engineer		
Approved By				
		Terry Hou /Reviewer		



2 Test Summary

Item	Standard	Test Case ID	Result
Multi-Step registration	WINNF-TS-0122-V1.0.2	WINNF.FT.C.REG.1	Pass
Single-Step registration for CBSD with CPI signed data	WINNF-TS-0122-V1.0.2	WINNF.FT.C.REG.5	Pass
Missing Required parameters (responseCode 102)	WINNF-TS-0122-V1.0.2	WINNF.FT.C.REG.8	Pass
Pending registration (responseCode 200)	WINNF-TS-0122-V1.0.2	WINNF.FT.C.REG.10	Pass
Invalid parameter (responseCode 103)	WINNF-TS-0122-V1.0.2	WINNF.FT.C.REG.12	Pass
Blacklisted CBSD (responseCode 101)	WINNF-TS-0122-V1.0.2	WINNF.FT.C.REG.14	Pass
Unsupported SAS protocol version (responseCode 100)	WINNF-TS-0122-V1.0.2	WINNF.FT.C.REG.16	Pass
Group Error (responseCode 201)	WINNF-TS-0122-V1.0.2	WINNF.FT.C.REG.18	Pass
Unsuccessful Grant responseCode=400 (INTERFERENCE)	WINNF-TS-0122-V1.0.2	WINNF.FT.C.GRA.1	Pass
Unsuccessful Grant responseCode=401 (GRANT_CONFLICT)	WINNF-TS-0122-V1.0.2	WINNF.FT.C.GRA.2	Pass
Heartbeat Success Case (first Heartbeat Response)	WINNF-TS-0122-V1.0.2	WINNF.FT.C.HBT.1	Pass
Heartbeat responseCode=105 (DEREGISTER)	WINNF-TS-0122-V1.0.2	WINNF.FT.C.HBT.3	Pass
Heartbeat responseCode=500 (TERMINATED_GRANT)	WINNF-TS-0122-V1.0.2	WINNF.FT.C.HBT.4	Pass
Heartbeat responseCode=501 (SUSPENDED_GRANT) in First Heartbeat Response	WINNF-TS-0122-V1.0.2	WINNF.FT.C.HBT.5	Pass
Heartbeat responseCode=501 (SUSPENDED_GRANT) in Subsequent Heartbeat Response	WINNF-TS-0122-V1.0.2	WINNF.FT.C.HBT.6	Pass
Heartbeat responseCode=502 (UNSYNC_OP_PARAM)	WINNF-TS-0122-V1.0.2	WINNF.FT.C.HBT.7	Pass
Heartbeat Response Absent (First Heartbeat)	WINNF-TS-0122-V1.0.2	WINNF.FT.C.HBT.9	Pass
Heartbeat Response Absent (Subsequent Heartbeat)	WINNF-TS-0122-V1.0.2	WINNF.FT.C.HBT.10	Pass
Successful Grant Renewal in Heartbeat Test Case	WINNF-TS-0122-V1.0.2	WINNF.FT.C.HBT.11	Pass
Registration Response contains measReportConfig	WINNF-TS-0122-V1.0.2	WINNF.FT.C.MES.1	Pass
Grant Response contains measReportConfig	WINNF-TS-0122-V1.0.2	WINNF.FT.C.MES.3	Pass



Item	Standard	Test Case ID	Result
Heartbeat Response contains measReportConfig	WINNF-TS-0122-V1.0.2	WINNF.FT.C.MES.4	Pass
Successful Relinquishment	WINNF-TS-0122-V1.0.2	WINNF.FT.C.RLQ.1	Pass
Deregistration responseCode=102	WINNF-TS-0122-V1.0.2	WINNF.FT.C.RLQ.3	Pass
Deregistration responseCode=103	WINNF-TS-0122-V1.0.2	WINNF.FT.C.RLQ.5	Pass
Successful Deregistration	WINNF-TS-0122-V1.0.2	WINNF.FT.C.DRG.1	Pass
Deregistration responseCode=102	WINNF-TS-0122-V1.0.2	WINNF.FT.C.DRG.3	Pass
Deregistration responseCode=103	WINNF-TS-0122-V1.0.2	WINNF.FT.C.DRG.5	Pass
Successful TLS connection between UUT and SAS Test Harness	WINNF-TS-0122-V1.0.2	WINNF.FT.C.SCS.1	Pass
TLS failure due to revoked certificate	WINNF-TS-0122-V1.0.2	WINNF.FT.C.SCS.2	Pass
TLS failure due to expired server certificate	WINNF-TS-0122-V1.0.2	WINNF.FT.C.SCS.3	Pass
TLS failure when SAS Test Harness certificate is issue by unknown CA	WINNF-TS-0122-V1.0.2	WINNF.FT.C.SCS.4	Pass
TLS failure when certificate at the SAS Test Harness is corrupted	WINNF-TS-0122-V1.0.2	WINNF.FT.C.SCS.5	Pass
UUT RF Transmit Power Measurement	WINNF-TS-0122-V1.0.2	WINNF.PT.C.HBT.1	Pass
SAS Version: 1.0.0.3			

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

Test standards:

CBRSA-TS-9001-V1.0.0

CBRS Alliance Certification Test Plan

WINNF-TS-0122-V1.0.2

Test and Certification for Citizens Broadband Radio Service (CBRS); Conformance and Performance Test Technical Specification; CBSD/DP as Unit Under Test (UUT)

KDB 940660 D01 Part 96 CBRS Eqpt v03



3 Contents

	Page
1 COVER PAGE	1
2 Test Summary.....	3
3 Contents	5
4 General Information.....	6
4.1 Details of E.U.T.....	6
4.2 Description of CBSD/DP Support Features.....	7
4.3 Summary of Test Results	8
4.4 Measurement Uncertainty	8
4.5 Description of Support Units.....	9
4.6 Test Location	9
4.7 Test Facility.....	9
5 Equipment List	10
6 Test Method and Environment.....	11
6.1 CBSD/DP Conformance and Performance	11
6.2 CBSD Test Procedure.....	11
6.3 Test Environment	11
6.4 Test Setup	12
7 Test Data.....	14
7.1 CBSD Registration Process.....	14
7.2 CBSD Spectrum Grant Process.....	22
7.3 CBSD HeartBeat Process	24
7.4 CBSD Measurement Report.....	34
7.5 CBSD Relinquishment Process	36
7.6 CBSD Deregistration Process	40
7.7 CBSD Security Validation.....	43
7.8 CBSD RF Power Measurement.....	46
8 Test Data Log.....	49
8.1 WINNF.FT.C.SCS.1	49
8.2 WINNF.FT.C.SCS.2	50
8.3 WINNF.FT.C.SCS.3	51
8.4 WINNF.FT.C.SCS.4	52
8.5 WINNF.FT.C.SCS.5	53
9 Test Setup Photo	54
10 EUT Constructional Details (EUT Photos).....	54



Report No.: KSCR250200029203

Page: 6 of 54

4 General Information

4.1 Details of E.U.T.

Power supply:	44-57V DC By POE
Test Voltage:	120V, 60Hz
Serial Number of Tested EUT:	CBSD-1
CBSD Class:	Category A CBSD
Transmitter Frequency Band:	5GNR N48, N77, N78
Transmitter Frequency Range:	3550~3700MHz
Hardware Version:	V1.0.0
Software Version:	V1.0.0
Antenna Gain:	7.0dBi (Provided by manufacturer)



4.2 Description of CBSD/DP Support Features

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

Y: Supported

N: Not supported

4.3 Summary of Test Results

WINNF-TS-0122			
Classes	Test Case Items	Pass Items	Pass Rate (%)
FT (CBSD, DP/CBSD)	33	33	100
PT (CBSD, DP/CBSD)	1	1	100
Total	34	34	100

Note:

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

4.4 Measurement Uncertainty

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

4.5 Description of Support Units

Description	Manufacturer	Model No.	Serial No.
NUC	Simply NUC	CBM1r8RB	770000T2
CPE	/	JT8900D N78	GX6000FEB2E4
Router	TP-Link	TL-SG108S-M2	22452H2000477
POE	PROCET	PT-PSE106GBR-10	PT2409211224

4.6 Test Location

All tests were performed at:

Compliance Certification Services (Kunshan) Inc.

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

Tel: +86 512 5735 5888 Fax: +86 512 5737 0818

No tests were sub-contracted.

Note:

- 1.SGS is not responsible for wrong test results due to incorrect information (e.g., max. internal working frequency, antenna gain, cable loss, etc) is provided by the applicant. (If applicable).
- 2.SGS is not responsible for the authenticity, integrity and the validity of the conclusion based on results of the data provided by applicant. (If applicable).
3. Sample source: sent by customer.

4.7 Test Facility

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

• A2LA

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

• FCC

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

• ISED

Compliance Certification Services (Kunshan) Inc. has been recognized by Innovation, Science and Economic Development Canada (ISED) as an accredited testing laboratory. Company Number: 2324E

• VCCI

The 3m and 10m Semi-anechoic chamber and Shielded Room of Compliance Certification Services (Kunshan) Inc. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-20134, R-11600, C-11707, T-11499, G-10216 respectively.



Report No.: KSCR250200029203

Page: 10 of 54

5 Equipment List

Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. Date (yyyy-mm-dd)	Cal. Due date (yyyy-mm-dd)
Laptop	Lenovo	Y510P	HFL000026	N/A	N/A
Spectrum Analyzer	KEYSIGHT	N9020A	KUS2001M00 1-2	08/01/2024	07/31/2025
Shield Room	YanChuang	N/A	KS301115-2	N/A	N/A
Coaxial Cable	Thermax	N/A	13	2024/09/15	2025/09/14
Attenuator	Mini-Circuits	NAT-6-2W	15542-1	N.C.R.	N.C.R.
Humidity / Temperature Indicator	Renke	RS-WS- N01-6J	1032844	2024/03/19	2025/03/18



6 Test Method and Environment

6.1 CBSD/DP Conformance and Performance

Test Requirement: CBRS CBSD Test Specification WINNF-TS-0122-V1.0.2
Test Method: CBRS CBSD Test Specification WINNF-TS-0122-V1.0.2
WINNF-IN-0156_WInnForum_SAS_Test_Harness_CBSD_UUT_Tutorial_
v1_0_0_1

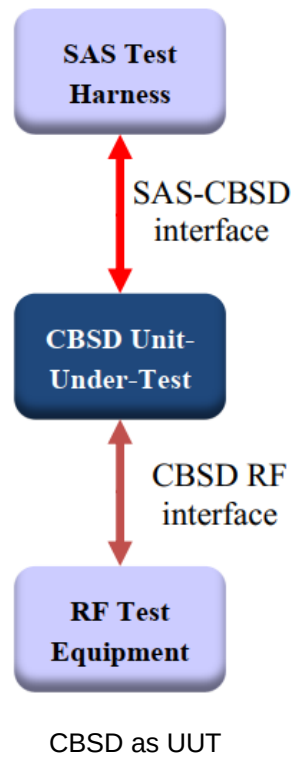
6.2 CBSD Test Procedure

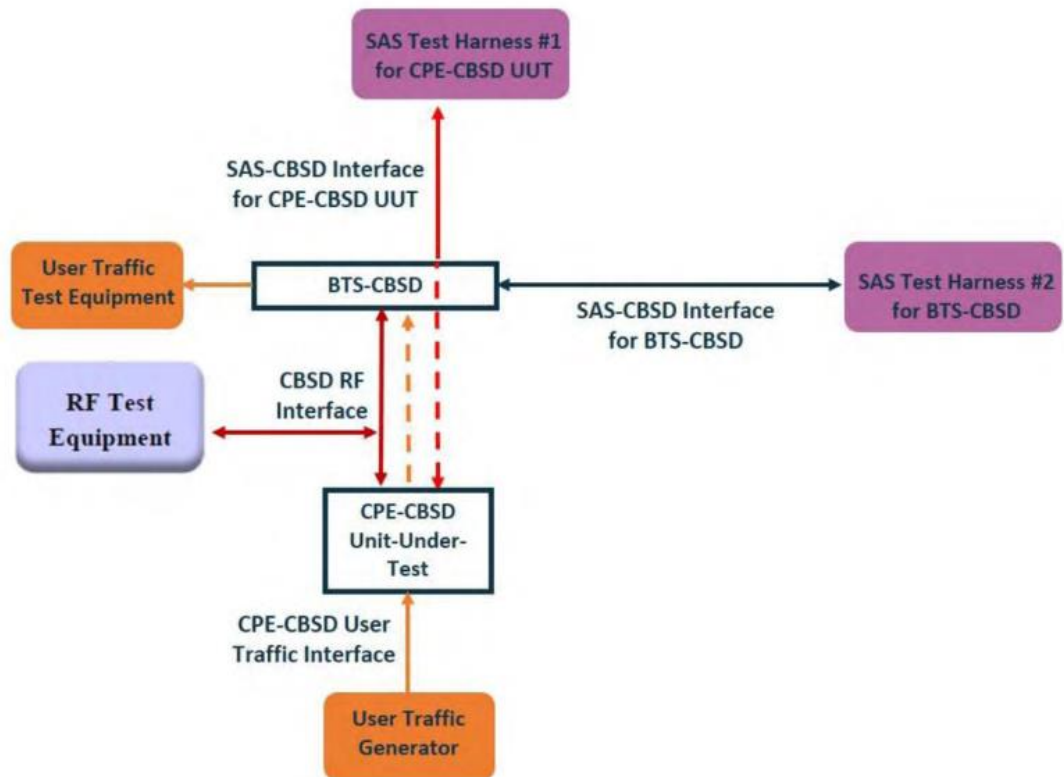
- a. Connect the UUT to SAS Test Harness system and RF Test instruments via the CBSD interface and RF components. The highest level is set to test configuration.
- b. UUT shall be UTC time synchronized
- c. The frequency band is granted and set as UUT supported Modulation and Channels, transmitted power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

6.3 Test Environment

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

6.4 Test Setup





Test setup diagram for WINNF.PT.C.HBT Test case

7 Test Data

7.1 CBSD Registration Process

7.1.1 WINNF.FT.C.REG.1

#	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 userId, fcId and cbsdSerialNumber 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: - cbsdId = C - measReportConfig shall not be included - responseCode = 0	--	--
4	After completion of step 3, SAS Test Harness will not provide any positive response (responseCode=0) to further request messages from the UUT.	--	--
5	Monitor the RF output of the UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify: UUT shall not transmit RF	■ Pass	□ Fail

7.1.2 WINNF.FT.C.REG.5

#	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 • All of the required and REG-Conditional parameters shall be configured and CPI signature provided	--	--
2	CBSD sends Registration request to SAS Test Harness: • The required userId, fcId and cbsdSerialNumber 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: - cbsdId = C - measReportConfig shall not be included - responseCode = 0	--	--
4	After completion of step 3, SAS Test Harness will not provide any positive response (responseCode=0) to further request messages from the UUT.	--	--
5	Monitor the RF output of the UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify: • UUT shall not transmit RF	☒ Pass	☐ Fail

7.1.3 WINNF.FT.C.REG.7

#	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	--	--
2	• UUT has successfully registered with SAS Test Harness	--	--



3	Change an installation parameters at the UUT (time T) - Tester needs to record the current time at which the parameter change is executed.	--	--
4	Monitor the SAS-CBSD interface. UUT sends a deregistrationRequest to the SAS Test Harness The deregistration request shall be sent within (T + 60 seconds) from step 3.	☒ Pass	☐ Fail

7.1.4 WINNF.FT.C.REG.8

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

**7.1.5 WINNF.FT.C.REG.10**

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



7.1.6 WINNF.FT.C.REG.12

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



7.1.7 WINNF.FT.C.REG.14

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



7.1.8 WINNF.FT.C.REG.16

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

**7.1.9 WINNF.FT.C.REG.18**

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



7.2 CBSD Spectrum Grant Process

7.2.1 WINNF.FT.C.GRA.1

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: ● UUT has registered successfully with SAS Test Harness, with cbsdId = C	--	--
2	UUT sends valid Grant Request.	☒ Pass	☐ Fail
3	SAS Test Harness sends a Grant Response message, including ● cbsdId=C - responseCode = 400	--	--
4	After completion of step 3, SAS Test Harness will not provide any positive response (responseCode=0) to further request messages from the UUT.	--	--
5	Monitor the RF output of the UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify: ● UUT shall not transmit RF	☒ Pass	☐ Fail

**7.2.2 WINNF.FT.C.GRA.2**

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: ● UUT has registered successfully with SAS Test Harness, with cbsdId = C	--	--
2	UUT sends valid Grant Request.	☒ Pass	☐ Fail
3	SAS Test Harness sends a Grant Response message, including - cbsdId=C - responseCode = 401	--	--
4	After completion of step 3, SAS Test Harness will not provide any positive response (responseCode=401) to further request messages from the UUT.	--	--
5	Monitor the RF output of the UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify: ● UUT shall not transmit RF	☒ Pass	☐ Fail

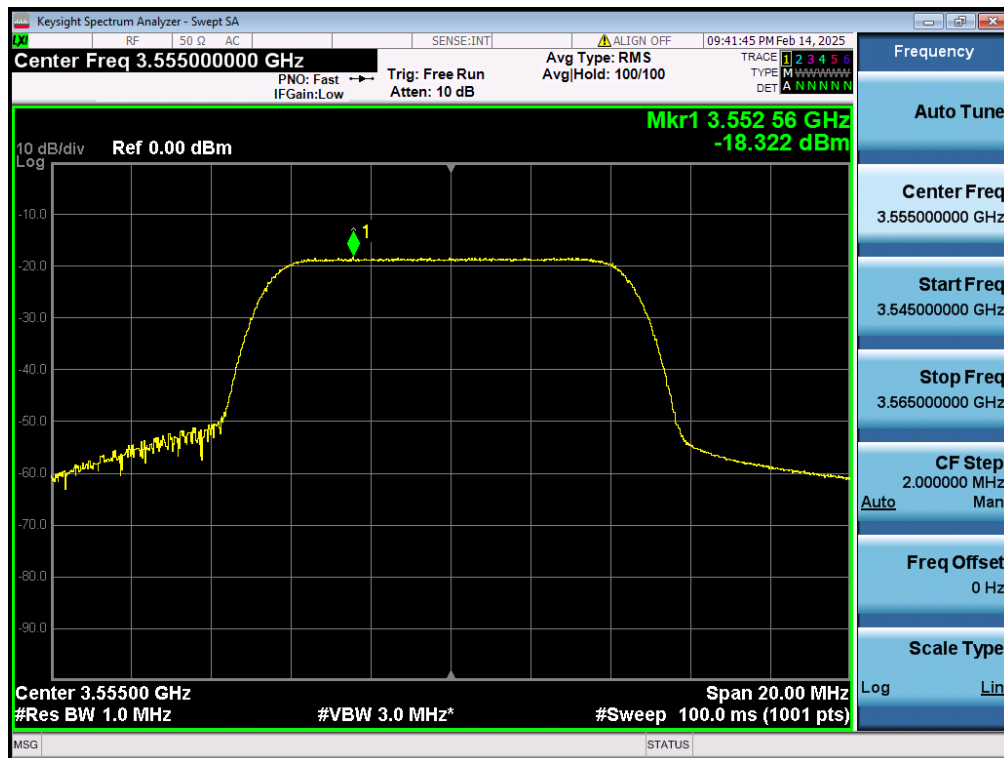
7.3 CBSD HeartBeat Process

7.3.1 WINNF.FT.C.HBT.1

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



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
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**7.3.2 WINNF.FT.C.HBT.3**

#	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 cbsdId = C ○ valid grantId = G ○ grant is for frequency range F, power P ○ grantExpireTime = 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: ● cbsdId = C ● grantId = G ● operationState = "AUTHORIZED"	--	--
3	SAS Test Harness sends a Heartbeat Response message, including the following parameters: ● cbsdId = C ● grantId = G ● transmitExpireTime = T = Current UTC time ● responseCode = 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

**7.3.3 WINNF.FT.C.HBT.4**

#	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 cbsdId = C ○ valid grantId = G ○ grant is for frequency range F, power P ○ grantExpireTime = 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: ● cbsdId = C ● grantId = G ● operationState = "AUTHORIZED"	☒ Pass	☐ Fail
3	SAS Test Harness sends a Heartbeat Response message, including the following parameters: ● cbsdId = C ● grantId = G ● transmitExpireTime = T = current UTC time ● responseCode = 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

7.3.4 WINNF.FT.C.HBT.5

#	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 cbsdId = C ○ valid grantId = G ○ grant is for frequency range F, power P ○ grantExpireTime = 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: ● cbsdId = C ● grantId = G ● operationState = "GRANTED"	☒ Pass	☐ Fail
3	SAS Test Harness sends a Heartbeat Response message, including the following parameters: ● cbsdId = C ● grantId = G ● transmitExpireTime = T = current UTC time ● ?responseCode = 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: ● cbsdId = C ● grantId = G ● operationState = "GRANTED" B. UUT sends a Relinquishment request message. Ensure message is correctly formatted with parameters: ● cbsdId = C ● grantId = G Monitor the RF output of the UUT. Verify: ● UUT does not transmit at any time	☒ Pass	☐ Fail

7.3.5 WINNF.FT.C.HBT.6

#	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 cbsdId = C ○ valid grantId = G ○ grant is for frequency range F, power P ○ grantExpireTime = 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: ● cbsdId = C ● grantId = G ● operationState = "AUTHORIZED"	■ Pass	□ Fail
3	SAS Test Harness sends a Heartbeat Response message, including the following parameters: ● cbsdId = C ● grantId = G ● transmitExpireTime = T = current UTC time ● responseCode = 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: ● cbsdId = C ● grantId = G ● operationState = "GRANTED" B. UUT sends a Relinquishment request message. Ensure message is correctly formatted with parameters: ● cbsdId = C ● grantId = G Monitor the RF output of the UUT. Verify: ● UUT shall stop transmission within (T+60) seconds of completion of step 3	■ Pass	□ Fail

7.3.6 WINNF.FT.C.HBT.7

#	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 cbsdId = C ○ valid grantId = G ○ grant is for frequency range F, power P ○ grantExpireTime = 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: ● cbsdId = C ● grantId = G ● operationState = "AUTHORIZED"	■ Pass	□ Fail
3	SAS Test Harness sends a Heartbeat Response message, including the following parameters: ● cbsdId = C ● grantId = G ● transmitExpireTime = T = current UTC time ● responseCode = 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: ○ cbsdId = C ○ grantId = G Monitor the RF output of the UUT. Verify: ● UUT shall stop transmission within (T+60) seconds of completion of step 3	■ Pass	□ Fail

7.3.7 WINNF.FT.C.HBT.9

#	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 cbsdId = C ○ valid grantId = G ○ grant is for frequency range F, power P ○ grantExpireTime = 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: ● cbsdId = C ● grantId = G ● operationState = "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



7.3.8 WINNF.FT.C.HBT.10

#	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 cbsdId = C ○ valid grantId = G ○ grant is for frequency range F, power P ○ grantExpireTime = 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: ● cbsdId = C ● grantId = G ● operationState = "AUTHORIZED"	■ Pass	□ Fail
3	SAS Test Harness sends a Heartbeat Response message, including the following parameters: - cbsdId = C - grantId = G - transmitExpireTime = T = current UTC time + 200 seconds ● responseCode = 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 (transmitExpireTime + 60 seconds), using the transmitExpireTime sent in Step 3.	■ Pass	□ Fail

7.3.9 WINNF.FT.C.HBT.11

#	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 cbsdId = C ○ valid grantId = G ○ grant is for frequency range F, power P ● UUT is in AUTHORIZED state and is transmitting within the grant bandwidth F on RF interface. ● Grant has the following parameters at the start of the test: ○ grantExpireTime = UTC time equal to time at start of test + 300 seconds = Tgrant_expire ○ transmitExpireTime = UTC time equal to time at start of test + 200 seconds ○ heartbeatInterval = 60 seconds	--	--
2	UUT sends a Heartbeat Request message. If Heartbeat Request message contains grantRenew = TRUE, go to Step 6, else go to Step 3.	--	--
3	Verify Heartbeat Request message is sent within the latest specified heartbeatInterval, and is formatted correctly, including: ● cbsdId = C ● grantId = G ● operationState = "AUTHORIZED"	☒ Pass	☐ Fail
4	SAS Test Harness sends a Heartbeat Response message, with the following parameters: ● cbsdId = C ● grantId = G ● transmitExpireTime = current UTC + 200 seconds ● grantExpireTime = same as Step 1 ● responseCode = 0	--	--
5	Go to Step 2	--	--
6	Verify Heartbeat Request message is sent within the latest specified heartbeatInterval, and is formatted correctly, including: ● cbsdId = C ● grantId = G ● operationState = "AUTHORIZED" ● grantRenew = TRUE	☒ Pass	☐ Fail
7	SAS Test Harness sends a Heartbeat Response message, with the following parameters: ● cbsdId = C ● grantId = G ● grantExpireTime = UTC time set far in the future ● transmitExpireTime = current UTC time + 200 seconds ● responseCode = 0	--	--
8	Continue to respond to any subsequentHeartbeat Request from CBSD with Heartbeat Response with the following parameters: ● cbsdId = C ● grantId = G ● transmitExpireTime = same as Step 7 ● responseCode = 0	--	--
9	Monitor RF transmission of UUT from start of test until Tgrant_expire + 60 seconds and ensure UUT continues to transmit throughout the time period.	☒ Pass	☐ Fail

7.4 CBSD Measurement Report

7.4.1 WINNF.FT.C.MES.1

#	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. - userId is present and correct - fcId is present and correct - cbsdSerialNumber is present and correct - measCapability = "RECEIVED_POWER_WITHOUT_GRANT"	■ Pass	□ Fail
3	SAS Test Harness sends a Grant Response message, with the following parameters: - cbsdId = C = valid cbsdId for this UUT - measReportConfig= "RECEIVED_POWER_WITHOUT_GRANT" - responseCode = 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. - cbsdId = C - measReport is present, and is a properly formatted rcvdPowerMeasReport.	■ Pass	□ Fail
6	SAS Test Harness sends a Heartbeat Response message, containing all required parameters properly formatted, and specifically: - cbsdId = C - availableChannel is an array of availableChannel /objects - responseCode = 0	--	--
7	UUT sends message type Grant Request message. Verify message contains all required parameters properly formatted, and specifically: - cbsdId = C - measReport is present, and is a properly formatted rcvdPowerMeasReport.	■ Pass	□ Fail

7.4.2 WINNF.FT.C.MES.3

#	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 cbsdId=C and measCapability = "RECEIVED_POWER_WITH_GRANT"	--	--

2	UUT sends a Grant Request message. Verify Grant Request message contains all required parameters properly formatted, and specifically: ● cbsdId = C ● operationParam is present and format is valid	☒ Pass	☐ Fail
3	SAS Test Harness sends a Grant Response message, with the following parameters: ● cbsdId = C ● grantId = G = valid grant ID ● grantExpireTime = UTC time in the future ● heartbeatInterval = 60 seconds ● measReportConfig= "RECEIVED_POWER_WITH_GRANT" ● operationParam is set to valid operating parameters ● channelType = "GAA" ● responseCode = 0	--	--
4	UUT sends a Heartbeat Request message. Verify message contains all required parameters properly formatted, and specifically: ● cbsdId = C ● grantId = G ● operationState = "GRANTED"	☒ Pass	☐ Fail
5	If Heartbeat Request message (step 4) contains measReport object, then: ● verify measReport is properly formatted as object rcvdPowerMeasReport ● end test, with PASS result else, if Heartbeat Request message (step 4) does not contain measReport object, then: ● If number of Heartbeat Requests sent by UUT after Step 3 is =5, then stop test with result of FAIL	☒ Pass	☐ Fail
6	SAS Test Harness sends a Heartbeat Response message, containing all required parameters properly formatted, and specifically: ● cbsdId = C ● grantId = G ● transmitExpireTime = current UTC time + 200 seconds ● responseCode = 0 Go to Step 4, above	--	--

7.4.3 WINNF.FT.C.MES.4

#	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 cbsdId=C and measCapability = "RECEIVED_POWER_WITH_GRANT" - UUT has received a valid grant with grantId = G - UUT is in Grant State AUTHORIZED and is actively transmitting within the bounds of its grant. - Grant has heartbeatInterval = 60 seconds	--	--
2	UUT sends a Heartbeat Request message. Verify Heartbeat Request message contains all required parameters properly formatted, and specifically: - cbsdId = C - grantId = G - operationState = "AUTHORIZED"	■ Pass	□ Fail
3	SAS Test Harness sends a Heartbeat Response message, containing all required parameters properly formatted, and specifically: - cbsdId = C - grantId = G - measReportConfig= "RECEIVED_POWER_WITH_GRANT" - responseCode = 0	--	--
4	UUT sends a Heartbeat Request message. Verify message contains all required parameters properly formatted, and specifically: - cbsdId = C - grantId = G - operationState = "AUTHORIZED"	■ Pass	□ Fail
5	If Heartbeat Request message (step 4) contains measReport object, then: - verify measReport is properly formatted as object - rcvdPowerMeasReport - end test, with PASS result else, if Heartbeat Request message (step 4) does not contain measReport object, then: - If number of Heartbeat Requests sent by UUT after Step 3 is = 5, then stop test with result of FAIL	■ Pass	□ Fail
6	SAS Test Harness sends a Heartbeat Response message, containing all required parameters properly formatted, and specifically: - cbsdId = C - grantId = G - responseCode = 0 Go to Step 4, above	--	--

7.5 CBSD Relinquishment Process

7.5.1 WINNF.FT.C.RLQ.1

#	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 cbsdId=C ● UUT has received a valid grant with grantId = 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: ● cbsdId = C ● grantId = G	■ Pass	□ Fail
3	SAS Test Harness shall approve the request with a Relinquishment Response message with parameters: - cbsdId = C - grantId = G ● responseCode = 0	--	--
4	After completion of step 3, SAS Test Harness will not provide any additional positive ● response (responseCode=0) to further request messages from the UUT	--	--
5	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



7.5.2 WINNF.FT.C.RLQ.3

#	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 cbsdId=C ● UUT has received a valid grant with grantId = 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: ● cbsdId = C ● grantId = G	--	--
3	SAS Test Harness shall approve the request with a Relinquishment Response message with parameters: - cbsdId = C - grantId = G ● responseCode = R	--	--
4	After completion of step 3, SAS Test Harness will not provide any additional positive response (responseCode=0) to further request messages from the UUT ●	--	--
5	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

7.5.3 WINNF.FT.C.RLQ.5

#	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 cbsdId=C ● UUT has received a valid grant with grantId = 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: ● cbsdId = C ● grantId = G	--	--
3	SAS Test Harness shall approve the request with a Relinquishment Response message with parameters: - cbsdId = C - grantId = G ● responseCode = 103	--	--
4	After completion of step 3, SAS Test Harness will not provide any additional positive response (responseCode=0) to further request messages from the UUT	--	--
5	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



7.6 CBSD Deregistration Process

7.6.1 WINNF.FT.C.DRG.1

#	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 cbsdId=C ● UUT has received a valid grant with grantId = 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 ● responseCode=0	--	--
3	● UUT sends Deregistration Request to SAS Test Harness with cbsdId = C.	☒ Pass	☐ Fail
4	SAS Test Harness shall approve the request with a Deregistration Response message with parameters: ● cbsdId = C ● responseCode = 0	--	--
5	After completion of step 3, SAS Test Harness will not provide any additional positive response (responseCode=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



7.6.2 WINNF.FT.C.DRG.3

#	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 cbsdId=C ● UUT has received a valid grant with grantId = 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 responseCode=0	--	--
3	● UUT sends Deregistration Request to SAS Test Harness with cbsdId = C.	--	--
4	The SAS Test Harness sends the Deregistration Response Message to UUT with: ● No cbsdId ● responseCode = 103	--	--
5	After completion of step 3, SAS Test Harness will not provide any additional positive response (responseCode=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

**7.6.3 WINNF.FT.C.DRG.5**

#	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 cbsdId=C ● UUT has received a valid grant with grantId = 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 responseCode=0	--	--
3	● UUT sends Deregistration Request to SAS Test Harness with cbsdId = C.	--	--
4	The SAS Test Harness sends the Deregistration Response Message to UUT with: ● cbsdId=C ● responseCode = 103	--	--
5	After completion of step 3, SAS Test Harness will not provide any additional positive response (responseCode=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: C. UUT sending a Registration Request message, as this is not mandatory D. UUT sending a Deregistration Request message	☒ Pass	☐ Fail

7.7 CBSD Security Validation

7.7.1 WINNF.FT.C.SCS.1

#	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. E. UUT sends a registration request to the SAS Test Harness and the SAS Test Harness sends a Registration Response with responseCode = 0 and cbsdId.	☒ 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

7.7.2 WINNF.FT.C.SCS.2

#	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	F. 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

7.7.3 WINNF.FT.C.SCS.3

#	Test Execution Steps	Results	
1	UUT shall start CBSD-SAS communication with the security procedures	☒ Pass	☐ Fail

2	● Make sure that UUT uses TLS v1.2 for security establishment. ● Make sure UUT selects the correct cipher suite. ● UUT shall use CRL or OCSP to verify the validity of the server certificate. ● Make sure that Mutual authentication does not happen between UUT and the SAS Test Harness.	☒ Pass	☐ Fail
3	G. 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

7.7.4 WINNF.FT.C.SCS.4

#	Test Execution Steps	Results	
1	● UUT shall start CBSD-SAS communication with the security procedures	☒ Pass	☐ Fail
2	● Make sure that UUT uses TLS v1.2 for security establishment. ● Make sure UUT selects the correct cipher suite. ● UUT shall use CRL or OCSP to verify the validity of the server certificate ● Make sure that Mutual authentication does not happen between UUT and the SAS Test Harness.	☒ Pass	☐ Fail
3	H. 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

**7.7.5 WINNF.FT.C.SCS.5**

#	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	I. 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



7.8 CBSD RF Power Measurement

7.8.1 WINNF.PT.C.HBT.1

#	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 • 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	--	--
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. J. 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.	☒ Pass	☐ Fail

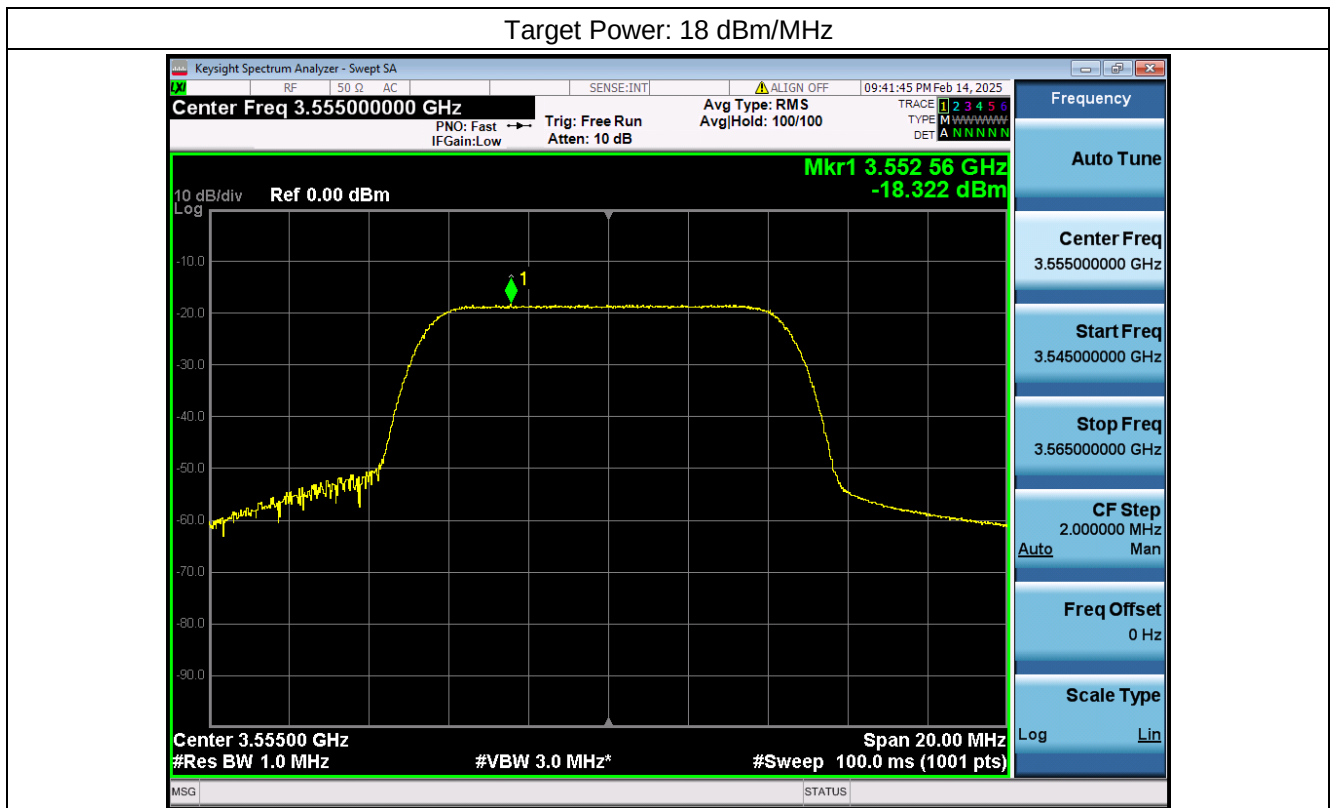
RF measurement plot for Test Case:

- 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.

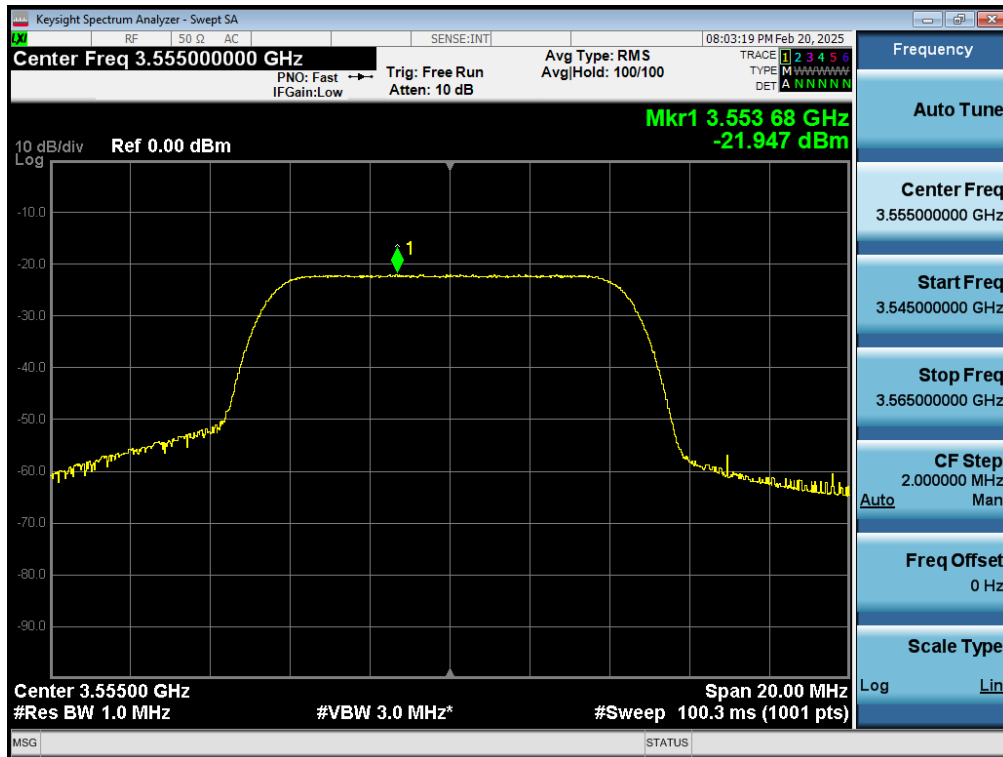
Frequency (MHz)	Channel Bandwidth (MHz)	Granted maxEIRP (dBm/MHz)	Conducted PSD (dBm/MHz)	MIMO Factor (dB)	Antenna Gain (dBi)	Cable Loss (dB)	maxEIRP (dBm/MHz)
3555	10	18	-18.322	6.02	7	22.8	17.498
3555	10	15	-21.947	6.02	7	22.8	13.873
3555	10	10	-27.028	6.02	7	22.8	8.792

Note:

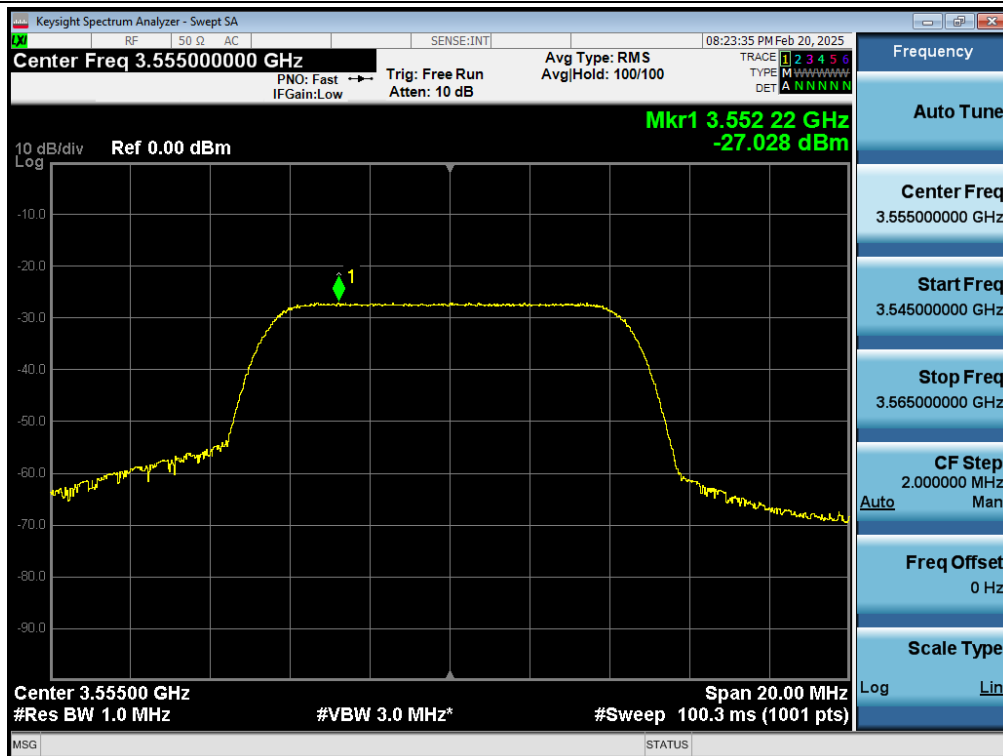
MaxEIRP= Conducted PSD+ Antenna Gain+ Cable loss+MIMO Factor



Target Power: 15 dBm/MHz



Target Power: 10 dBm/MHz



8 Test Data Log

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

8.1 WINNF.FT.C.SCS.1

WINNF.CFT.SCS.1.pcap

File(E) Edit(E) View(V) Capture(C) Analysis(A) Statistics(S) Tools(T) Help(H)

tls

No.	Time	Source	Destination	Protocol	Length	Info
12	0.005335	10.120.8.10	10.120.8.205	TLSv1.2		589 Client Hello
14	0.005361	10.120.8.10	172.19.0.2	TLSv1.2		589 Client Hello
19	0.005568	172.19.0.2	10.120.8.10	TLSv1.2		3379 Server Hello, Certificate, Certificate Request, Server Hello
21	0.005602	10.120.8.205	10.120.8.10	TLSv1.2		3379 Server Hello, Certificate, Certificate Request, Server Hello
26	0.022170	10.120.8.10	10.120.8.205	TLSv1.2		3860 Certificate, Client Key Exchange, Certificate Verify, Change Cipher Spec, Encrypted Handshake Message
28	0.022222	10.120.8.10	172.19.0.2	TLSv1.2		3860 Certificate, Client Key Exchange, Certificate Verify, Change Cipher Spec, Encrypted Handshake Message
33	0.024808	172.19.0.2	10.120.8.10	TLSv1.2		123 Change Cipher Spec, Encrypted Handshake Message
35	0.024829	10.120.8.205	10.120.8.10	TLSv1.2		611 Application Data
40	0.025571	10.120.8.10	10.120.8.205	TLSv1.2		611 Application Data
42	0.025599	10.120.8.10	172.19.0.2	TLSv1.2		611 Application Data
44	0.066184	172.19.0.2	10.120.8.10	TLSv1.2		118 Application Data
46	0.066232	10.120.8.205	10.120.8.10	TLSv1.2		118 Application Data
51	0.066604	172.19.0.2	10.120.8.10	TLSv1.2		551 Application Data, Application Data, Application Data, Application Data
53	0.066622	10.120.8.205	10.120.8.10	TLSv1.2		551 Application Data, Application Data, Application Data, Application Data
58	0.068059	10.120.8.10	10.120.8.205	TLSv1.2		103 Encrypted Alert
60	0.068075	10.120.8.10	172.19.0.2	TLSv1.2		103 Encrypted Alert
87	0.997328	10.120.8.10	10.120.8.205	TLSv1.2		589 Client Hello

Frame 19: 3379 bytes on wire (27032 bits), 3379 bytes captured (27032 bits) on interface 0

Ethernet II, Src: Intel E100 (08:00:00:00:00:00), Dst: Intel E100 (08:00:00:00:00:00)

Internet Protocol Version 4, Src: 172.19.0.2, Dst: 10.120.8.10

Transmission Control Protocol, Src Port: 9990, Dst Port: 47004, Seq: 1, Ack: 518, Len: 3307

Transport Layer Security

TLSv1.2 Record Layer: Handshake Protocol: Server Hello

Content Type: Handshake (22)

Version: TLS 1.2 (0x0303)

Length: 81

Handshake Protocol: Server Hello

Handshake Type: Server Hello (2)

Length: 77

Version: TLS 1.2 (0x0303)

Random: 6e727c7dd2804ffac602bde193df82809c699cfa787fce1a5c53657e0bd002c6

Session ID Length: 32

Session ID: e72fabce2fc7e8dc5077c9643514924a621edc01657219b5f4ac86e8ea59a6ea

0000 08 00 00 00 00 00 00 00 00 01 03 06 02 42 ac 13 4b
 0010 00 02 00 00 45 00 0d 1f 50 f7 40 00 40 06 1e 4b
 0020 ac 13 00 02 0a 78 08 0a 27 06 b7 9c b2 88 f9 39
 0030 d0 3f 2b 08 00 18 01 fa cb a8 00 00 01 01 08 0a
 0040 e7 bc ab 33 30 32 01 c2 16 03 03 00 51 02 00 00
 0050 4d 03 03 6e 72 7c 7d d2 80 4f fa c6 02 bd e1 93
 0060 df 82 80 9c 69 9c fa 78 7f ce 1a 5c 53 65 7e 0b
 0070 d0 02 c6 20 e7 2f ab ce 2f c7 e8 dc 50 77 c9 64
 0080 35 14 92 4a 62 1e dc 01 65 72 19 b5 f4 ac 86 e8
 0090 ea 59 a6 ea 00 9d 00 00 05 ff 01 00 01 00 16 03
 00a0 03 0c 5d 0b 00 0c 59 00 0c 56 00 05 a7 30 82 05
 00b0 a3 30 82 03 8b a0 03 02 01 02 02 14 5d 1b 61 2c
 00c0 62 bc 03 c6 5f 9e ce 8e f7 8d 5d c6 ff 28 d1 5c
 00d0 30 0d 06 09 2a 86 48 86 f7 0d 01 01 00 05 00 30
 00e0 75 31 0b 30 09 06 03 55 04 06 13 02 43 31 17
 00f0 30 15 06 03 55 04 0a 0c 0e 4c 4c 69 4e 51 20 4e
 0100 65 74 77 6f 72 6b 73 31 20 30 1e 06 03 55 04 0b
 0110 0a 17 53 03 41 20 03 41 03 20 03 20 03 20 03 20



Report No.: KSCR250200029203

Page: 50 of 54

8.2 WINNF.FT.C.SCS.2

WINNF.C.FT.C.SCS.2.pcap

文件(F) 编辑(E) 视图(V) 捕获(C) 分析(A) 统计(S) 电话(T) 无线(W) 工具(I) 帮助(H)

12 0.012111 10.120.8.10 10.120.8.205 TLSv1.2 589 Client Hello

14 0.012161 10.120.8.10 172.19.0.2 TLSv1.2 589 Client Hello

19 0.012427 172.19.0.2 10.120.8.10 TLSv1.2 3396 Server Hello, Certificate, Certificate Request, Server Hello Do

21 0.012453 10.120.8.205 10.120.8.10 TLSv1.2 3396 Server Hello, Certificate, Certificate Request, Server Hello Do

26 0.016405 10.120.8.10 10.120.8.205 TLSv1.2 79 Alert (Level: Fatal, Description: Certificate Revoked)

28 0.016438 10.120.8.10 172.19.0.2 TLSv1.2 79 Alert (Level: Fatal, Description: Certificate Revoked)

< Frame 26: 79 bytes on wire (632 bits), 79 bytes captured (632 bits)

> Linux cooked capture v2

> Internet Protocol Version 4, Src: 10.120.8.10, Dst: 10.120.8.205

> Transmission Control Protocol, Src Port: 53652, Dst Port: 9990, Seq: 518, Ack: 3325, Len: 7

▼ Transport Layer Security

▼ TLSv1.2 Record Layer: Alert (Level: Fatal, Description: Certificate Revoked)

Content Type: Alert (21)

Version: TLS 1.2 (0x0303)

Length: 2

▼ Alert Message

Level: Fatal (2)

Description: Certificate Revoked (44)

0000 08 00 00 00 00 00 02 00 01 03 06 0c a1 38 15

0010 02 2d 00 00 45 00 0b 97 2a 40 00 40 06 7d cc

0020 0a 78 08 0a 0a 78 08 cd d1 94 27 06 cc 9f 0e 90

0030 fd 65 e0 ba 80 18 00 8d 4f b8 00 00 01 01 08 0a

0040 30 38 23 b3 e7 c2 cd 03 15 03 03 00 02 02 2c



Report No.: KSCR250200029203

Page: 51 of 54

8.3 WINNF.FT.C.SCS.3

WINNF.C.FT.SCS.3.pcap

文件(F) 编辑(E) 视图(V) 捕获(C) 分析(A) 统计(S) 电话(T) 无线(W) 工具(I) 帮助(H)

tls

No.	Time	Source	Destination	Protocol	Length	Info
12	0.018541	10.120.8.10	10.120.8.205	TLSv1.2		589 Client Hello
14	0.018579	10.120.8.10	172.19.0.2	TLSv1.2		589 Client Hello
19	0.018854	172.19.0.2	10.120.8.10	TLSv1.2		3396 Server Hello, Certificate, Certificate Request, Server Hello Done
21	0.018903	10.120.8.205	10.120.8.10	TLSv1.2		3396 Server Hello, Certificate, Certificate Request, Server Hello Done
26	0.021946	10.120.8.10	10.120.8.205	TLSv1.2		79 Alert (Level: Fatal, Description: Certificate Expired)
28	0.021989	10.120.8.10	172.19.0.2	TLSv1.2		79 Alert (Level: Fatal, Description: Certificate Expired)

< Frame 26: 79 bytes on wire (632 bits), 79 bytes captured (632 bits)
> Linux cooked capture v2
> Internet Protocol Version 4, Src: 10.120.8.10, Dst: 10.120.8.205
> Transmission Control Protocol, Src Port: 34524, Dst Port: 9990, Seq: 518, Ack: 3325, Len: 7
v Transport Layer Security
v TLSv1.2 Record Layer: Alert (Level: Fatal, Description: Certificate Expired)
Content Type: Alert (21)
Version: TLS 1.2 (0x0303)
Length: 2
v Alert Message
Level: Fatal (2)
Description: Certificate Expired (45)

0000 08 00 00 00 00 00 02 00 01 03 06 0c a1 38 15
0010 02 2d 00 00 45 00 00 3b b4 9d 40 00 40 06 60 59
0020 0a 78 08 0a 0a 78 08 cd 86 dc 27 06 9b ff 8d 69
0030 c9 7d 9a ee 80 18 00 8d 80 69 00 00 01 01 08 0a
0040 30 40 c5 ff e7 cb 6f 28 15 03 03 00 02 02 2d

8.4 WINNF.FT.C.SCS.4

WINNF.C.FT.C.SCS.4.pcap

文件(F) 编辑(E) 视图(V) 跳转(G) 捕获(C) 分析(A) 统计(S) 电话(T) 无线(W) 工具(I) 帮助(H)

12 0.019146 10.120.8.10 10.120.8.205 TLSv1.2 589 Client Hello

14 0.019178 10.120.8.10 172.19.0.2 TLSv1.2 589 Client Hello

19 0.019456 172.19.0.2 10.120.8.10 TLSv1.2 3368 Server Hello, Certificate, Certificate Request, Server Hello Do

21 0.019510 10.120.8.205 10.120.8.10 TLSv1.2 3368 Server Hello, Certificate, Certificate Request, Server Hello Do

26 0.022912 10.120.8.10 10.120.8.205 TLSv1.2 79 Alert (Level: Fatal, Description: Unknown CA)

30 0.022941 10.120.8.10 172.19.0.2 TLSv1.2 79 Alert (Level: Fatal, Description: Unknown CA)

< Frame 26: 79 bytes on wire (632 bits), 79 bytes captured (632 bits) on interface 0

> Linux cooked capture v2

> Internet Protocol Version 4, Src: 10.120.8.10, Dst: 10.120.8.205

> Transmission Control Protocol, Src Port: 41686, Dst Port: 9990, Seq: 518, Ack: 3297, Len: 7

> Transport Layer Security

> TLSv1.2 Record Layer: Alert (Level: Fatal, Description: Unknown CA)

> Content Type: Alert (21)

> Version: TLS 1.2 (0x0303)

> Length: 2

> Alert Message

> Level: Fatal (2)

> Description: Unknown CA (48)

0000 08 00 00 00 00 00 02 00 01 03 06 0c a1 38 15

0010 02 2d 00 00 45 00 00 3b c3 13 40 00 40 06 51 e3

0020 0a 78 08 0a 0a 78 08 cd a2 d6 27 06 8a 3f 40 63

0030 cb 9e db 2f 80 18 00 8d e3 c6 00 00 01 01 08 0a

0040 30 47 93 0e e7 d2 3c 16 15 03 03 00 02 02 30



Report No.: KSCR250200029203

Page: 53 of 54

8.5 WINNF.FT.C.SCS.5

WINNF.C.FT.SCS.5.pcap

文件(F) 编辑(E) 视图(V) 跳转(G) 捕获(C) 分析(A) 统计(S) 电话(T) 无线(W) 工具(I) 帮助(H)

tls

No.	Time	Source	Destination	Protocol	Length	Info
12	0.129179	10.120.8.10	10.120.8.205	TLSv1.2	589	Client Hello
14	0.129249	10.120.8.10	172.19.0.2	TLSv1.2	589	Client Hello
19	0.129648	172.19.0.2	10.120.8.10	TLSv1.2	1671	Server Hello, Certificate, Certificate Request, Server Hello Done
21	0.129675	10.120.8.205	10.120.8.10	TLSv1.2	1671	Server Hello, Certificate, Certificate Request, Server Hello Done
23	0.133630	10.120.8.10	10.120.8.205	TLSv1.2	79	Alert (Level: Fatal, Description: Decrypt Error)
30	0.133701	10.120.8.10	172.19.0.2	TLSv1.2	79	Alert (Level: Fatal, Description: Decrypt Error)

< Frame 23: 79 bytes on wire (632 bits), 79 bytes captured (632 bits)
> Linux cooked capture v2
> Internet Protocol Version 4, Src: 10.120.8.10, Dst: 10.120.8.205
> Transmission Control Protocol, Src Port: 45806, Dst Port: 9990, Seq: 518, Ack: 1600, Len: 7
▼ Transport Layer Security
 ▼ TLSv1.2 Record Layer: Alert (Level: Fatal, Description: Decrypt Error)
 Content Type: Alert (21)
 Version: TLS 1.2 (0x0303)
 Length: 2
 ▼ Alert Message
 Level: Fatal (2)
 Description: Decrypt Error (51)

0000 08 00 00 00 00 00 02 00 01 03 06 0c a1 38 15
0010 02 2d 00 00 45 00 00 3b 10 e6 40 00 40 06 04 11
0020 0a 78 08 0a 0a 78 08 cd b2 ee 27 06 84 d2 77 2d
0030 ec 4c bc a4 80 18 00 87 4c d7 00 00 01 01 08 0a
0040 30 4b 7b 41 e7 d6 24 3a 15 03 03 00 02 02 33



Report No.: KSCR250200029203

Page: 54 of 54

9 Test Setup Photo

Refer to Appendix - Test Setup Photo for KSCR2502000292AT

10 EUT Constructional Details (EUT Photos)

Refer to Appendix - Photographs of EUT Constructional Details for KSCR2502000292AT