



SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch

SZEMC-TRF-01 Rev. A/0 Aug01,2022

Report No.: SZCR230800275901

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TEST REPORT

Application No.: SZCR2308002759AT
Applicant: Baicells Technologies Co., Ltd.
Address of Applicant: 9-10F, 1stBldg., No.81BeiqingRoad, Haidian District, Beijing, China
Manufacturer: Baicells Technologies Co., Ltd.
Address of Manufacturer: 9-10F, 1stBldg., No.81BeiqingRoad, Haidian District, Beijing, China
Equipment Under Test (EUT):
EUT Name: 5G NR Base Station
Model No.: BSC7048A243
Trade Mark: Baicells
FCC ID: 2AG32BSC7048A243
Standard(s) : FCC 47 CFR Part 96
KDB 940660 D01 V03
CBRS-TS-9001-V1.2.1
WINNF-TS-0122-V1.0.2
Date of Receipt: 2023-08-25
Date of Test: 2023-08-25 to 2023-09-05
Date of Issue: 2023-09-08

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

Keny Xu

Keny Xu
EMC Laboratory Manager



SGS-CSTC Standards Technical Services Co., Ltd.
Shenzhen Branch EMC Laboratory

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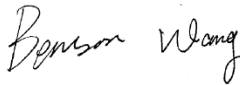
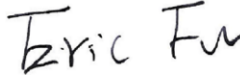
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Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2023-09-08		Original

Authorized for issue by:				
				
		Benson Wang/Project Engineer		
				
		Eric Fu/Reviewer		



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2 Test Summary

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



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Test Summary for Standalone CBSD			
Item	Standard	Test Case ID	Result
Successful TLS connection between UUT and SAS Test Harness	WINNF-TS-0122-V1.0.2	WINNF.FT.C.SCS.1	Pass
TLS failure due to revoked certificate	WINNF-TS-0122-V1.0.2	WINNF.FT.C.SCS.2	Pass
TLS failure due to expired server certificate	WINNF-TS-0122-V1.0.2	WINNF.FT.C.SCS.3	Pass
TLS failure when SAS Test Harness certificate is issue by unknown CA	WINNF-TS-0122-V1.0.2	WINNF.FT.C.SCS.4	Pass
TLS failure when certificate at the SAS Test Harness is corrupted	WINNF-TS-0122-V1.0.2	WINNF.FT.C.SCS.5	Pass
UUT RF Transmit Power Measurement	WINNF-TS-0122-V1.0.2	WINNF.PT.C.HBT	Pass
SAS Version: 1.0.0.3			

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

Test standards:

CBRSA-TS-9001-V1.2.1

CBRS Alliance Certification Test Plan

WINNF-TS-0122-V1.0.2

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

KDB 940660 D01 Part 96 CBRS Eqpt v03

This original certification of this CBSD is based on DP SAS, and the updated software version is changed to support the standalone CBSD SAS function. Other radio frequency parts remain unchanged.



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4 General Information

4.1 Details of E.U.T.

Power supply:	Adapter Model: HEP-480-54 INPUT: 100-240V, 5.5A-2.2A, 50/60Hz OUTPUT: +54V==8.9A Rated Power:480.6W
Sample Type:	Fixed device
CBSD Class:	B
Transmitter Frequency Band:	N48
Transmitter Frequency Range:	3550~3700MHz
Hardware Version:	Ver.A
Software Version:	BaiBNQ_2.4.9
Test sample:	1202000577233VB0002
Antenna Gain:	13dBi
MIMO supported	2*2
Antenna Type:	External Antenna



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.	N
C5	Mandatory for UUT which supports RECEIVED_POWER_WITH_GRANT measurement report type.	N
C6	Mandatory for UUT which supports parameter change being made at the UUT and prior to sending a deregistration.	N

Y: Supported

N: Not supported

4.3 Summary of Test Results

WINNF-TS-0122			
Classes	Test Case Items	Pass Items	Pass Rate (%)
FT (CBSD, DP/CBSD)	25	25	100
PT (CBSD, DP/CBSD)	1	1	100
Total	26	26	100

Note:

1. Functional Test (FT): Test to validate the conformance of the Protocols and functionalities implemented in the CBSD/DP UUT to the requirements developed by 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.
Mobile Phone	OSOM	SAGA	/
EPC	Lanner Electronics Inc.	LICA-1513A	LR202002004052
Router	TP-LINK	TL-R860+	1175379002425





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4.6 Test Location

All tests were performed at:

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Tel: +86 755 2601 2053 Fax: +86 755 2671 0594

No tests were sub-contracted.



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5 Equipment List

Test Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
Laptop (With SAS Test harness)	Samsung	930XCJ	REF. No.SEA1900	/	/
Spectrum Analyzer	Keysight	N9020A	SEM004-21	2023-03-20	2024-03-19
Shield Room	SAEMC	MSR433	SEM001-11	2021-03-13	2024-03-12
Coaxial Cable	SGS	N/A	SEM031-01	2023-07-11	2024-07-10
Attenuator	Weinschel Associates	WA41	SEM021-09	N/A	N/A
Splitter	MACOM	2090-6214-00	N/A	N/A	N/A
Humidity/ Temperature Indicator	Shanghai Meteorological Industry Factory	ZJ1-2B	SEM002-03	2022-09-27	2023-09-26



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



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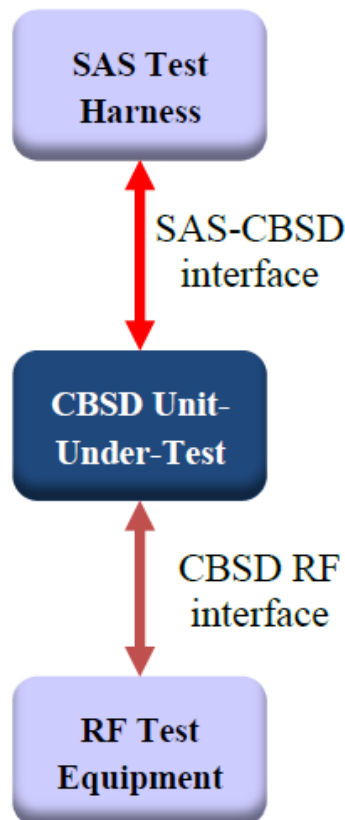
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6.3 Test Environment

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

6.4 Test Setup

- 1) DP is deployed on the network management, and the registration of DP to SAS is to register with SAS according to the granularity of CBSD ID;
- 2) The DP and the network element communicate messages according to the cell granularity, and each CBSDID corresponds to a cell of an RRU which belongs to a base station.



CBSD as UUT, BTS-CBSD communication with SAS



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: <ul style="list-style-type: none"> UUT has successfully completed SAS Discovery and Authentication with the SAS Test Harness UUT is in the Unregistered state 	--	--
2	CBSD sends correct Registration request information, as specified in [n.5], to the SAS Test Harness: <ul style="list-style-type: none"> The required userId, fcld 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. <p>Note: It is outside the scope of this document to test the Registration information that is supplied via another means.</p>	<div>■</div> Pass	<div>□</div> Fail
3	SAS Test Harness sends a CBSD Registration Response as follows: <ul style="list-style-type: none"> 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: <ul style="list-style-type: none"> UUT shall not transmit RF 	<div>■</div> Pass	<div>□</div> Fail



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7.1.2 WINNF.FT.C.REG.5

#	Test Execution Steps	Results	
1	<p>Ensure the following conditions are met for test entry:</p> <ul style="list-style-type: none"> 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	<p>CBSD sends Registration request to the SAS Test Harness:</p> <ul style="list-style-type: none"> The required userId, fcId and cbsdSerialNumber and REG-Conditional cbsdCategory, airInterface, measCapability and cpiSignatureData registration parameters shall be sent from the CBSD and conform to proper format and acceptable ranges. Any optional registration parameters that may be included in the message shall be verified that they conform to proper format and are within acceptable ranges. 	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
3	<p>SAS Test Harness sends a CBSD Registration Response as follows:</p> <ul style="list-style-type: none"> cbsdId = C measReportConfig shall not be included. responseCode = 0 	--	--
4	<p>After completion of step 3, SAS Test Harness will not provide any positive response (responseCode=0) to further request messages from the UUT.</p>	--	--
5	<p>Monitor the RF output of the UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify:</p> <ul style="list-style-type: none"> UUT shall not transmit RF 	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail



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7.1.3 WINNF.FT.C.REG.8

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



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7.1.4 WINNF.FT.C.REG.10

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



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7.1.5 WINNF.FT.C.REG.12

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



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7.1.6 WINNF.FT.C.REG.14

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



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7.1.7 WINNF.FT.C.REG.16

#	Test Execution Steps	Results	
1	<p>Ensure the following conditions are met for test entry:</p> <ul style="list-style-type: none"> UUT has successfully completed SAS Discovery and Authentication with SAS Test Harness UUT is in the Unregistered state 	--	--
2	CBSD sends a Registration request to SAS Test Harness.	--	--
3	<p>SAS Test Harness rejects the request by sending a CBSD Registration Response as follows:</p> <ul style="list-style-type: none"> 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	<p>Monitor the RF output of the UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify:</p> <ul style="list-style-type: none"> UUT shall not transmit RF 	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail



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7.1.8 WINNF.FT.C.REG.18

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



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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



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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	--	--



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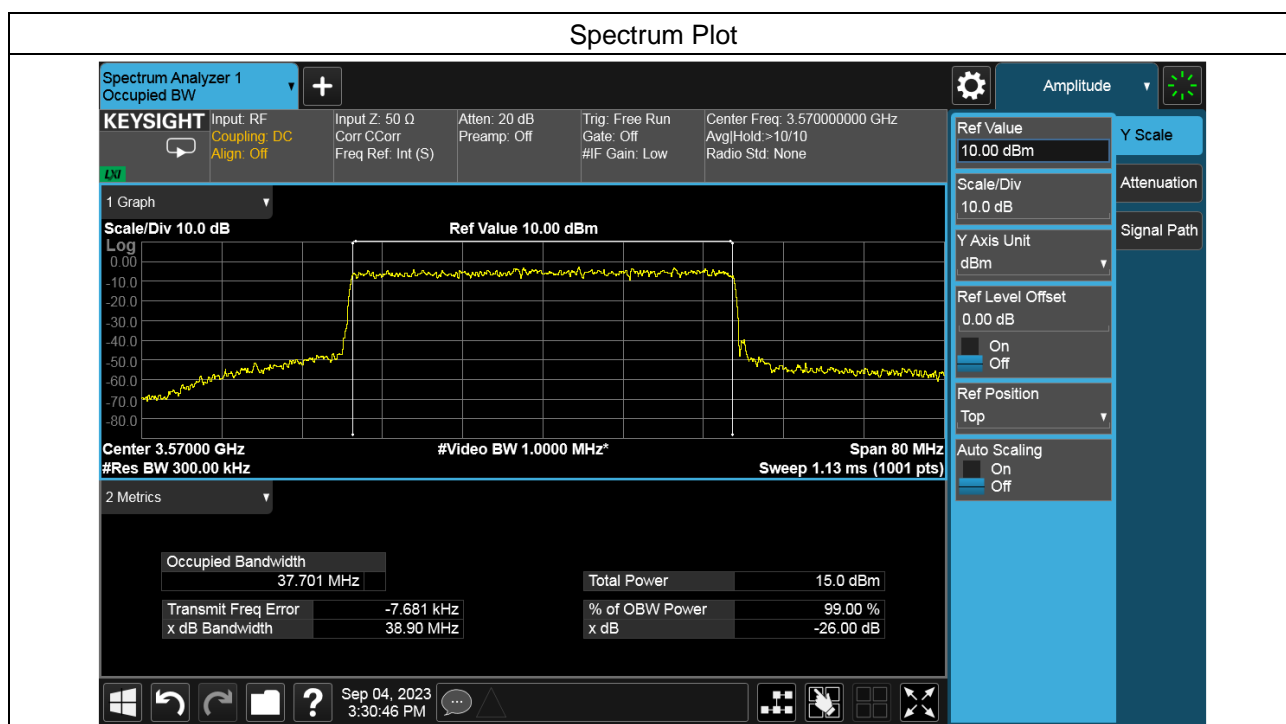
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9	<p>For further Heartbeat Request messages sent from UUT after completion of step 8, validate message is sent within latest specified heartbeatInterval, and:</p> <ul style="list-style-type: none"> ● cbsId = C ● grantId = G ● operationState = "AUTHORIZED" <p>and SAS Test Harness responds with a Heartbeat Response message including the following parameters:</p> <ul style="list-style-type: none"> ● cbsId = C ● grantId = G ● transmitExpireTime = current UTC time + 200 seconds ● responseCode = 0 	<p>■ Pass</p>	<p>□ Fail</p>
10	<p>Monitor the RF output of the UUT from start of test until UUT transmission commences. Verify:</p> <ul style="list-style-type: none"> ● UUT does not transmit at any time prior to completion of the first heartbeat response ● UUT transmits after step 8 is complete, and its transmission is limited to within the bandwidth range F. 	<p>■ Pass</p>	<p>□ Fail</p>



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7.3.2 WINNF.FT.C.HBT.3

#	Test Execution Steps	Results	
1	<p>Ensure the following conditions are met for test entry:</p> <ul style="list-style-type: none"> UUT has registered successfully with SAS Test Harness UUT has a valid single grant as follows: <ul style="list-style-type: none"> 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	<p>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:</p> <ul style="list-style-type: none"> cbsdId = C grantId = G operationState = "AUTHORIZED" 	--	--
3	<p>SAS Test Harness sends a Heartbeat Response message, including the following parameters:</p> <ul style="list-style-type: none"> 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	<p>Monitor the RF output of the UUT. Verify:</p> <ul style="list-style-type: none"> UUT shall stop transmission within (T + 60 seconds) of completion of step 3 	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail



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7.3.3 WINNF.FT.C.HBT.4

#	Test Execution Steps	Results	
1	<p>Ensure the following conditions are met for test entry:</p> <ul style="list-style-type: none"> UUT has registered successfully with SAS Test Harness UUT has a valid single grant as follows: <ul style="list-style-type: none"> 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	<p>UUT sends a Heartbeat Request message. Ensure Heartbeat Request message is sent within latest specified heartbeatInterval, and is formatted correctly, including:</p> <ul style="list-style-type: none"> cbsdId = C grantId = G operationState = "AUTHORIZED" 	<div>■</div> Pass	<div>□</div> Fail
3	<p>SAS Test Harness sends a Heartbeat Response message, including the following parameters:</p> <ul style="list-style-type: none"> 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	<p>Monitor the RF output of the UUT. Verify:</p> <ul style="list-style-type: none"> UUT shall stop transmission within (T + 60 seconds) of completion of step 3 	<div>■</div> Pass	<div>□</div> Fail



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7.3.4 WINNF.FT.C.HBT.5

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



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7.3.5 WINNF.FT.C.HBT.6

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



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7.3.6 WINNF.FT.C.HBT.7

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



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7.3.7 WINNF.FT.C.HBT.9

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



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7.3.8 WINNF.FT.C.HBT.10

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



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7.4 CBSD Relinquishment Process

7.4.1 WINNF.FT.C.RLQ.1

#	Test Execution Steps	Results	
1	<p>Ensure the following conditions are met for test entry:</p> <ul style="list-style-type: none"> 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. <p>Invoke trigger to relinquish UUT Grant from the SAS Test Harness</p>	--	--
2	<p>UUT sends a Relinquishment Request message. Verify message contains all required parameters properly formatted, and specifically:</p> <ul style="list-style-type: none"> cbsdId = C grantId = G 	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
3	<p>SAS Test Harness shall approve the request with a Relinquishment Response message with parameters:</p> <ul style="list-style-type: none"> - cbsdId = C - grantId = G ● responseCode = 0 	--	--
4	<p>After completion of step 3, SAS Test Harness will not provide any additional positive</p> <ul style="list-style-type: none"> ● response (responseCode=0) to further request messages from the UUT 	--	--
5	<p>Monitor the RF output of the UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify:</p> <ul style="list-style-type: none"> UUT shall stop RF transmission at any time between triggering the relinquishment and UUT sending the relinquishment request 	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail



7.5 CBSD Deregistration Process

7.5.1 WINNF.FT.C.DRG.1

#	Test Execution Steps	Results	
1	<p>Ensure the following conditions are met for test entry:</p> <ul style="list-style-type: none"> • 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. <p>Invoke trigger to deregister UUT from the SAS Test Harness</p>	--	--
2	<p>UUT sends a Relinquishment request and receives Relinquishment response with</p> <ul style="list-style-type: none"> • responseCode=0 	--	--
3	<ul style="list-style-type: none"> • UUT sends Deregistration Request to SAS Test Harness with cbsdId = C. 	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
4	<p>SAS Test Harness shall approve the request with a Deregistration Response message with parameters:</p> <ul style="list-style-type: none"> • cbsdId = C • responseCode = 0 	--	--
5	<p>After completion of step 3, SAS Test Harness will not provide any additional positive</p> <ul style="list-style-type: none"> • response (responseCode=0) to further request messages from the UUT. 	--	--
6	<p>Monitor the RF output of the UUT from start of test until 60 seconds after Step 4 is complete. This is the end of the test. Verify:</p> <ul style="list-style-type: none"> • UUT stopped RF transmission at any time between triggering the deregistration and either A OR B occurs: <ul style="list-style-type: none"> A. UUT sending a Registration Request message, as this is not mandatory B. UUT sending a Deregistration Request message 	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail



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7.6 CBSD Security Validation

7.6.1 WINNF.FT.C.SCS.1

#	Test Execution Steps	Results	
1	<ul style="list-style-type: none"> UUT shall start CBSD-SAS communication with the security procedure The UUT shall establish a TLS handshake with the SAS Test Harness using configured certificate. Configure the SAS Test Harness to accept the security procedure and establish the connection 	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
2	<ul style="list-style-type: none"> Make sure that Mutual authentication happens between UUT and the SAS Test Harness. Make sure that UUT uses TLS v1.2 Make sure that cipher suites from one of the following is selected, <ul style="list-style-type: none"> TLS_RSA_WITH_AES_128_GCM_SHA256 TLS_RSA_WITH_AES_256_GCM_SHA384 TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256 TLS_ECDHE_ECDSA_WITH_AES_256_GCM_SHA384 TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256 	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
3	<p>A successful registration is accomplished using one of the test cases described in section 6.1.4.1, depending on CBSD capability.</p> <ul style="list-style-type: none"> UUT sends a registration request to the SAS Test Harness and the SAS Test Harness sends a Registration Response with responseCode = 0 and cbsdId. 	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
4	<p>Monitor the RF output of the UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify:</p> <ul style="list-style-type: none"> UUT shall not transmit RF 	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail

7.6.2 WINNF.FT.C.SCS.2

#	Test Execution Steps	Results	
1	<ul style="list-style-type: none"> UUT shall start CBSD-SAS communication with the security procedures 	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
2	<ul style="list-style-type: none"> Make sure that UUT uses TLS v1.2 for security establishment. Make sure UUT selects the correct cipher suite. UUT shall use CRL or OCSP to verify the validity of the server certificate. Make sure that Mutual authentication does not happen between UUT and the SAS Test Harness. 	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
3	<ul style="list-style-type: none"> UUT may retry for the security procedure which shall fail. 	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
4	<ul style="list-style-type: none"> SAS Test-Harness shall not receive any Registration request or any application data. 	--	--
5	<p>Monitor the RF output of the UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify:</p> <ul style="list-style-type: none"> UUT shall not transmit RF 	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail



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7.6.3 WINNF.FT.C.SCS.3

#	Test Execution Steps	Results	
1	<ul style="list-style-type: none"> UUT shall start CBSD-SAS communication with the security procedures 	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
2	<ul style="list-style-type: none"> Make sure that UUT uses TLS v1.2 for security establishment. Make sure UUT selects the correct cipher suite. UUT shall use CRL or OCSP to verify the validity of the server certificate. Make sure that Mutual authentication does not happen between UUT and the SAS Test Harness. 	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
3	<ul style="list-style-type: none"> UUT may retry for the security procedure which shall fail. 	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
4	<ul style="list-style-type: none"> SAS Test-Harness shall not receive any Registration request or any application data. 	--	--
5	Monitor the RF output of the UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify: <ul style="list-style-type: none"> UUT shall not transmit RF 	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail

7.6.4 WINNF.FT.C.SCS.4

#	Test Execution Steps	Results	
1	<ul style="list-style-type: none"> UUT shall start CBSD-SAS communication with the security procedures 	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
2	<ul style="list-style-type: none"> Make sure that UUT uses TLS v1.2 for security establishment. Make sure UUT selects the correct cipher suite. UUT shall use CRL or OCSP to verify the validity of the server certificate Make sure that Mutual authentication does not happen between UUT and the SAS Test Harness. 	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
3	<ul style="list-style-type: none"> UUT may retry for the security procedure which shall fail. 	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
4	<ul style="list-style-type: none"> SAS Test-Harness shall not receive any Registration request or any application data. 	--	--
5	Monitor the RF output of the UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify: <ul style="list-style-type: none"> UUT shall not transmit RF 	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail



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7.6.5 WINNF.FT.C.SCS.5

#	Test Execution Steps	Results	
1	<ul style="list-style-type: none"> UUT shall start CBSD-SAS communication with the security procedures 	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
2	<ul style="list-style-type: none"> Make sure that UUT uses TLS v1.2 for security establishment. Make sure UUT selects the correct cipher suite. UUT shall use CRL or OCSP to verify the validity of the server certificate Make sure that Mutual authentication does not happen between UUT and the SAS Test Harness. 	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
3	<ul style="list-style-type: none"> UUT may retry for the security procedure which shall fail. 	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
4	<ul style="list-style-type: none"> SAS Test-Harness shall not receive any Registration request or any application data. 	--	--
5	Monitor the RF output of the UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify: <ul style="list-style-type: none"> UUT shall not transmit RF 	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail



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7.7 CBSD RF Power Measurement

7.7.1 WINNF.PT.C.HBT

#	Test Execution Steps	Results	
1	<p>Ensure the following conditions are met for test entry:</p> <ul style="list-style-type: none"> 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	<p>UUT and SAS Test Harness perform a series of Heartbeat Request/Response cycles, which continues until the other test steps are complete. Messaging for each cycle is as follows:</p> <ul style="list-style-type: none"> UUT sends Heartbeat Request, including: <ul style="list-style-type: none"> cbsdId = C grantId = G SAS Test Harness responds with Heartbeat Response, including: <ul style="list-style-type: none"> cbsdId = C grantId = G transmitExpireTime = current UTC time + 200 seconds responseCode = 0 	--	--
3	<p>Tester performs power measurement on RF interface(s) of UUT, and verifies it complies with the maxEirp setting, Pi. The RF measurement method is out of scope of this document, but may include additional configuration of the UUT, as required, to fulfill the requirements of the power measurement method.</p> <ul style="list-style-type: none"> 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. 	<div>■</div> Pass	<div>□</div> Fail



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RF measurement plot for Test Case:

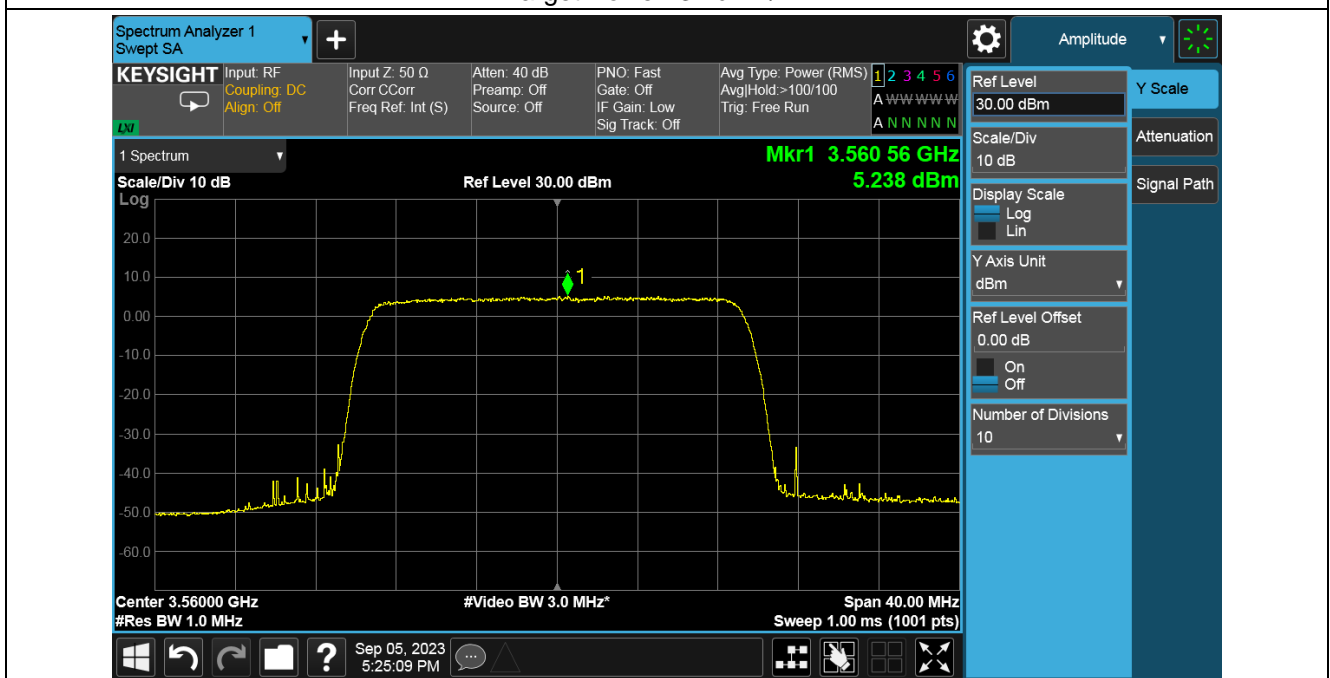
- Tester performs power measurement on RF interface(s) of UUT, and verifies it complies with the maxEirp setting, Pi. The RF measurement method is out of scope of this document, but may include additional configuration of the UUT, as required, to fulfill the requirements of the power measurement method.

Freq. (MHz)	Conducted PSD (dBm/MHz)	Antenna Gain (dBi)	Loss (dB)	Array Gain (dB)	EIRP PSD (dBm/MHz)	Limit (dBm/MHz)	Verdict
3560	5.238	13.0	15.0	3.01	36.248	37	Pass
3560	-10.937	13.0	15.0	3.01	20.073	22	Pass
3560	-21.344	13.0	15.0	3.01	9.666	12	Pass

Note:

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

Target Power: 37 dBm/MHz



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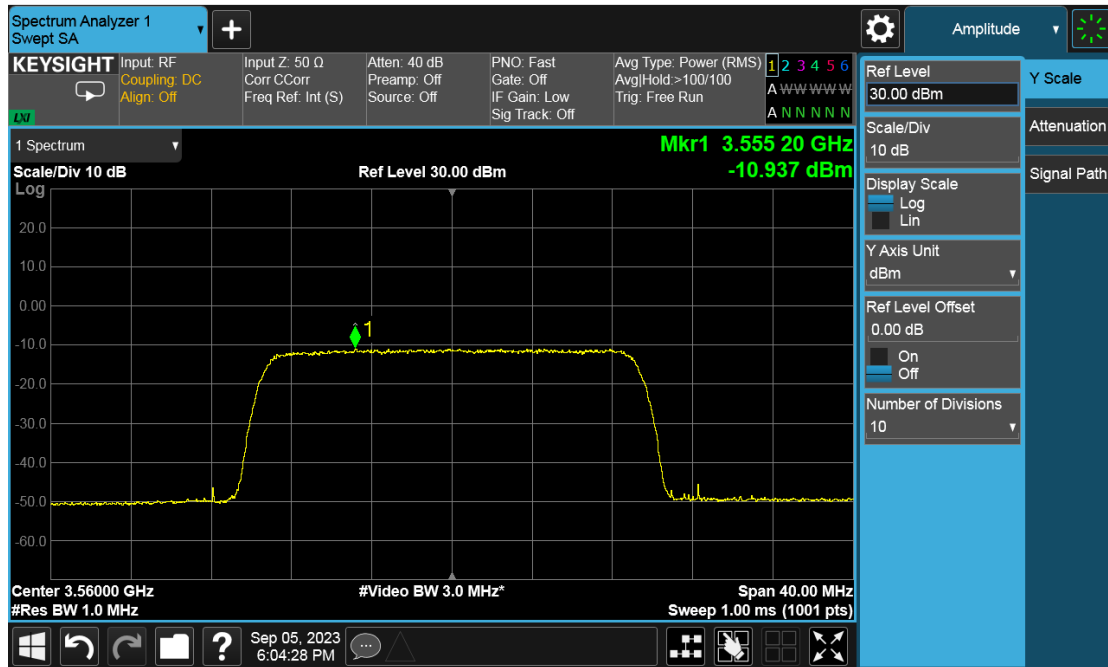
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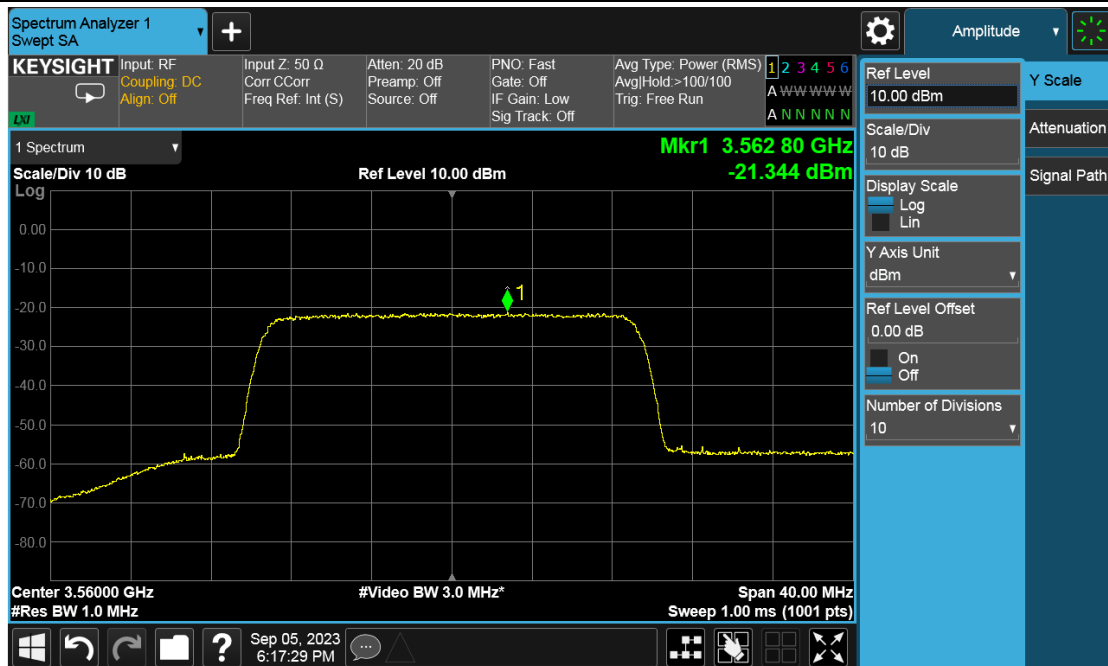
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Target Power: 22 dBm/MHz



Target Power: 12 dBm/MHz



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8 Test Data Log For Standalone CBSD

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

8.1 WINNF.FT.C.SCS.1

No.	Time	Source	Destination	Protocol	Length	Info
6	2.774080	192.168.24.210	192.168.24.103	TLSv1.2	571	Client Hello
7	2.774251	192.168.24.103	192.168.24.210	TLSv1.2	1514	Server Hello
9	2.774251	192.168.24.103	192.168.24.210	TLSv1.2	167	Certificate, Certificate Request, Server Hello Done
13	2.792753	192.168.24.210	192.168.24.103	TCP	1514	49162 → 5000 [ACK] Seq=518 Ack=3034 Win=65536 Len=1460 [TCP segment of a reassembled PDU]
14	2.792753	192.168.24.210	192.168.24.103	TLSv1.2	1514	Certificate
15	2.792753	192.168.24.210	192.168.24.103	TLSv1.2	553	Client Key Exchange, Certificate Verify, Change Cipher Spec, Encrypted Handshake Message
17	2.799048	192.168.24.103	192.168.24.210	TLSv1.2	195	Change Cipher Spec, Encrypted Handshake Message
18	2.801590	192.168.24.210	192.168.24.103	TLSv1.2	248	Application Data
19	2.801835	192.168.24.103	192.168.24.210	TLSv1.2	100	Application Data
20	2.804561	192.168.24.210	192.168.24.103	TCP	1514	49162 → 5000 [ACK] Seq=4131 Ack=3139 Win=65536 Len=1460 [TCP segment of a reassembled PDU]

8.2 WINNF.FT.C.SCS.2

The top screenshot displays an HTTP 200 OK response. The packet list shows a frame of 536 bytes on the wire. The packet details pane shows the Hypertext Transfer Protocol section with a status of 200 OK. The packet bytes pane shows the raw data in hexadecimal and ASCII.

The bottom screenshot displays a TLSv1.2 Handshake Protocol: Server Hello message. The packet list shows a frame of 1514 bytes on the wire. The packet details pane shows the TLSv1.2 Record Layer: Handshake Protocol: Server Hello section. The packet bytes pane shows the raw data in hexadecimal and ASCII.

8.3 WINNF.FT.C.SCS.3

No.	Time	Source	Destination	Protocol	Length	Info
8	2.011496	192.168.24.210	192.168.24.103	TLSv2.2	571	Client Hello
9	2.011761	192.168.24.103	192.168.24.210	TLSv2.2	1514	Server Hello
11	2.011761	192.168.24.103	192.168.24.210	TLSv2.2	174	Certificate, Certificate Request, Server Hello Done
15	2.017215	192.168.24.210	192.168.24.103	TLSv2.2	81	Alert (Level: Fatal, Description: Certificate Expired)

Frame 9: 1514 bytes on wire (12112 bits), 1514 bytes captured (12112 bits) on interface \Device\NPF... (190A60F1-6F12-421E-B580-E96AC86630F6), Id 0	0000	48 bf 74 2c d1 b2 00 00 00 01 54 26 08
Ethernet II, Src: 00:00:00:01:54:26 (00:00:00:01:54:26), Dst: Realtek_2c:d1:b2 (48:bf:74:2c:d1:b2)	0010	85 dc 33 4d 40 00 00 00 00 00 c8 a8 18
Internet Protocol Version 4, Src: 192.168.24.103, Dst: 192.168.24.210	0020	18 c2 11 88 bc 16 6a 4c 07 69 4c 27 46
Transmission Control Protocol, Src Port: 5000, Dst Port: 48312, Seq: 1, Ack: 518, Len: 1460	0030	01 ff 08 50 00 16 03 03 00 56 02 00
Transport Layer Security	0040	03 63 26 2a 05 09 e5 42 a3 a3 e8 05 c3
Handshake Protocol: Server Hello	0050	64 86 6f b3 91 f1 9c 2c a0 8a 87 cc 1f
Handshake Type: Server Hello (2)	0060	26 20 23 95 5a 85 c2 00 00 e4 3a c4 c9
Version: TLS 1.2 (0x0303)	0070	3f 7e 70 20 17 1f 36 ce e3 07 01 5d 7c
Length: 86	0080	01 16 03 03 00 4d 00 00 00 49 00 00 46
Random: 61262a08b5d2a3e3e885c371f99164866f391f19c2ca0a07cc1f7f6b7526	0090	30 02 05 35 30 02 03 16 a0 03 02 01 02
Session ID Length: 32	00a0	56 0b 60 30 04 06 09 2a 06 48 86 77 0d
Session ID: 23955a85c2600ba43ac4c9c2c92d3f7e701b71f36cee3e7815d70464ab0055	00b0	05 00 30 5c 11 0b 30 09 06 03 55 04 06
Cipher Suite: TLS_RSA_WITH_AES_256_GCM_SHA384 (0x009d)	00c0	4e 31 0c 30 0a 06 03 55 04 0a 0c 03 53
Compression Method: null (0)	00d0	19 30 17 06 03 55 04 00 0c 10 52 53 41
Extensions Length: 18	00e0	53 20 50 72 6f 76 69 64 65 72 31 26 30
Extension: renegotiation_info (len=1)	00f0	55 04 03 0c 1d 57 49 6e 6e 46 6f 72 75
Type: renegotiation_info (0x0001)	0100	53 41 20 55 41 53 20 50 72 6f 76 69 64
Length: 1	0110	43 41 30 1e 17 0d 32 33 30 38 33 31 31
Renegotiation Info extension	0120	34 39 5a 17 0d 32 33 30 38 33 31 31 31
Renegotiation Info extension Length: 0	0130	39 5a 30 7a 11 0b 30 09 06 03 55 04 06
Extension: heartbeat (len=1)	0140	26 30 20 06 03 55 04 00 0c 22 57 49 6e
Type: heartbeat (0x0001)	0150	72 75 4a 20 53 41 53 20 50 72 6f 76 69
Length: 1	0160	20 43 65 72 74 69 66 69 63 61 74 65 31
Heartbeat extension	0170	06 03 55 04 03 0c 27 65 78 70 69 72 65
Heartbeat extension Length: 0	0180	73 63 65 72 74 2e 74 65 73 74 6c 61 62
Extension: heartbeat (len=1)	0190	6e 6e 2e 67 69 74 68 75 62 2e 63 6f
Type: heartbeat (0x0001)	01a0	01 22 30 04 06 09 2a 06 48 86 77 0d 01
Length: 1	01b0	00 03 02 01 0f 00 30 02 01 0a 02 02 01
Mode: Peer allowed to send requests (1)	01c0	01 73 c8 e3 40 63 9d 11 79 4d f3 56 77
[JA3S Fullstring: 771,157,65281-15]	01d0	58 a5 00 00 8e e8 21 33 2d 52 12 03 47
[JA3S: 6d37f1b33064e9f87565080eb7404f]	01e0	68 a4 a1 66 05 f6 9a 04 46 42 00 1b 04
	01f0	7a cc 06 f9 43 cf 5f f3 f9 41 a3 e4 01
	0200	38 bf 8a 0a 88 78 1c ba 90 cb 55 4e a8
	0210	fc e0 f9 68 8a 03 30 ae 11 61 09 0d

8.4 WINNF.FT.C.SCS.4

No.	Time	Source	Destination	Protocol	Length	Info
4	0.002256	192.168.24.103	192.168.24.103	TLSv1.2	571	Client Hello
5	0.006803	192.168.24.103	192.168.24.103	TLSv1.2	1514	Server Hello
7	0.006803	192.168.24.103	192.168.24.103	TLSv1.2	183	Certificate, Certificate Request, Server Hello Done
11	0.009316	192.168.24.103	192.168.24.103	TLSv1.2	61	Alert (Level: Fatal, Description: Unknown CA)
16	5.814819	192.168.24.103	192.168.24.103	TLSv1.2	571	Client Hello
17	5.835126	192.168.24.103	192.168.24.103	TLSv1.2	1514	Server Hello
19	5.835126	192.168.24.103	192.168.24.103	TLSv1.2	183	Certificate, Certificate Request, Server Hello Done
23	5.837448	192.168.24.103	192.168.24.103	TLSv1.2	61	Alert (Level: Fatal, Description: Unknown CA)
28	10.061999	192.168.24.103	192.168.24.103	TLSv1.2	571	Client Hello
29	10.062335	192.168.24.103	192.168.24.103	TLSv1.2	1514	Server Hello

No.	Time	Source	Destination	Protocol	Length	Info
4	0.002256	192.168.24.103	192.168.24.103	TLSv1.2	571	Client Hello
5	0.006803	192.168.24.103	192.168.24.103	TLSv1.2	1514	Server Hello
7	0.006803	192.168.24.103	192.168.24.103	TLSv1.2	183	Certificate, Certificate Request, Server Hello Done
11	0.009316	192.168.24.103	192.168.24.103	TLSv1.2	61	Alert (Level: Fatal, Description: Unknown CA)
16	5.814819	192.168.24.103	192.168.24.103	TLSv1.2	571	Client Hello
17	5.835126	192.168.24.103	192.168.24.103	TLSv1.2	1514	Server Hello
19	5.835126	192.168.24.103	192.168.24.103	TLSv1.2	183	Certificate, Certificate Request, Server Hello Done
23	5.837448	192.168.24.103	192.168.24.103	TLSv1.2	61	Alert (Level: Fatal, Description: Unknown CA)

8.5 WINNF.FT.C.SCS.5

No.	Time	Source	Destination	Protocol	Length	Info
12	13.15.072284	192.168.24.210	192.168.24.103	TLSv1.2	1514	Client Hello
13	13.15.072686	192.168.24.103	192.168.24.210	TLSv1.2	1514	Server Hello
15	15.072686	192.168.24.103	192.168.24.210	TLSv1.2	167	Certificate, Certificate Request, Server Hello Done
19	15.072659	192.168.24.210	192.168.24.103	TLSv1.2	61	Alert (Level: Fatal, Description: Decrypt Error)
24	20.182679	192.168.24.210	192.168.24.103	TLSv1.2	571	Client Hello
25	20.182904	192.168.24.103	192.168.24.210	TLSv1.2	1514	Server Hello
27	20.182904	192.168.24.103	192.168.24.210	TLSv1.2	167	Certificate, Certificate Request, Server Hello Done
31	20.188388	192.168.24.210	192.168.24.103	TLSv1.2	61	Alert (Level: Fatal, Description: Decrypt Error)

Frame 13: 1514 bytes on wire (12112 bits), 1514 bytes captured (12112 bits) on interface Device\NPF{190A0D51-6F12-421E-8588-E96AC86A3D66}, id 0

Ethernet II, Src: 00:00:00:01:54:26 (00:00:00:01:54:26), Dst: Realtek\c:\d1:b2 (48:b8:74:c:d1:b2)

Internet Protocol Version 4, Src: 192.168.24.103, Dst: 192.168.24.210

Transmission Control Protocol, Src Port: 5000, Dst Port: 48400, Seq: 1, Ack: 518, Len: 1460

Transport Layer Security

- TLSv1.2 Record Layer: Handshake Protocol: Server Hello
 - Content Type: Handshake (22)
 - Version: TLS 1.2 (0x0303)
 - Length: 86
 - Handshake Protocol: Server Hello
 - Handshake Type: Server Hello (2)
 - Length: 82
 - Version: TLS 1.2 (0x0303)
 - Random: 26b2e3a3848373c464477835b282a7399687654b676c8b6e4e43c8a1ccf3b
 - Session ID Length: 32
 - Session ID: 4a5ec60427f49014541108ee962a3581c95d21599674beb76d174eb34a255
 - Cipher Suite: TLS_RSA_WITH_AES_256_GCM_SHA384 (0x009d)
 - Compression Method: null (0)
 - Extensions Length: 10
 - Extension: renegotiation_info (len=1)
 - Type: renegotiation_info (65282)
 - Length: 1
 - Renegotiation Info extension
 - Renegotiation Info extension length: 0
 - Extension: heartbeat (len=1)
 - Type: heartbeat (15)
 - Length: 1
 - Note: Peer allowed to send requests (1)
 - [JA3S Fullstring: 771,157,65281-15]
 - [JA3S: 6d37f1b33064e9f87565808eb74b4f]

9 Photographs

9.1 EUT Constructional Details (EUT Photos)

Please Refer to external and internal photos for details.

- End of the Report -

