



Compliance Certification Services (Kunshan) Inc.

Report No.: KSCR220300035801

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TEST REPORT

Application No.: KSCR2203000358AT (SZCR2202000416AT)
FCC ID: 2AG32PBS3101S
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: LTE Base Station
Model No.: pBS3101SH
Trade Mark: Baicells
Standard(s): FCC 47 CFR Part 96
CBRS-A-TS-9001-V1.2.1
WINNF-TS-0122-V1.0.2
KDB 940660 D01 V03
Date of Receipt: 2022-02-18
Date of Test: 2022-02-21 to 2022-03-16
Date of Issue: 2022-03-17

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

Eric Lin
Laboratory Manager

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS International Electrical Approvals or testing done by SGS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by SGS International Electrical Approvals in writing.



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Revision Record			
Version	Description	Date	Remark
00	Original	2022-03-17	/

Authorized for issue by:			
		<i>Damon Zhou</i>	
		Damon Zhou / Project Engineer	
		<i>Eric Lin</i>	
		Eric Lin / Reviewer	



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EMC Laboratory

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2 Test Summary

Item	Standard	Test Case ID	Result
Domain Proxy Multi-Step registration	WINNF-TS-0122-V1.0.0	WINNF.FT.D.REG.2	Pass
Domain Proxy Missing Required parameters (responseCode 102)	WINNF-TS-0122-V1.0.0	WINNF.FT.D.REG.9	Pass
Domain Proxy Pending registration (responseCode 200)	WINNF-TS-0122-V1.0.0	WINNF.FT.D.REG.11	Pass
Domain Proxy Invalid parameters (responseCode 103)	WINNF-TS-0122-V1.0.0	WINNF.FT.D.REG.13	Pass
Domain Proxy Blacklisted CBSD (responseCode 101)	WINNF-TS-0122-V1.0.0	WINNF.FT.D.REG.15	Pass
Domain Proxy Unsupported SAS protocol version responseCode 100)	WINNF-TS-0122-V1.0.0	WINNF.FT.D.REG.17	Pass
Domain Proxy Group Error (responseCode 201)	WINNF-TS-0122-V1.0.0	WINNF.FT.D.REG.19	Pass
Unsuccessful Grant responseCode=400 (INTERFERENCE)	WINNF-TS-0122-V1.0.0	WINNF.FT.C.GRA.1	Pass
Unsuccessful Grant responseCode=401 (GRANT_CONFLICT)	WINNF-TS-0122-V1.0.0	WINNF.FT.C.GRA.2	Pass
Domain Proxy Heartbeat Success Case (first Heartbeat Response)	WINNF-TS-0122-V1.0.0	WINNF.FT.D.HBT.2	Pass
Heartbeat responseCode=105 (DEREGISTER)	WINNF-TS-0122-V1.0.0	WINNF.FT.C.HBT.3	Pass
Heartbeat responseCode=501 (SUSPENDED_GRANT) in First Heartbeat Response	WINNF-TS-0122-V1.0.0	WINNF.FT.C.HBT.5	Pass
Heartbeat responseCode=501 (SUSPENDED_GRANT) in Subsequent Heartbeat Response	WINNF-TS-0122-V1.0.0	WINNF.FT.C.HBT.6	Pass
Heartbeat responseCode=502 (UNSYNC_OP_PARAM)	WINNF-TS-0122-V1.0.0	WINNF.FT.C.HBT.7	Pass
Domain Proxy Heartbeat responseCode=500 (TERMINATED_GRANT)	WINNF-TS-0122-V1.0.0	WINNF.FT.D.HBT.8	Pass
Heartbeat Response Absent (First Heartbeat)	WINNF-TS-0122-V1.0.0	WINNF.FT.C.HBT.9	Pass
Heartbeat Response Absent (Subsequent Heartbeat)	WINNF-TS-0122-V1.0.0	WINNF.FT.C.HBT.10	Pass
Domain Proxy Successful Relinquishment	WINNF-TS-0122-V1.0.0	WINNF.FT.D.RLQ.2	Pass
Domain Proxy Successful Deregistration	WINNF-TS-0122-V1.0.0	WINNF.FT.D.DRG.2	Pass



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Item	Standard	Test Case ID	Result
Successful TLS connection between UUT and SAS Test Harness	WINNF-TS-0122-V1.0.0	WINNF.FT.C.SCS.1	Pass
TLS failure due to revoked certificate	WINNF-TS-0122-V1.0.0	WINNF.FT.C.SCS.2	Pass
TLS failure due to expired server certificate	WINNF-TS-0122-V1.0.0	WINNF.FT.C.SCS.3	Pass
TLS failure when SAS Test Harness certificate is issue by unknown CA	WINNF-TS-0122-V1.0.0	WINNF.FT.C.SCS.4	Pass
TLS failure when certificate at the SAS Test Harness is corrupted	WINNF-TS-0122-V1.0.0	WINNF.FT.C.SCS.5	Pass
UUT RF Transmit Power Measurement	WINNF-TS-0122-V1.0.0	WINNF.PT.C.HBT.1	Pass
SAS Version: 1.0.0.3			

The UUT is a BTS-CBSD with Domain Proxy. 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



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4 General Information

4.1 Details of E.U.T.

Power supply:	Adapter Model NO.: G0566-480-100 Input: 100-240V~50/60Hz, 1.5A Output: 48.0V, 1.0A
Sample Type:	Fixed device
CBSD Class:	B
Transmitter Frequency Band:	LTE Band 48
Transmitter Frequency Range:	3550~3700MHz
Hardware Version:	A01
Software Version:	BaiBS_QRTB_2.8.11
Test sample:	SN1: 120200039521AGB0700 SN2: 12020003952147B0011
Antenna Gain:	13 dBi
MIMO Type:	2*2 MIMO
Note: This is a BTS-CBSD communication with Domain Proxy. The Domain Proxy is a cloud Domain Proxy which information show as below: Hardware Version of Domain Proxy: A01 Software Version of Domain Proxy: DP 1.7	

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.	N
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



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4.3 Summary of Test Results

WINNF-TS-0122			
Classes	Test Case Items	Pass Items	Pass Rate (%)
FT (CBSD, DP/CBSD)	24	24	100
PT (CBSD, DP/CBSD)	1	1	100
Total	25	25	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.
CPE	SMAWAVE	USB Dongle	/
Gateway	FreedomFi	FFG-HL-4-64	HL-2143-00004105

4.6 Test Location

All tests were performed at:

Compliance Certification Services (Kunshan) Inc.

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No tests were sub-contracted.



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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	KUS2001M001-2	2021/7/13	2022/7/12
Shield Room	研创	N/A	KS301115-2	N/A	N/A
Coaxial Cable	Thermax	N/A	14	2021/10/16	2022/10/15
Attenuator	Mini-Circuits	NAT-6-2W	15542-1	N.C.R.	N.C.R.
Humidity / Temperature Indicator	Anymetre	TH603	CZ700001(4/7)	2021/10/14	2022/10/13



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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 TestHarness.
- 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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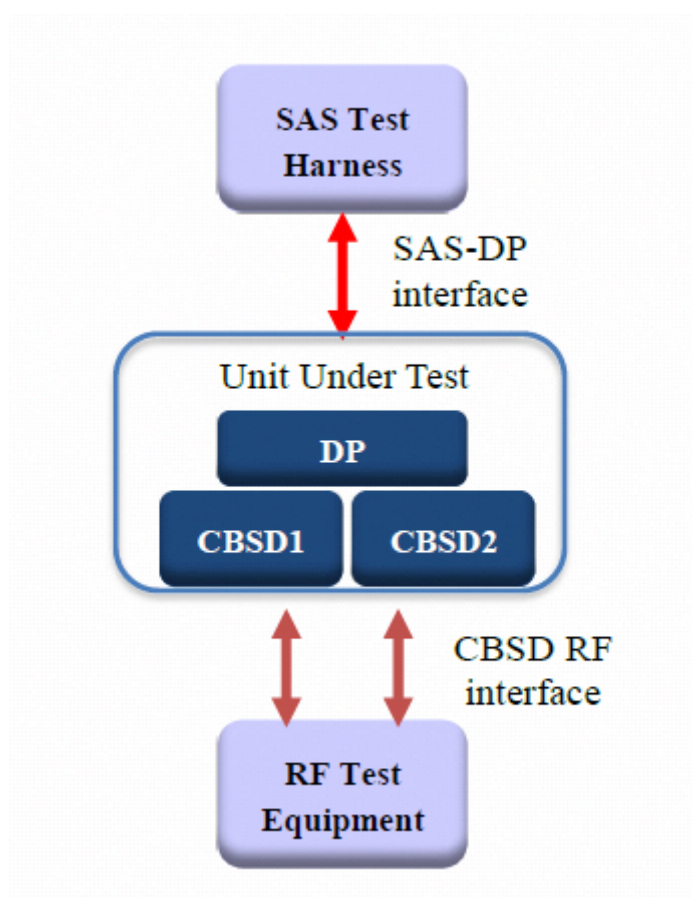
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6.3 Test Environment

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



DP/CBSD as UUT, BTS-CBSD communication with Domain Proxy



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7 Test Data

7.1 CBSD Registration Process

7.1.1 WINNF.FT.D.REG.2

#	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	DP with two CBSD sends correct Registration request information, as specified in [n.5], in the form of one 2-element Array or as individual messages to the SAS Test Harness: ● The required userId, fcId and cbsdSerialNumber registration parameters shall be sent for each 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 in the form of one 2-element Array or individual messages as follows: - cbsdId = Ci - measReportConfig shall not be included - responseCode = 0 for each CBSD	--	--
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.D.REG.9

#	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	The DP with two CBSDs sends a Registration request in the form of one 2-element Array or as individual messages to SAS Test Harness.	--	--
3	SAS Test Harness sends a CBSD Registration Response in the form of one 2-element Array or as individual messages as follows: - SAS response does not include a cbsdId. - responseCode = 102 for CBSD1 and CBSD2	--	--
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.D.REG.11

#	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	The DP with two CBSDs sends a Registration request in the form of one 2-element Array or as individual messages to SAS Test Harness.	--	--
3	SAS Test Harness sends a CBSD Registration Response in the form of one 2-element Array or as individual messages as follows: - SAS response does not include a cbsdId. - responseCode = 200 for CBSD1 and CBSD2	--	--
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



7.1.4 WINNF.FT.D.REG.13

#	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	The DP with two CBSDs sends a Registration request in the form of one 2-element Array or as individual messages to SAS Test Harness.	--	--
3	SAS Test Harness sends a CBSD Registration Response in the form of one 2-element Array or as individual messages as follows: - SAS response does not include a cbsdId. - responseCode = 0 for CBSD1 - responseCode = 103 for CBSD2	--	--
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.D.REG.15

#	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	The DP with two CBSDs sends a Registration request in the form of one 2-element Array or as individual messages to SAS Test Harness.	--	--
3	SAS Test Harness sends a CBSD Registration Response in the form of one 2-element Array or as individual messages as follows: - SAS response does not include a cbsdId. - responseCode = 0 for CBSD1 - responseCode = 101 for CBSD2	--	--
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



7.1.6 WINNF.FT.D.REG.17

#	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	The DP with two CBSDs sends a Registration request in the form of one 2-element Array or as individual messages to SAS Test Harness.	--	--
3	SAS Test Harness sends a CBSD Registration Response in the form of one 2-element Array or as individual messages as follows: - SAS response does not include a cbsdId. - responseCode = 100 for CBSD1 and CBSD2	--	--
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

7.1.7 WINNF.FT.D.REG.19

#	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	The DP with two CBSDs sends a Registration request in the form of one 2-element Array or as individual messages to SAS Test Harness.	--	--
3	SAS Test Harness sends a CBSD Registration Response in the form of one 2-element Array or as individual messages as follows: - SAS response does not include a cbsdId. - responseCode = 0 for CBSD1 - responseCode = 201 for CBSD2	--	--
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



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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.	--	--
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.	--	--
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



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7.3 CBSD HeartBeat Process

7.3.1 WINNF.FT.D.HBT.2

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: ● DP has two CBSD registered successfully with SAS Test Harness, with cbsdId = Ci, i={1,2}	--	--
2	DP 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	DP sends a Spectrum Inquiry Request message for each CBSD. This may occur in a separate message per CBSD, or together in a single message with array of 2. Verify Spectrum Inquiry Request message is formatted correctly for each CBSD, including for CBSDi, i={1,2}: ● cbsdId = Ci ● List of frequencyRange objects sent by DP are within the CBRS frequency range	■ Pass	□ Fail
4	If a separate Spectrum Inquiry Request message was sent for each CBSD, the SAS Test Harness shall respond to each Spectrum Inquiry Request message with a separate Spectrum Inquiry Response message. If a single Spectrum Inquiry Request message was sent containing a 2-object array (one per CBSD), the SAS Test Harness shall respond with a single Spectrum Inquiry Response message containing a 2-object array. Verify parameters for each CBSD within the Spectrum Inquiry Response message are as follows, for CBSDi, i={1,2}: ● cbsdId = Ci ● availableChannel is an array of availableChannel objects ● responseCode = 0	--	--
5	DP sends a Grant Request message for each CBSD. This may occur in a separate message per CBSD, or together in a single message with array of 2. Verify Grant Request message is formatted correctly for each CBSD, including for CBSDi, i={1,2}: ● cbsdId = C ● maxEIRP is at or below the limit appropriate for CBSD category as defined by Part 96 ● operationFrequencyRange, Fi, sent by UUT is a valid range within the CBRS band	■ Pass	□ Fail
6	If a separate Grant Request message was sent for each CBSD, the SAS Test Harness shall respond to each Grant Request message with a separate Grant Response message. If a single Grant Request message was sent containing a 2-object array (one per CBSD), the SAS Test Harness shall respond with a single Grant Response message containing a 2-object array. Verify parameters for each CBSD within the Grant Response message are as follows, for CBSDi, i={1,2}: ● cbsdId = Ci ● grantId = Gi = a valid grant ID	--	--



	● grantExpireTime = UTC time greater than duration of the test ● responseCode = 0		
7	Ensure DP sends first Heartbeat Request message for each CBSD. This may occur in a separate message per CBSD, or together in a single message with array of 2. Verify Heartbeat Request message is formatted correctly for each CBSD, including, for CBSDi i={1,2}: ● cbsdId = Ci, i={1,2} ● grantId = Gi, i={1,2} ● operationState = "GRANTED"	☒ Pass	☐ Fail
8	If a separate Heartbeat Request message was sent for each CBSD by the DP, the SAS Test Harness shall respond to each Heartbeat Request message with a separate Heartbeat Response message. If a single Heartbeat Request message was sent by the DP containing a 2-object array (one per CBSD), the SAS Test Harness shall respond with a single Heartbeat Response message containing a 2-object array. Verify parameters for each CBSD within the Heartbeat Response message are as follows, for CBSDi: ● cbsdId = Ci ● grantId = Gi ● transmitExpireTime = current UTC time + 200 seconds ● responseCode = 0	--	--
9	For further Heartbeat Request messages sent from DP after completion of step 8, validate message is sent within latest specified heartbeatInterval for CBSDi: ● cbsdId = Ci ● grantId = Gi ● operationState = "AUTHORIZED" and SAS Test Harness responds with a Heartbeat Response message including the following parameters, for CBSDi ● cbsdId = Ci ● grantId = Gi ● 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. Monitor the RF output of the UUT from start of test until RF 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 Fi.	☒ Pass	☐ Fail

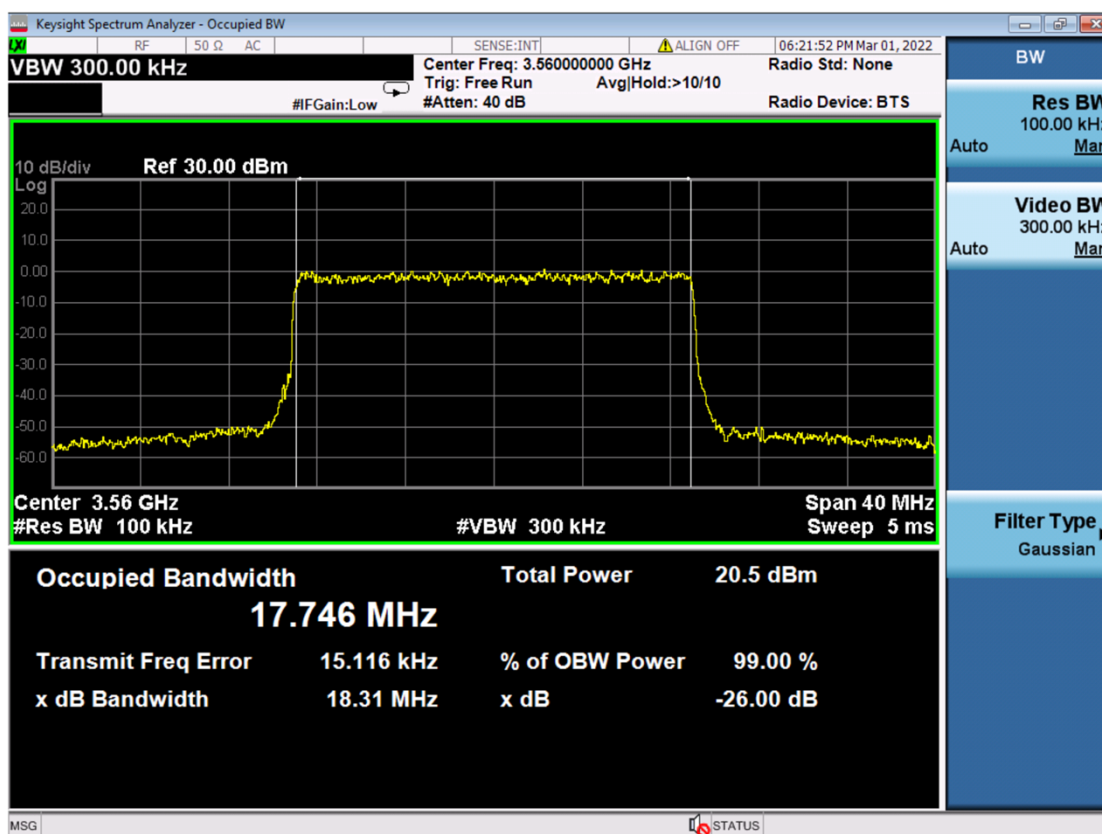


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7.3.2 WINNF.FT.C.HBT.3

#	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"	☒ 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 = 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



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7.3.3 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



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7.3.4 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



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7.3.5 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



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7.3.6 WINNF.FT.D.HBT.8

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: ● DP has two CBSD registered successfully with SAS Test Harness ● Each CBSD {1,2} has a valid single grant as follows ○ valid cbsdId = Ci, i={1,2} ○ valid grantId = Gi, i={1,2} ○ grant is for frequency range Fi, power Pi ○ grantExpireTime = UTC time greater than duration of the test ● Both CBSD are in AUTHORIZED state and transmitting within their granted bandwidth on RF interface	--	--
2	DP sends a Heartbeat Request message for each CBSD. This may occur in a separate message per CBSD, or together in a single message with array of size 2. Verify Heartbeat Request message is sent within latest specified heartbeatInterval, and is formatted correctly for each CBSD, including, for CBSDi i={1,2}: ● cbsdId = Ci, i = {1,2} ● grantId = Gi, i = {1,2} ● operationState = "AUTHORIZED"	☒ Pass	☐ Fail
3	If separate Heartbeat Request message was sent for each CBSD by the DP, the SAS Test Harness shall respond to each Heartbeat Request message with a separate Heartbeat Response message. If a single Heartbeat Request message was sent by the DP containing a 2-object array (one per CBSD), the SAS Test Harness shall respond with a single Heartbeat Response message containing a 2-object array. Parameters for each CBSD within the Heartbeat Response message should be as follows, for CBSDi: ● cbsdId = Ci ● grantId = Gi ● For CBSD1: ○ transmitExpireTime = current UTC time + 200 seconds ○ responseCode = 0 ● For CBSD2: ○ 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. If CBSD sends further Heartbeat Request messages for CBSD1, SAS Test Harness shall respond with a Heartbeat Response message with parameters: ● cbsdId = C1 ● grantId = G1 ● transmitExpireTime = current UTC time + 200 seconds ● responseCode = 0 ● Heartbeat Request message is within heartbeatInterval of previous Heartbeat Request message	--	--
5	Monitor the RF output of CBSD2. Verify: ● CBSD2 shall stop transmission within bandwidth F2 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



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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



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7.4 CBSD Relinquishment Process

7.4.1 WINNF.FT.D.RLQ.2

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: ● DP has successfully completed SAS Discovery and Authentication with SAS Test Harness ● DP has successfully registered 2 CBSD with SAS Test Harness, each with $cbsdId=Ci$, $i=\{1,2\}$ ● DP has received a valid grant with $grantId = Gi$, $i=\{1,2\}$ for each CBSD ● Both CBSD are in Grant State AUTHORIZED and actively transmitting within the bounds of their grants. Invoke trigger to relinquish UUT Grant from the SAS Test Harness	--	--
2	Verify DP sends a Relinquishment Request message for each CBSD. This may occur in a separate message per CBSD, or together in a single message with array of 2. Verify Relinquishment Request message contains all required parameters properly formatted for each CBSD, specifically, for CBSDi: ● $cbsdId = Ci$ ● $grantId = Gi$	☒ Pass	☐ Fail
3	If a separate Relinquishment Request message was sent for each CBSD by the DP, the SAS Test Harness shall respond to each request message with a separate response message. If a single Relinquishment Request message was sent by the DP containing a 2-object array (one per CBSD), the SAS Test Harness shall respond with a single Response message containing a 2-object array. Parameters for each CBSD within the Relinquishment Response shall be as follows: ● $cbsdId = Ci$ ● $grantId = Gi$ ● $responseCode = 0$	--	--
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 each 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 relinquishments and UUT sending the relinquishment requests for each CBSD.	☒ Pass	☐ Fail



7.5 CBSD Deregistration Process

7.5.1 WINNF.FT.D.DRG.2

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: ● Each UUT has successfully registered with SAS Test Harness ● Each UUT is in the authorized state ● DP has successfully completed SAS Discovery and Authentication with SAS Test Harness ● DP has successfully registered 2 CBSD with SAS Test Harness, each with cbsdId=Ci, i={1,2} ● DP has received a valid grant with grantId = Gi, i={1,2} for each CBSD ● Both CBSD are in Grant State AUTHORIZED and actively transmitting within the bounds of their grants. Invoke trigger to relinquish UUT Grant from the SAS Test Harness	--	--
2	UUT sends a Relinquishment request and receives Relinquishment response with responseCode=0	--	--
3	Verify DP sends a Deregistration Request message for each CBSD. This may occur in a separate message per CBSD, or together in a single message with array of 2. Verify Deregistration Request message contains all required parameters properly formatted for each CBSD, specifically, for CBSDi: ● cbsdId = Ci	☒ Pass	☐ Fail
4	If a separate Deregistration Request message was sent for each CBSD by the DP, the SAS Test Harness shall respond to each request message with a separate response message. If a single Deregistration Request message was sent by the DP containing a 2-object array (one per CBSD), the SAS Test Harness shall respond with a single Response message containing a 2-object array. Parameters for each CBSD within the Deregistration Response shall be as follows: ● cbsdId = Ci ● responseCode = 0	--	--
5	After completion of step 4, SAS Test Harness will not provide any positive response (responseCode=0) to further request messages from the UUT.	--	--
6	Monitor the RF output of each 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 CBSD Security Validation

7.6.1 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. 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

7.6.2 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	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



7.6.3 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	● 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

7.6.4 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	● 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



7.6.5 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	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



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7.7 CBSD RF Power Measurement

7.7.1 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. 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



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RF measurement plot for Test Case:

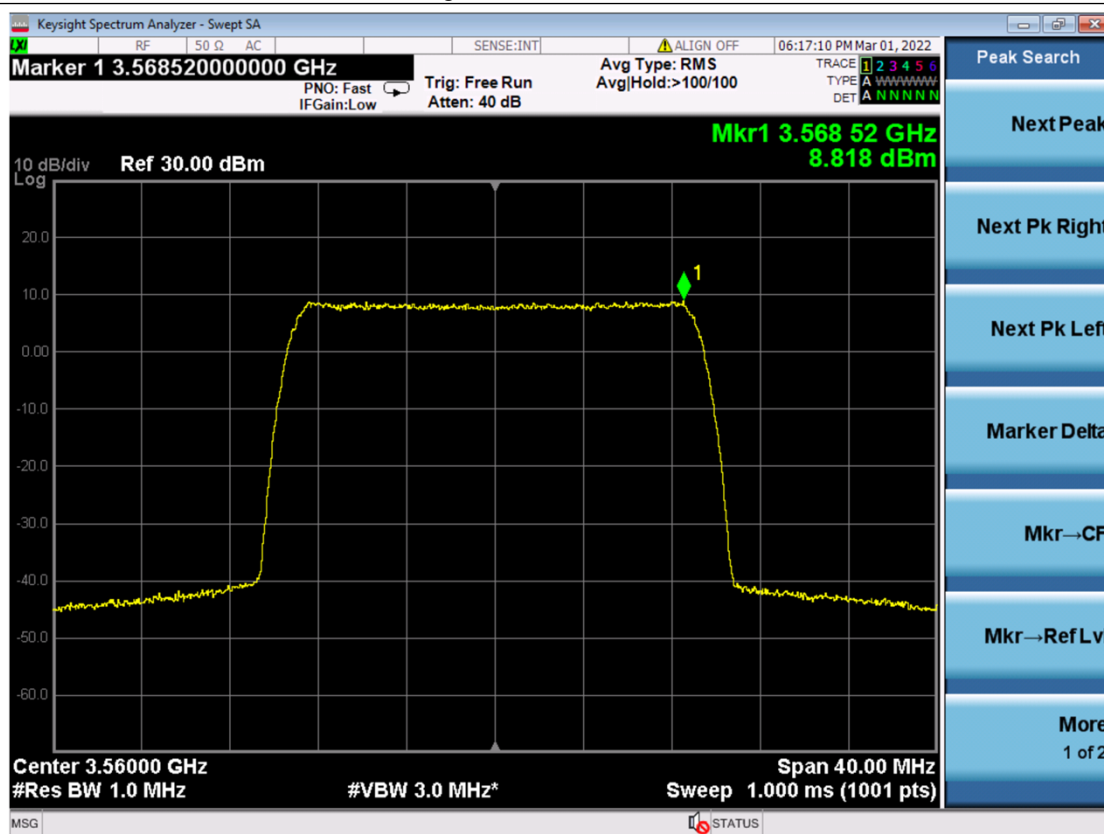
- Tester performs power measurement on RF interface(s) of UUT, and verifies it complies with the maxEirp setting, Pi. The RF measurement method is out of scope of this document, but may include additional configuration of the UUT, as required, to fulfill the requirements of the power measurement method.

Freq. (MHz)	Conducted PSD (dBm/MHz)	Antenna Gain (dBi)	Array Gain (dB)	Loss (dB)	EIRP PSD (dBm/MHz)	Limit (dBm/MHz)	Verdict
3560	8.818	13.0	3.01	2	26.828	37	Pass
3560	-0.530	13.0	3.01	2	17.480	18	Pass

Note:

- Array Gain=10log(n), n is the antenna number, for this CBSD the n=2
- EIRP PSD= Conducted PSD+ Antenna Gain+ Array Gain+ Loss

Target Power: 37dBm/MHz



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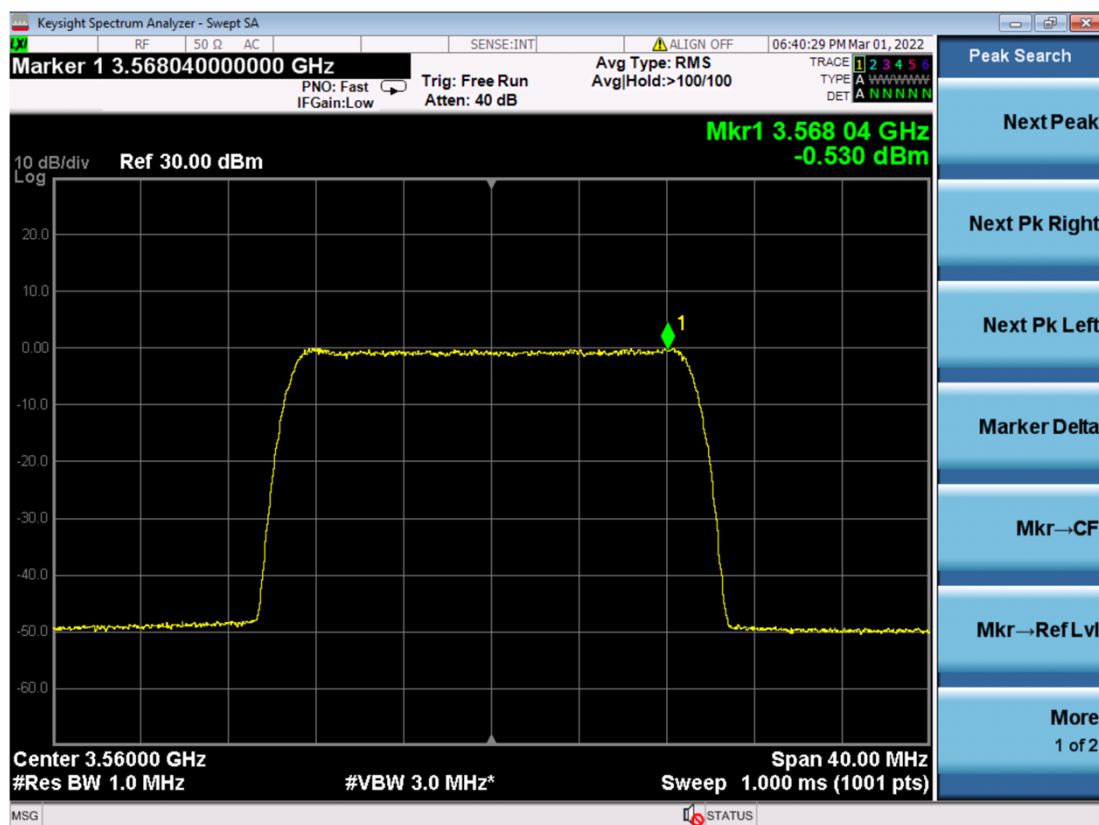
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Target Power: 18dBm/MHz



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8 Test Data Log

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
4	0.007927	10.10.101.241	10.10.101.185	TLSv1.2	583	Client Hello
6	0.009662	10.10.101.185	10.10.101.241	TLSv1.2	4162	Server Hello
8	0.009804	10.10.101.185	10.10.101.241	TLSv1.2	747	Certificate, Certificate Request, Server Hello Done
10	0.009908	10.10.101.241	10.10.101.185	TLSv1.2	4747	Certificate
11	0.009981	10.10.101.241	10.10.101.185	TLSv1.2	653	Client Key Exchange, Certificate Verify, Change Cipher Spec, Encrypted
13	0.101680	10.10.101.185	10.10.101.241	TLSv1.2	117	Change Cipher Spec, Encrypted Handshake Message

Frame 6: 4162 bytes on wire (33296 bits), 4162 bytes captured (33296 bits)
Ethernet II, Src: 8e:8b:6c:36:62:27 (8e:8b:6c:36:62:27), Dst: e6:ee:1e:dd:0f:20 (e6:ee:1e:dd:0f:20)
Internet Protocol Version 4, Src: 10.10.101.185, Dst: 10.10.101.241
Transmission Control Protocol, Src Port: 9000, Dst Port: 53528, Seq: 1, Ack: 518, Len: 4096
Transport Layer Security
TLSv1.2 Record Layer: Handshake Protocol: Server Hello
Content Type: Handshake (22)
Version: TLS 1.2 (0x0303)
Length: 85
Handshake Protocol: Server Hello
Handshake Type: Server Hello (2)
Length: 81
Version: TLS 1.2 (0x0303)
Random: 54dce017c6d6adf10a294f816e58ffb4fab9a32353febe35d1ce64805accbde5
Session ID Length: 32
Session ID: 23c78f4fbaddee2454e80d955b7f3435c1f2cf2d9f3efcd233bc126876808179
Cipher Suite: TLS_RSA_WITH_AES_256_GCM_SHA384 (0x009d)
Compression Method: null (0)
Extensions Length: 9
Extension: renegotiation_info (len=1)
Extension: extended_master_secret (len=0)
[JA3S Fullstring: 771,157,65281-23]

0000	cf 2d 9f 3e fc d2 33 bc 12 68 76 80 81 79 00 9d	...	3	..hv..y..
0000	00 00 09 ff 01 00 01 00 00 17 00 00 16 03 03 12			

Cipher Suite (tls.handshake.ciphersuite), 2 byte(s) | 分组: 140 | 已显示: 60 (42.9%) | 配置

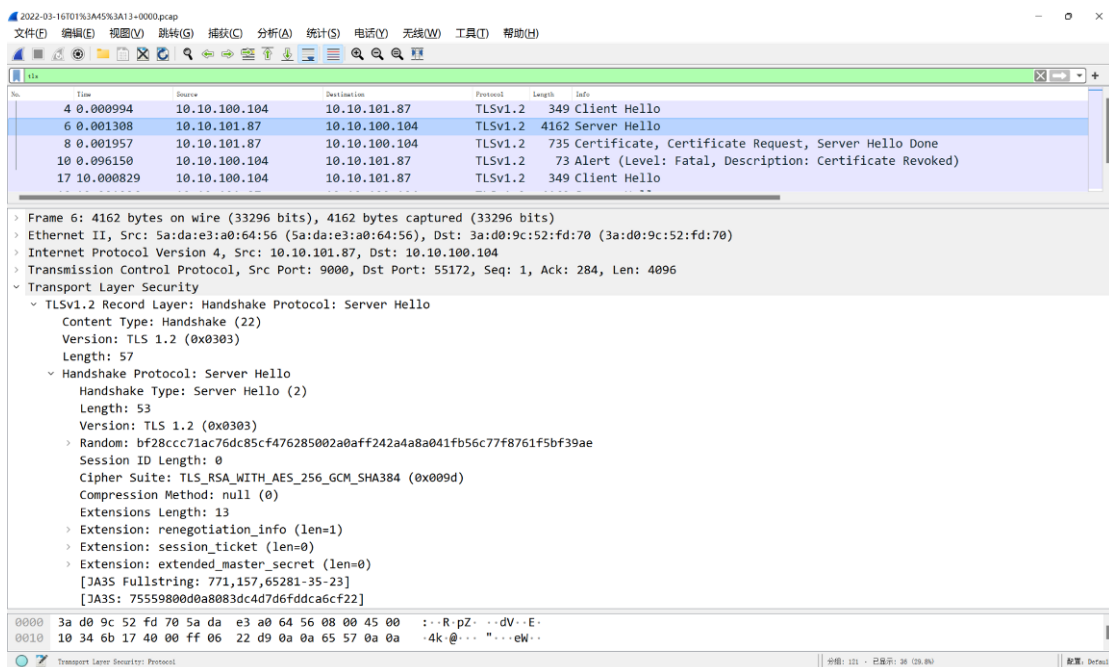
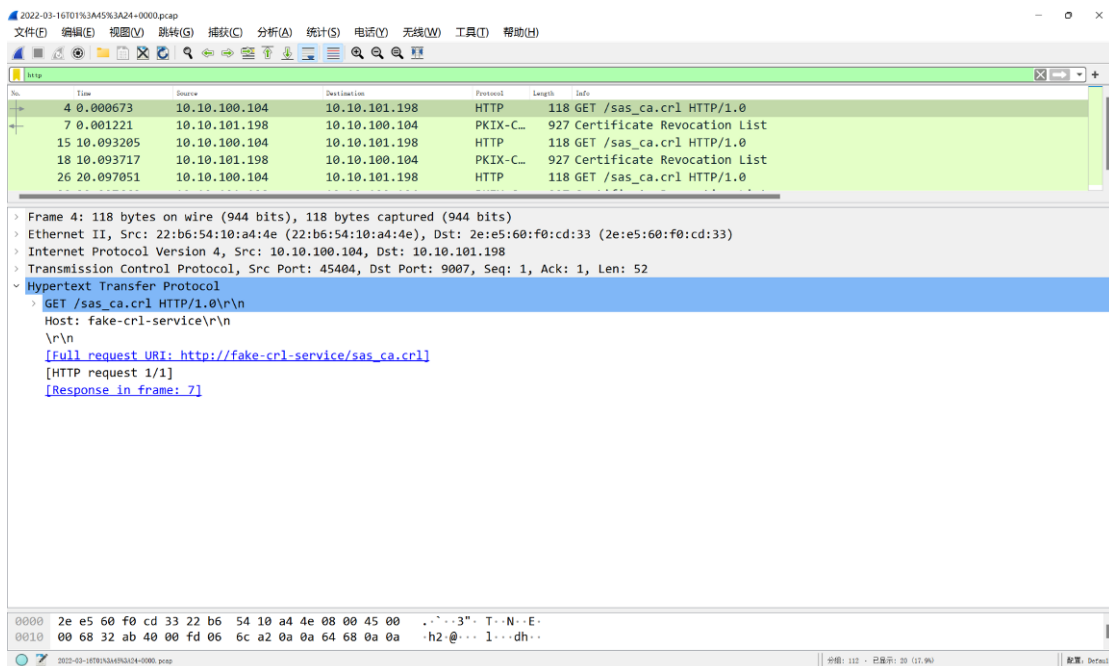


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8.2 WINNF.FT.C.SCS.2



8.3 WINNF.FT.C.SCS.3

2022-03-10T02:3A38%3A59+0000.pcap

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

tls

No.	Time	Source	Destination	Protocol	Length	Info
4	0.004414	10.10.100.227	10.10.101.87	TLSv1.2	583	Client Hello
6	0.004879	10.10.101.87	10.10.100.227	TLSv1.2	4162	Server Hello
8	0.005563	10.10.101.87	10.10.100.227	TLSv1.2	766	Certificate, Certificate Request, Server Hello Done
10	0.006255	10.10.100.227	10.10.101.87	TLSv1.2	73	Alert (Level: Fatal, Description: Certificate Expired)
15	9.998383	10.10.100.227	10.10.101.87	TLSv1.2	583	Client Hello
17	9.998735	10.10.101.87	10.10.100.227	TLSv1.2	4162	Server Hello

> Frame 6: 4162 bytes on wire (33296 bits), 4162 bytes captured (33296 bits)

> Ethernet II, Src: 66:48:e0:c4:62:4e (66:48:e0:c4:62:4e), Dst: 46:82:01:3a:57:2a (46:82:01:3a:57:2a)

> Internet Protocol Version 4, Src: 10.10.101.87, Dst: 10.10.100.227

> Transmission Control Protocol, Src Port: 9000, Dst Port: 49288, Seq: 1, Ack: 518, Len: 4096

> Transport Layer Security

- ↳ TLSv1.2 Record Layer: Handshake Protocol: Server Hello
 - Content Type: Handshake (22)
 - Version: TLS 1.2 (0x0303)
 - Length: 85
- ↳ Handshake Protocol: Server Hello
 - Handshake Type: Server Hello (2)
 - Length: 81
 - Version: TLS 1.2 (0x0303)
 - Random: 9f1e9f753a49a9d99bbe6b1d97533df3f71005efcd5886268159f48a2445c2a7
 - Session ID Length: 32
 - Session ID: 443448f6134d72104bb2ad9b223fb28eb916fb0da11242791b7d2eaea0702638
 - Cipher Suite: TLS_RSA_WITH_AES_256_GCM_SHA384 (0x009d)
 - Compression Method: null (0)
 - Extensions Length: 9
 - ↳ Extension: renegotiation_info (len=1)
 - ↳ Extension: extended_master_secret (len=0)
 - [JA3S Fullstring: 771,157,65281-23]

0080 fb 0d a1 12 42 79 1b 7d 2e ae a0 70 26 38 00 9d ...By:} ...p&8..

0090 00 00 09 ff 01 00 01 00 00 17 00 00 16 03 03 12

Cipher Suite (tls.handshake.ciphersuite), 2 byte(s)

分组: 65 • 已显示: 20 (36.4%)

配置

8.4 WINNF.FT.C.SCS.4

2022-03-01T09:34:53.19+0000.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
4	0.004028	10.10.101.247	10.10.100.88	TLSv1.2	583	Client Hello
6	0.004171	10.10.100.88	10.10.101.247	TLSv1.2	1667	Server Hello, Certificate, Certificate Request, Server Hello Done
8	0.004958	10.10.101.247	10.10.100.88	TLSv1.2	73	Alert (Level: Fatal, Description: Unknown CA)
13	10.009153	10.10.101.247	10.10.100.88	TLSv1.2	583	Client Hello
15	10.009295	10.10.100.88	10.10.101.247	TLSv1.2	1667	Server Hello, Certificate, Certificate Request, Server Hello Done
17	10.010419	10.10.101.247	10.10.100.88	TLSv1.2	73	Alert (Level: Fatal, Description: Unknown CA)

> Frame 6: 1667 bytes on wire (13336 bits), 1667 bytes captured (13336 bits)
> Ethernet II, Src: f2:5b:68:68:5d:57 (f2:5b:68:68:5d:57), Dst: 46:8b:c4:bc:f7:40 (46:8b:c4:bc:f7:40)
> Internet Protocol Version 4, Src: 10.10.100.88, Dst: 10.10.101.247
> Transmission Control Protocol, Src Port: 9000, Dst Port: 40712, Seq: 1, Ack: 518, Len: 1601
✖ Transport Layer Security
 ✖ TLSv1.2 Record Layer: Handshake Protocol: Server Hello
 Content Type: Handshake (22)
 Version: TLS 1.2 (0x0303)
 Length: 85
 ✖ Handshake Protocol: Server Hello
 Handshake Type: Server Hello (2)
 Length: 81
 Version: TLS 1.2 (0x0303)
 Random: 06ea44751df4afad4dc2a0167ad809f9c6ebf958ae4636c305839896863ba40
 Session ID Length: 32
 Session ID: 016f3b181e81362216cd8bf04dbf6ce166758667f035711b8ca4971d7a2fd251
 Cipher Suite: TLS_RSA_WITH_AES_256_GCM_SHA384 (0x009d)
 Compression Method: null (0)
 Extensions Length: 9
 > Extension: renegotiation_info (len=1)
 > Extension: extended_master_secret (len=0)
 [JAB3 Fullstring: 771,157,65281-23]

0080 86 67 f0 35 71 1b 8c a4 97 1d 7a 2f d2 51 00 9d ..g:5q... ..z/Q..
0090 00 00 09 ff 01 00 01 00 00 17 00 00 16 03 03 05
Cipher Suite (tls.handshake.ciphersuite), 2 byte(s) 分组: 27 · 已显示: 9 (33.3%) 配置

2022-03-01T09:34:53.19+0000.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
4	0.004028	10.10.101.247	10.10.100.88	TLSv1.2	583	Client Hello
6	0.004171	10.10.100.88	10.10.101.247	TLSv1.2	1667	Server Hello, Certificate, Certificate Request, Server Hello Done
8	0.004958	10.10.101.247	10.10.100.88	TLSv1.2	73	Alert (Level: Fatal, Description: Unknown CA)
13	10.009153	10.10.101.247	10.10.100.88	TLSv1.2	583	Client Hello
15	10.009295	10.10.100.88	10.10.101.247	TLSv1.2	1667	Server Hello, Certificate, Certificate Request, Server Hello Done
17	10.010419	10.10.101.247	10.10.100.88	TLSv1.2	73	Alert (Level: Fatal, Description: Unknown CA)

> Frame 8: 73 bytes on wire (584 bits), 73 bytes captured (584 bits)
> Ethernet II, Src: 46:8b:c4:bc:f7:40 (46:8b:c4:bc:f7:40), Dst: f2:5b:68:68:5d:57 (f2:5b:68:68:5d:57)
> Internet Protocol Version 4, Src: 10.10.101.247, Dst: 10.10.100.88
> Transmission Control Protocol, Src Port: 40712, Dst Port: 9000, Seq: 518, Ack: 1602, 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 f2 5b 68 68 5d 57 46 8b c4 bc f7 40 08 00 45 00 ..[hh]WF- ...@...
0010 00 3b dd ba 40 00 fd 06 c1 9e 0a 0a 65 f7 0a 0a ...;-@... ..e...
2022-03-01T09:34:53.19+0000.pcap 分组: 27 · 已显示: 9 (33.3%) 配置



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8.5 WINNF.FT.C.SCS.5

No.	Time	Source	Destination	Protocol	Length	Info
4	0.086253	10.10.101.242	10.10.100.104	TLSv1.2	583	Client Hello
6	0.086748	10.10.100.104	10.10.101.242	TLSv1.2	4162	Server Hello
8	0.087405	10.10.100.104	10.10.101.242	TLSv1.2	747	Certificate, Certificate Request, Server Hello Done
10	0.088447	10.10.101.242	10.10.100.104	TLSv1.2	73	Alert (Level: Fatal, Description: Decrypt Error)
17	9.985884	10.10.101.242	10.10.100.104	TLSv1.2	583	Client Hello
19	9.986261	10.10.100.104	10.10.101.242	TLSv1.2	4162	Server Hello

Frame 6: 4162 bytes on wire (33296 bits), 4162 bytes captured (33296 bits) on interface 0
Ethernet II, Src: 66:78:02:2c:59:9c (66:78:02:2c:59:9c), Dst: 02:a7:95:cf:ba:d6 (02:a7:95:cf:ba:d6)
Internet Protocol Version 4, Src: 10.10.100.104, Dst: 10.10.101.242
Transmission Control Protocol, Src Port: 9000, Dst Port: 41958, Seq: 1, Ack: 518, Len: 4096
Transport Layer Security
 TLSv1.2 Record Layer: Handshake Protocol: Server Hello
 Content Type: Handshake (22)
 Version: TLS 1.2 (0x0303)
 Length: 85
 Handshake Protocol: Server Hello
 Handshake Type: Server Hello (2)
 Length: 81
 Version: TLS 1.2 (0x0303)
 Random: 0b24cc6e31ff12f2a5e2a7de89030f5a89b95e149957f39adf2582e0c1e88416
 Session ID Length: 32
 Session ID: a01507953aa949ff609272582450a5d415f40f3b1d60d491b2c42431c8fa4a9c
 Cipher Suite: TLS_RSA_WITH_AES_256_GCM_SHA384 (0x009d)
 Compression Method: null (0)
 Extensions Length: 9
 Extension: renegotiation_info (len=1)
 Extension: extended_master_secret (len=0)
 [JA3S Fullstring: 771,157,65281-23]

0080 0f 3b 1d 60 d4 91 b2 c4 24 31 c8 fa 4a 9c 00 9d ..j.....\$1..J..
0090 00 00 09 ff 01 00 01 00 00 17 00 00 16 03 03 12
Cipher Suite (tls.handshake.ciphersuite), 2 byte(s)

9 Photographs

9.1 EUT Constructional Details (EUT Photos)

Please Refer to Integral and internal photos for details.

- End of the Report -



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