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# **TEST REPORT**

Test Result:	Pass*
Date of Issue:	2022-11-22
Date of Test:	2022-10-17 to 2022-11-21
Date of Receipt:	2022-10-17
	KDB 940660 D01 V03
	FCC 47 CFR Part 96
	WINNF-TS-0122-V1.0.2
Standard(s):	CBRSA-TS-9001-V1.2.1
Model No.:	CPX60P
EUT Name:	5G CPE
Equipment Under Test (EU	Т):
Address of Manufacturer:	14600 Industry Circle La Mirada, CA 90638
Manufacturer:	BTI Wireless
Address of Applicant:	14600 Industry Circle La Mirada, CA 90638
Applicant:	BTI Wireless
FCC ID:	WBKCPX60P
Application No.:	KSCR2210001952AT

\* In the configuration tested, the EUT complied with the standards specified above.

Ena fri

Eric Lin Laboratory Manager



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Revision Record			
Version	Description	Date	Remark
00	Original	2022-11-22	/

Authorized for issue by:		
	cloudpeng	
	Cloud Peng / Project Engineer	
	Enie fri	
	Eric Lin / Reviewer	



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### **Test Summary**

Item	Standard	Test Case ID	Result
Multi-Step registration	WINNF-TS-0122- V1.0.2	WINNF.FT.C.REG.1	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 Grant Renewal in Heartbeat Test Case	WINNF-TS-0122- V1.0.2	WINNF.FT.C.HBT.11	Pass



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

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

### Test standards:

CBRSA-TS-9001-V1.0.0

CBRS Alliance Certification Test Plan

### WINNF-TS-0122-V1.0.2

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

### KDB 940660 D01 Part 96 CBRS Eqpt v03



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### 4 General Information

4.1	Details of E.U.T.		
	Power supply: 12.0V DC by Adapter		
		Adapter Model:TPA289-24120-US	
		Input:100-240V~50/60Hz,0.7A	
		Output: DC 12V 2A	
	Cable(s):	1.0m LAN Cable	
	Serial Number of Tested EUT:	CPX60P-V2N220004WKT	
CBSD Class: Category A CBSD		Category A CBSD	
Transmitter Frequency Band: N48/n78(3550-3700MHz)		N48/n78(3550-3700MHz)	
	Transmitter Frequency Range:	3550~3700MHz	
Hardware Version: V1.0		V1.0	
	Software Version:	CPX60P-V2-PC4P-V2.1.10	
	Test sample:	CPX60P-V2N220004WKT	
	Antenna Gain: Ant1:4.9dBi		
		Ant2:5.8dBi	
	MIMO Type:	2T2R	

Note: EUT Support ULMIMO Only

### 4.2 Description of CBSD/DP Support Features

Condition	Feature Description	Supported
C1	Mandatory for UUT which supports multi-step registration message.	Y
C2	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.	
C3	Mandatory for UUT which supports single-step registration containing CPI- signed data in the registration message.	
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.		Y
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)	31	31	100
PT (CBSD, DP/CBSD)	1	1	100
Total	32	32	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.

Duration and Duty Cycle		
Period	Limit	Test Result
10-second	1-second	Pass
300-second	10-second	Pass
3600-second	20-second	Pass

Note: limited in duration and duty cycle to the minimum time necessary to get a grant from the SAS; this time should not exceed 1 second within any 10-second period, 10seconds within any 300-second period, or 20 seconds within any 3600-second period.

### 4.4 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Radio Frequency	± 7.25 x 10 <sup>-8</sup>
2	RF conducted power	± 0.75dB
3	Temperature test	± 1°C
4	Humidity test	± 3%
5	Supply voltages	± 1.5%
6	Time	± 3%



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### 4.5 Description of Support Units

Description	Manufacturer	Model No.	Serial No.
5GC	astir	astir_5GC	A372768X0507398
Router	TP-Link	TL-R860+	1175379002425
Base Band Unit	BTI	sCELL- G52091NAX	L603JESE1I
Remote Radio Unit	BTI	RU4370 (FCC ID: WBKRU4370)	C0214921000004S

### 4.6 Test Location

All tests were performed at: Compliance Certification Services (Kunshan) Inc. No.10 Weiye Rd, Innovation park, Eco&Tec, Development Zone, Kunshan City, Jiangsu, China. Tel: +86 512 5735 5888 Fax: +86 512 5737 0818 No tests were sub-contracted.



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### 4.7 Test Facility

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

### CNAS (No. CNAS L4354)

CNAS has accredited Compliance Certification Services (Kunshan) Inc. to ISO/IEC 17025:2017 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

### • A2LA (Certificate No. 2541.01)

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

### • FCC (Designation Number: CN1172)

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

Designation Number: CN1172.

### • ISED (CAB identifier: CN0072)

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

Company Number: 2324E

### • VCCI (Member No.: 1938)

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

### 4.8 Deviation from Standards

None

### 4.9 Abnormalities from Standard Conditions

None



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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	KUS2001M00 1-2	2022/8/22	2023/8/21
Shield Room	研创	N/A	KS301115-2	N/A	N/A
Coaxial Cable	Thermax	N/A	13	2022/9/16	2023/9/15
Attenuator	Mini-Circuits	NAT-6-2W	15542-1	N.C.R.	N.C.R.
Humidity / Temperature Indicator	Renke	RS-WS- N01-6J	1032844	2022/4/1	2023/3/31



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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 Test Harness.
- d. Each test case results were recorded and validated by SAS Test Harness system and RF instruments test cases was recorded test results from SAS Test Harness system.

### 6.3 Test Environment

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



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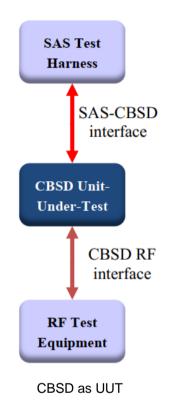
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6.4 Test Setup





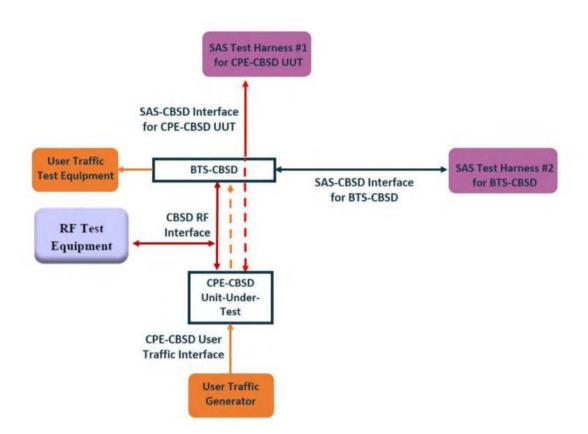
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Test Report Form Version: Rev01



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



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### 7 Test Data

### 7.1 CBSD Registration Process

### 7.1.1 WINNF.FT.C.REG.1

#	Test Execution Steps	Res	sults
1	<ul> <li>Ensure the following conditions are met for test entry:</li> <li>UUT has successfully completed SAS Discovery and Authentication with the SAS Test Harness</li> <li>UUT is in the Unregistered state</li> </ul>		
2	<ul> <li>CBSD sends correct Registration request information, as specified in [n.5], to the SAS Test Harness:</li> <li>The required userId, fccId and cbsdSerialNumber registration parameters shall be sent from the CBSD and conform to proper format and acceptable ranges.</li> <li>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.</li> <li>Note: It is outside the scope of this document to test the Registration information that is supplied via another means.</li> </ul>	∎ Pass	□ Fail
3	SAS Test Harness sends a CBSD Registration Response as follows: - cbsdId = C - measReportConfig shall not be included - responseCode = 0		
4	After completion of step 3, SAS Test Harness will not provide any positive response (responseCode=0) to further request messages from the UUT.		
5	<ul> <li>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:</li> <li>UUT shall not transmit RF</li> </ul>	∎ Pass	□ Fail



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### 7.1.2 WINNF.FT.C.REG.8

#	Test Execution Steps	Res	sults
1	<ul> <li>Ensure the following conditions are met for test entry:</li> <li>UUT has successfully completed SAS Discovery and Authentication with SAS Test Harness</li> <li>UUT is in the Unregistered state</li> </ul>		
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> <li>SAS response does not include cbsdld</li> <li>responseCode = 102</li> </ul>		
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	<ul> <li>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:</li> <li>UUT shall not transmit RF</li> </ul>	∎ Pass	□ Fail



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### 7.1.3 WINNF.FT.C.REG.10

#	Test Execution Steps	Res	sults
1	<ul> <li>Ensure the following conditions are met for test entry:</li> <li>UUT has successfully completed SAS Discovery and Authentication with SAS Test Harness</li> <li>UUT is in the Unregistered state</li> </ul>		
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> <li>SAS response does not include cbsdld</li> <li>responseCode = 200</li> </ul>		
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	<ul> <li>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:</li> <li>UUT shall not transmit RF</li> </ul>	∎ Pass	□ Fail



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### 7.1.4 WINNF.FT.C.REG.12

#	Test Execution Steps	Res	sults
1	<ul> <li>Ensure the following conditions are met for test entry:</li> <li>UUT has successfully completed SAS Discovery and Authentication with SAS Test Harness</li> <li>UUT is in the Unregistered state</li> </ul>		
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> <li>SAS response does not include cbsdld</li> <li>responseCode = 103</li> </ul>		
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	<ul> <li>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:</li> <li>UUT shall not transmit RF</li> </ul>	∎ Pass	□ Fail



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### 7.1.5 WINNF.FT.C.REG.14

#	Test Execution Steps	Res	sults
1	<ul> <li>Ensure the following conditions are met for test entry:</li> <li>UUT has successfully completed SAS Discovery and Authentication with SAS Test Harness</li> <li>UUT is in the Unregistered state</li> </ul>		
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> <li>SAS response does not include cbsdld</li> <li>responseCode = 101</li> </ul>		
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	<ul> <li>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:</li> <li>UUT shall not transmit RF</li> </ul>	∎ Pass	□ Fail



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### 7.1.6 WINNF.FT.C.REG.16

#	Test Execution Steps	Res	sults
1	<ul> <li>Ensure the following conditions are met for test entry:</li> <li>UUT has successfully completed SAS Discovery and Authentication with SAS Test Harness</li> <li>UUT is in the Unregistered state</li> </ul>		
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> <li>SAS response does not include cbsdld</li> <li>responseCode = 100</li> </ul>		
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	<ul> <li>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:</li> <li>UUT shall not transmit RF</li> </ul>	∎ Pass	□ Fail



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### 7.1.7 WINNF.FT.C.REG.18

#	Test Execution Steps	Res	sults
1	<ul> <li>Ensure the following conditions are met for test entry:</li> <li>UUT has successfully completed SAS Discovery and Authentication with SAS Test Harness</li> <li>UUT is in the Unregistered state</li> </ul>		
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> <li>SAS response does not include cbsdld</li> <li>responseCode = 201</li> </ul>		
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	<ul> <li>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:</li> <li>UUT shall not transmit RF</li> </ul>	∎ Pass	□ Fail



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### 7.2 CBSD Spectrum Grant Process

### 7.2.1 WINNF.FT.C.GRA.1

#	Test Execution Steps	Res	sults
1	<ul> <li>Ensure the following conditions are met for test entry:</li> <li>UUT has registered successfully with SAS Test Harness, with cbsdld = C</li> </ul>		
2	UUT sends valid Grant Request.	∎ Pass	□ Fail
3	<ul> <li>SAS Test Harness sends a Grant Response message, including</li> <li>cbsdld=C         <ul> <li>responseCode = 400</li> </ul> </li> </ul>		
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	<ul> <li>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:</li> <li>UUT shall not transmit RF</li> </ul>	∎ Pass	□ Fail



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### 7.2.2 WINNF.FT.C.GRA.2

#	Test Execution Steps	Res	sults
1	<ul> <li>Ensure the following conditions are met for test entry:</li> <li>UUT has registered successfully with SAS Test Harness, with cbsdld = C</li> </ul>		
2	UUT sends valid Grant Request.	∎ Pass	□ Fail
3	SAS Test Harness sends a Grant Response message, including - cbsdld=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	<ul> <li>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:</li> <li>UUT shall not transmit RF</li> </ul>	<b>■</b> Pass	□ Fail



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### 7.3 CBSD HeartBeat Process

### 7.3.1 WINNF.FT.C.HBT.1

#	Test Execution Steps	Res	sults
1	<ul> <li>Ensure the following conditions are met for test entry:</li> <li>UUT has registered successfully with SAS Test Harness, with cbsdld = C</li> </ul>		
2	<ul> <li>UUT sends a message:</li> <li>If message is type Spectrum Inquiry Request, go to step 3, or</li> <li>If message is type Grant Request, go to step 5</li> </ul>		
3	<ul> <li>UUT sends Spectrum Inquiry Request. Validate:</li> <li>cbsdld = C</li> <li>List of frequencyRange objects sent by UUT are within the CBRS frequency range</li> </ul>	∎ Pass	□ Fail
4	<ul> <li>SAS Test Harness sends a Spectrum Inquiry Response message, including the following parameters:</li> <li>cbsdld = C</li> <li>availableChannel is an array of availableChannel objects</li> <li>responseCode = 0</li> </ul>		-
5	<ul> <li>UUT sends Grant Request message. Validate:</li> <li>cbsdld = C</li> <li>maxEIRP is at or below the limit appropriate for CBSD category as defined by Part 96</li> <li>operationFrequencyRange, F, sent by UUT is a valid range within the CBRS band</li> </ul>	∎ Pass	□ Fail
6	<ul> <li>SAS Test Harness sends a Grant Response message, including the parameters:</li> <li>cbsdld = C</li> <li>grantId = G = a valid grant ID</li> <li>grantExpireTime = UTC time greater than duration of the test</li> <li>responseCode = 0</li> </ul>		
7	<ul> <li>UUT sends a first Heartbeat Request message.</li> <li>Verify Heartbeat Request message is formatted correctly, including:</li> <li>cbsdld = C</li> <li>grantld = G</li> <li>operationState = "GRANTED"</li> </ul>	∎ Pass	□ Fail
8	<ul> <li>SAS Test Harness sends a Heartbeat Response message, with the following parameters:</li> <li>cbsdld = C</li> <li>grantld = G</li> <li>transmitExpireTime = current UTC time + 200 seconds</li> <li>responseCode = 0</li> </ul>		



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9	<ul> <li>For further Heartbeat Request messages sent from UUT after completion of step 8, validate message is sent within latest specified heartbeatInterval, and:</li> <li>cbsdld = C</li> <li>grantId = G</li> <li>operationState = "AUTHORIZED"</li> <li>and SAS Test Harness responds with a Heartbeat Response message including the following parameters:</li> <li>cbsdld = C</li> <li>grantId = G</li> <li>cbsdld = C</li> <li>grantId = G</li> <li>responseCode = 0</li> </ul>	∎ Pass	□ Fail
10	<ul> <li>Monitor the RF output of the UUT from start of test until UUT transmission commences. Verify:</li> <li>UUT does not transmit at any time prior to completion of the first heartbeat response</li> <li>UUT transmits after step 8 is complete, and its transmission is limited to within the bandwidth range F.</li> </ul>	∎ Pass	□ Fail



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		Spectrum Plo	ot	
Marker 1 3.623280000	AC 1000 GHz PNO: Fast		rg Type: RMS TR/ g Hold: 54/100 T נ	PM Nov 18, 2022 ACE 1 2 3 4 5 6 YPE M WWWWW DET A NNNN Select Trace
10 dB/div Ref 20.00 dB	m		Mkr1 3.623 -0.4	3 28 GHz 1 459 dBm
10.0		<u>^1</u>		Clear Write
-10.0				Trace Average
-20.0				Max Hold
-40.0				Min Hold
-60.0				View Blank Trace On
Center 3.6000 GHz #Res BW 1.0 MHz		3.0 MHz*	Span #Sweep 100.0 ms (	200.0 MHz 1 of 3 (10001 pts)

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### 7.3.2 WINNF.FT.C.HBT.3

#	Test Execution Steps	Res	sults
1	<ul> <li>Ensure the following conditions are met for test entry:</li> <li>UUT has registered successfully with SAS Test Harness</li> <li>UUT has a valid single grant as follows:</li> <li>valid cbsdld = C</li> <li>valid grantId = G</li> <li>grant is for frequency range F, power P</li> <li>grantExpireTime = UTC time greater than duration of the test</li> <li>UUT is in AUTHORIZED state and is transmitting within the grant bandwidth F on RF interface</li> </ul>		
2	<ul> <li>UUT sends a Heartbeat Request message.</li> <li>Ensure Heartbeat Request message is sent within Heartbeat Interval specified in the latest Heartbeat Response, and formatted correctly, including:</li> <li>cbsdld = C</li> <li>grantId = G</li> <li>operationState = "AUTHORIZED"</li> </ul>		
3	<ul> <li>SAS Test Harness sends a Heartbeat Response message, including the following parameters:</li> <li>cbsdld = C</li> <li>grantld = G</li> <li>transmitExpireTime = T = Current UTC time</li> <li>responseCode = 105 (DEREGISTER)</li> </ul>		
4	After completion of step 3, SAS Test Harness shall not allow any further grants to the UUT.		
5	<ul> <li>Monitor the RF output of the UUT. Verify:</li> <li>UUT shall stop transmission within (T + 60 seconds) of completion of step 3</li> </ul>	∎ Pass	□ Fail



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### 7.3.3 WINNF.FT.C.HBT.4

#	Test Execution Steps	Res	sults
1	<ul> <li>Ensure the following conditions are met for test entry:</li> <li>UUT has registered successfully with SAS Test Harness</li> <li>UUT has a valid single grant as follows: <ul> <li>valid cbsdld = C</li> <li>valid grantId = G</li> <li>grant is for frequency range F, power P</li> <li>grantExpireTime = UTC time greater than duration of the test</li> </ul> </li> <li>UUT is in AUTHORIZED state and is transmitting within the grant bandwidth F on RF interface</li> </ul>		
2	<ul> <li>UUT sends a Heartbeat Request message.</li> <li>Ensure Heartbeat Request message is sent within latest specified heartbeatInterval, and is formatted correctly, including:</li> <li>cbsdld = C</li> <li>grantId = G</li> <li>operationState = "AUTHORIZED"</li> </ul>	∎ Pass	□ Fail
3	<ul> <li>SAS Test Harness sends a Heartbeat Response message, including the following parameters:</li> <li>cbsdld = C</li> <li>grantId = G</li> <li>transmitExpireTime = T = current UTC time</li> <li>responseCode = 500 (TERMINATED_GRANT)</li> </ul>		
4	After completion of step 3, SAS Test Harness shall not allow any further grants to the UUT.		
5	<ul> <li>Monitor the RF output of the UUT. Verify:</li> <li>UUT shall stop transmission within (T + 60 seconds) of completion of step 3</li> </ul>	∎ Pass	□ Fail



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### 7.3.4 WINNF.FT.C.HBT.5

#	Test Execution Steps	Res	sults
1	<ul> <li>Ensure the following conditions are met for test entry:</li> <li>UUT has registered successfully with SAS Test Harness</li> <li>UUT has a valid single grant as follows: <ul> <li>valid cbsdld = C</li> <li>valid grantId = G</li> <li>grant is for frequency range F, power P</li> <li>grantExpireTime = UTC time greater than duration of the test</li> </ul> </li> <li>UUT is in GRANTED, but not AUTHORIZED state (i.e. has not performed its first Heartbeat Request)</li> </ul>	-	
2	<ul> <li>UUT sends a Heartbeat Request message.</li> <li>Verify Heartbeat Request message is formatted correctly, including:</li> <li>cbsdld = C</li> <li>grantId = G</li> <li>operationState = "GRANTED"</li> </ul>	∎ Pass	□ Fail
3	<ul> <li>SAS Test Harness sends a Heartbeat Response message, including the following parameters:</li> <li>cbsdld = C</li> <li>grantId = G</li> <li>transmitExpireTime = T = current UTC time</li> <li>?responseCode = 501 (SUSPENDED_GRANT)</li> </ul>		
4	After completion of step 3, SAS Test Harness shall not allow any further grants to the UUT.		
	<ul> <li>Monitor the SAS-CBSD interface. Verify either A OR B occurs:</li> <li>A. UUT sends a Heartbeat Request message. Ensure message is sent within latest specified heartbeatInterval, and is correctly formatted with parameters:</li> <li>cbsdld = C</li> <li>grantId = G</li> <li>operationState = "GRANTED"</li> </ul>	∎ Pass	□ Fail
5	<ul> <li>B. UUT sends a Relinquishment request message. Ensure message is correctly formatted with parameters:</li> <li>cbdsId = C</li> <li>grantId = G</li> <li>Monitor the RF output of the UUT. Verify:</li> <li>UUT does not transmit at any time</li> </ul>		



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#### 7.3.5 WINNF.FT.C.HBT.6

#	Test Execution Steps	Res	sults
1	<ul> <li>Ensure the following conditions are met for test entry:</li> <li>UUT has registered successfully with SAS Test Harness</li> <li>UUT has a valid single grant as follows: <ul> <li>valid cbsdId = C</li> <li>valid grantId = G</li> <li>grant is for frequency range F, power P</li> <li>grantExpireTime = UTC time greater than duration of the test</li> </ul> </li> <li>UUT is in AUTHORIZED state and is transmitting within the grant bandwidth F on RF interface</li> </ul>		
2	<ul> <li>UUT sends a Heartbeat Request message.</li> <li>Ensure Heartbeat Request message is sent within latest specified heartbeatInterval, and is formatted correctly, including:</li> <li>cbsdld = C</li> <li>grantId = G</li> <li>operationState = "AUTHORIZED"</li> </ul>	∎ Pass	□ Fail
3	<pre>SAS Test Harness sends a Heartbeat Response message, including the following parameters:     cbsdld = C     grantId = G     transmitExpireTime = T = current UTC time     responseCode = 501 (SUSPENDED_GRANT)</pre>		
4	After completion of step 3, SAS Test Harness shall not allow any further grants to the UUT.		
5	<ul> <li>Monitor the SAS-CBSD interface. Verify either A OR B occurs:</li> <li>A. UUT sends a Heartbeat Request message. Ensure message is sent within latest specified heartbeatInterval, and is correctly formatted with parameters:</li> <li>cbsdld = C</li> <li>grantld = G</li> <li>operationState = "GRANTED"</li> </ul> B. UUT sends a Relinquishment request message. Ensure message is correctly formatted with parameters: <ul> <li>cbdsld = C</li> <li>grantld = G</li> <li>operationState = "GRANTED"</li> </ul> B. UUT sends a Relinquishment request message. Ensure message is correctly formatted with parameters: <ul> <li>cbdsld = C</li> <li>grantld = G</li> </ul> Monitor the RF output of the UUT. Verify: <ul> <li>UUT shall stop transmission within (T+60) seconds of completion of step 3</li> </ul>	∎ Pass	□ Fail



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#### 7.3.6 WINNF.FT.C.HBT.7

#	Test Execution Steps	Res	sults
1	<ul> <li>Ensure the following conditions are met for test entry:</li> <li>UUT has registered successfully with SAS Test Harness</li> <li>UUT has a valid single grant as follows: <ul> <li>valid cbsdld = C</li> <li>valid grantId = G</li> <li>grant is for frequency range F, power P</li> <li>grantExpireTime = UTC time greater than duration of the test</li> </ul> </li> <li>UUT is in AUTHORIZED state and is transmitting within the grant bandwidth F on RF interface</li> </ul>		
2	<ul> <li>UUT sends a Heartbeat Request message.</li> <li>Ensure Heartbeat Request message is sent within latest specified heartbeatInterval, and is formatted correctly, including:</li> <li>cbsdld = C</li> <li>grantId = G</li> <li>operationState = "AUTHORIZED"</li> </ul>	∎ Pass	□ Fail
3	SAS Test Harness sends a Heartbeat Response message, including the following parameters: cbsdld = 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	<ul> <li>Monitor the SAS-CBSD interface. Verify:</li> <li>UUT sends a Grant Relinquishment Request message. Verify message is correctly formatted with parameters:         <ul> <li>cbsdld = C</li> <li>grantId = G</li> </ul> </li> <li>Monitor the RF output of the UUT. Verify:         <ul> <li>UUT shall stop transmission within (T+60) seconds of completion of step 3</li> </ul> </li> </ul>	∎ Pass	□ Fail



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#### 7.3.7 WINNF.FT.C.HBT.9

#	Test Execution Steps	Res	sults
1	<ul> <li>Ensure the following conditions are met for test entry:</li> <li>UUT has registered successfully with SAS Test Harness</li> <li>UUT has a valid single grant as follows: <ul> <li>valid cbsdld = C</li> <li>valid grantld = G</li> <li>grant is for frequency range F, power P</li> <li>grantExpireTime = UTC time greater than duration of the test</li> </ul> </li> <li>UUT is in GRANTED, but not AUTHORIZED state(i.e. has not performed its first Heartbeat Request)</li> </ul>		-
2	<ul> <li>UUT sends a Heartbeat Request message.</li> <li>Ensure Heartbeat Request message is sent within latest specified heartbeatInterval, and is formatted correctly, including:</li> <li>cbsdld = C</li> <li>grantId = G</li> <li>operationState = "GRANTED"</li> </ul>	∎ Pass	□ Fail
3	<ul> <li>After completion of step 2, SAS Test Harness does not respond to any further</li> <li>messages from UUT to simulate loss of network connection</li> </ul>		
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	Res	sults
1	<ul> <li>Ensure the following conditions are met for test entry:</li> <li>UUT has registered successfully with SAS Test Harness</li> <li>UUT has a valid single grant as follows: <ul> <li>valid cbsdld = C</li> <li>valid grantId = G</li> <li>grant is for frequency range F, power P</li> <li>grantExpireTime = UTC time greater than duration of the test</li> </ul> </li> <li>UUT is in AUTHORIZED state and is transmitting within the grant bandwidth F</li> </ul>		
2	on RF interface UUT sends a Heartbeat Request message. Verify Heartbeat Request message is sent within latest specified heartbeatInterval, and is formatted correctly, including: • cbsdld = C • grantId = G • operationState = "AUTHORIZED"	∎ Pass	□ Fail
3	SAS Test Harness sends a Heartbeat Response message, including the following parameters: cbsdld = 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	<ul> <li>Monitor the RF output of the UUT. Verify:</li> <li>UUT shall stop all transmission on RF interface within (transmitExpireTime + 60 seconds), using the transmitExpireTime sent in Step 3.</li> </ul>	∎ Pass	□ Fail



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#### 7.3.9 WINNF.FT.C.HBT.11

#	Test Execution Steps	Res	sults
1	<ul> <li>Ensure the following conditions are met for test entry:</li> <li>UUT has registered successfully with SAS Test Harness</li> <li>UUT has a valid single grant as follows: <ul> <li>valid cbsdld = C</li> <li>valid grantld = G</li> <li>grant is for frequency range F, power P</li> </ul> </li> <li>UUT is in AUTHORIZED state and is transmitting within the grant bandwidth F on RF interface.</li> <li>Grant has the following parameters at the start of the test: <ul> <li>grantExpireTime =UTC time equal to time at start of test + 300 seconds = Tgrant_expire</li> <li><i>transmitExpireTime</i> = UTC time equal to time at start of test + 200 seconds</li> <li><i>heartbeatInterval</i> = 60 seconds</li> </ul> </li> </ul>		
2	UUT sends a Heartbeat Request message. If Heartbeat Request message contains grantRenew = TRUE, go to Step 6, else go to Step 3.		
3	<ul> <li>Verify Heartbeat Request message is sent within the latest specified heartbeatInterval, and is formatted correctly, including:</li> <li>cbsdld = C</li> <li>grantId = G</li> <li>operationState = "AUTHORIZED"</li> </ul>	∎ Pass	□ Fail
4	<ul> <li>SAS Test Harness sends a Heartbeat Response message, with the following parameters:</li> <li>cbsdld = C</li> <li>grantId = G</li> <li>transmitExpireTime = current UTC + 200 seconds</li> <li>grantExpireTime = same as Step 1</li> <li>responseCode = 0</li> </ul>		
5	Go to Step 2		
6	<ul> <li>Verify Heartbeat Request message is sent within the latest specified heartbeatInterval, and is formatted correctly, including:</li> <li>cbsdld = C</li> <li>grantId = G</li> <li>operationState = "AUTHORIZED"</li> <li>grantRenew = TRUE</li> </ul>	∎ Pass	□ Fail
7	<ul> <li>SAS Test Harness sends a Heartbeat Response message, with the following parameters:</li> <li>cbsdld = C</li> <li>grantId = G</li> <li>grantExpireTime = UTC time set far in the future</li> <li>transmitExpireTime = current UTC time + 200 seconds</li> <li>responseCode = 0</li> </ul>		
8	Continue to respond to any subsquentHeartbeat Request from CBSD with Heartbeat		



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	Response with the following parameters: <ul> <li>cbsdld = C</li> <li>grantld = G</li> <li>transmitExpireTime = same as Step 7</li> <li>responseCode = 0</li> </ul>		
9	Monitor RF transmission of UUT from start of test until Tgrant_expire + 60 seconds and ensure UUT continues to transmit throughout the time period.	∎ Pass	□ Fail

### 7.4 CBSD Measurement Report

### 7.4.1 WINNF.FT.C.MES.3

#	Test Execution Steps	Res	sults
1	<ul> <li>Ensure the following conditions are met for test entry:</li> <li>UUT has successfully completed SAS Discovery and Authentication with SAS Test Harness</li> <li>UUT has successfully registered with SAS Test Harness, with cbsdld=C and measCapability =     "RECEIVED_POWER_WITH_GRANT"</li> </ul>		
2	<ul> <li>UUT sends a Grant Request message.</li> <li>Verify Grant Request message contains all required parameters properly formatted, and specifically:</li> <li>cbsdld = C</li> <li>operationParam is present and format is valid</li> </ul>	∎ Pass	□ Fail
3	<ul> <li>SAS Test Harness sends a Grant Response message, with the following parameters:</li> <li>cbsdld = C</li> <li>grantld = G = valid grant ID</li> <li>grantExpireTime = UTC time in the future</li> <li>heartbeatInterval = 60 seconds</li> <li>measReportConfig= "RECEIVED_POWER_WITH_GRANT"</li> <li>operationParam is set to valid operating parameters</li> <li>channelType = "GAA"</li> <li>responseCode = 0</li> </ul>		-
4	UUT sends a Heartbeat Request message. Verify message contains all required parameters properly formatted, and specifically: • cbsdld = C • grantId = G • operationState = "GRANTED"	∎ Pass	□ Fail
5	<ul> <li>If Heartbeat Request message (step 4) contains measReport object, then:</li> <li>verify measReport is properly formatted as object rcvdPowerMeasReport</li> <li>end test, with PASS result</li> <li>else, if Heartbeat Request message (step 4) does not contain measReport object, then:</li> <li>If number of Heartbeat Requests sent by UUT after Step 3 is =5, then stop test with result of FAIL</li> </ul>	∎ Pass	□ Fail



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6	<ul> <li>SAS Test Harness sends a Heartbeat Response message, containing all required parameters properly formatted, and specifically:</li> <li>cbsdld = C</li> <li>grantld = G</li> <li>transmitExpireTime = current UTC time + 200 seconds</li> <li>responseCode = 0</li> <li>Go to Step 4, above</li> </ul>			
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### 7.4.2 WINNF.FT.C.MES.4

#	Test Execution Steps	Res	sults
1	<ul> <li>Ensure the following conditions are met for test entry:</li> <li>UUT has successfully completed SAS Discovery and Authentication with SAS Test Harness</li> <li>UUT has successfully registered with SAS Test Harness, with cbsdld=C and measCapability = "RECEIVED_POWER_WITH_GRANT"</li> <li>UUT has received a valid grant with grantId = G</li> <li>UUT is in Grant State AUTHORIZED and is actively transmitting within the bounds of its grant.</li> <li>Grant has heartbeatInterval = 60 seconds</li> </ul>		
2	<ul> <li>UUT sends a Heartbeat Request message.</li> <li>Verify Heartbeat Request message contains all required parameters properly formatted, and specifically: <ul> <li>cbsdld = C</li> <li>grantld = G</li> <li>operationState = "AUTHORIZED"</li> </ul> </li> </ul>	∎ Pass	□ Fail
3	<ul> <li>SAS Test Harness sends a Heartbeat Response message, containing all required parameters properly formatted, and specifically:</li> <li>cbsdld = C</li> <li>grantld = G</li> <li>measReportConfig= "RECEIVED_POWER_WITH_GRANT"</li> <li>responseCode = 0</li> </ul>		
4	<ul> <li>UUT sends a Heartbeat Request message. Verify message contains all required parameters properly formatted, and specifically:</li> <li>cbsdld = C</li> <li>grantId = G</li> <li>operationState = "AUTHORIZED"</li> </ul>	∎ Pass	□ Fail
5	<ul> <li>If Heartbeat Request message (step 4) contains measReport object, then:</li> <li>verify measReport is properly formatted as object</li> <li>rcvdPowerMeasReport</li> <li>end test, with PASS result</li> <li>else, if Heartbeat Request message (step 4) does not contain measReport object, then:</li> <li>If number of Heartbeat Requests sent by UUT after Step 3 is = 5, then stop test with result of FAIL</li> </ul>	∎ Pass	□ Fail
6	<ul> <li>SAS Test Harness sends a Heartbeat Response message, containing all required parameters properly formatted, and specifically:</li> <li>cbsdld = C</li> <li>grantld = G</li> <li>responseCode = 0</li> <li>Go to Step 4, above</li> </ul>		



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### 7.5 CBSD Relinquishment Process

### 7.5.1 WINNF.FT.C.RLQ.1

#	Test Execution Steps	Res	sults
1	<ul> <li>Ensure the following conditions are met for test entry:</li> <li>UUT has successfully completed SAS Discovery and Authentication with SAS Test Harness</li> <li>UUT has successfully registered with SAS Test Harness, with cbsdld=C</li> <li>UUT has received a valid grant with grantld = G</li> <li>UUT is in Grant State AUTHORIZED and is actively transmitting within the bounds of its grant.</li> <li>Invoke trigger to relinquish UUT Grant from the SAS Test Harness</li> </ul>		
2	<ul> <li>UUT sends a Relinquishment Request message. Verify message contains all required parameters properly formatted, and specifically:</li> <li>cbsdld = C</li> <li>grantld = G</li> </ul>	∎ Pass	□ Fail
3	<pre>SAS Test Harness shall approve the request with a Relinquishment Response message with parameters:         - cbsdld = C         - grantld = G         responseCode = 0</pre>		
4	<ul> <li>After completion of step 3, SAS Test Harness will not provide any additional positive</li> <li>response (responseCode=0) to further request messages from the UUT</li> </ul>		
5	<ul> <li>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:</li> <li>UUT shall stop RF transmission at any time between triggering the relinquishment and UUT sending the relinquishment request</li> </ul>	∎ Pass	□ Fail



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### 7.5.2 WINNF.FT.C.RLQ.3

#	Test Execution Steps	Res	sults
1	<ul> <li>Ensure the following conditions are met for test entry:</li> <li>UUT has successfully completed SAS Discovery and Authentication with SAS Test Harness</li> <li>UUT has successfully registered with SAS Test Harness, with cbsdld=C</li> <li>UUT has received a valid grant with grantId = G</li> <li>UUT is in Grant State AUTHORIZED and is actively transmitting within the bounds of its grant.</li> <li>Invoke trigger to relinquish UUT Grant from the SAS Test Harness</li> </ul>		
2	<ul> <li>UUT sends a Relinquishment Request message. Verify message contains all required parameters properly formatted, and specifically:</li> <li>cbsdld = C</li> <li>grantId = G</li> </ul>		
3	SAS Test Harness shall approve the request with a Relinquishment Response message with parameters: - cbsdld = C - grantld = G • responseCode = R		
4	<ul> <li>After completion of step 3, SAS Test Harness will not provide any additional positive</li> <li>response (responseCode=0) to further request messages from the UUT</li> </ul>		
5	<ul> <li>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:</li> <li>UUT shall stop RF transmission at any time between triggering the relinquishment and UUT sending the relinquishment request</li> </ul>	∎ Pass	□ Fail



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### 7.5.3 WINNF.FT.C.RLQ.5

#	Test Execution Steps	Res	sults
1	<ul> <li>Ensure the following conditions are met for test entry:</li> <li>UUT has successfully completed SAS Discovery and Authentication with SAS Test Harness</li> <li>UUT has successfully registered with SAS Test Harness, with cbsdld=C</li> <li>UUT has received a valid grant with grantId = G</li> <li>UUT is in Grant State AUTHORIZED and is actively transmitting within the bounds of its grant.</li> <li>Invoke trigger to relinquish UUT Grant from the SAS Test Harness</li> </ul>		
2	<ul> <li>UUT sends a Relinquishment Request message. Verify message contains all required parameters properly formatted, and specifically:</li> <li>cbsdld = C</li> <li>grantId = G</li> </ul>		
3	SAS Test Harness shall approve the request with a Relinquishment Response message with parameters: - cbsdld = C - grantld = G • responseCode = 103		
4	<ul> <li>After completion of step 3, SAS Test Harness will not provide any additional positive</li> <li>response (responseCode=0) to further request messages from the UUT</li> </ul>		
5	<ul> <li>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:</li> <li>UUT shall stop RF transmission at any time between triggering the relinquishment and UUT sending the relinquishment request</li> </ul>	∎ Pass	□ Fail

### 7.6 CBSD Deregistration Process

### 7.6.1 WINNF.FT.C.DRG.1

#	Test Execution Steps	Re	sults
1	<ul> <li>Ensure the following conditions are met for test entry:</li> <li>UUT has successfully completed SAS Discovery and Authentication with SAS Test Harness</li> <li>UUT has successfully registered with SAS Test Harness, with cbsdld=C</li> <li>UUT has received a valid grant with grantId = G</li> <li>UUT is in Grant State AUTHORIZED and is actively transmitting within the bounds of its grant.</li> <li>Invoke trigger to deregister UUT from the SAS Test Harness</li> </ul>		
2	UUT sends a Relinquishment request and receives Relinquishment response with • responseCode=0		



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3	• UUT sends Deregistration Request to SAS Test Harness with cbsdld = C.	∎ Pass	□ Fail
4	<ul> <li>SAS Test Harness shall approve the request with a Deregistration</li> <li>Response message with parameters:</li> <li>cbsdld = C</li> <li>responseCode = 0</li> </ul>		
5	<ul> <li>After completion of step 3, SAS Test Harness will not provide any additional positive</li> <li>response (responseCode=0) to further request messages from the UUT.</li> </ul>		
6	<ul> <li>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:</li> <li>UUT stopped RF transmission at any time between triggering the deregistration and either A OR B occurs:         <ul> <li>UUT sending a Registration Request message, as this is not mandatory B.</li> <li>UUT sending a Deregistration Request message</li> </ul> </li> </ul>	∎ Pass	□ Fail



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### 7.6.2 WINNF.FT.C.DRG.3

#	Test Execution Steps	F	Results
1	<ul> <li>Ensure the following conditions are met for test entry:</li> <li>UUT has successfully completed SAS Discovery and Authentication with SAS Test Harness</li> <li>UUT has successfully registered with SAS Test Harness, with cbsdld=C</li> <li>UUT has received a valid grant with grantId = G</li> <li>UUT is in Grant State AUTHORIZED and is actively transmitting within the bounds of its grant.</li> <li>Invoke trigger to deregister UUT from the SAS Test Harness</li> </ul>		
2	UUT sends a Relinquishment request and receives Relinquishment response with responseCode=0		
3	<ul> <li>UUT sends Deregistration Request to SAS Test Harness with cbsdld = C.</li> </ul>		
4	<ul> <li>The SAS Test Harness sends the Deregistration Response Message to UUT with:</li> <li>No cbsdld</li> <li>responseCode = 103</li> </ul>		
5	After completion of step 3, SAS Test Harness will not provide any additional positive response (responseCode=0) to further request messages from the UUT.		
6	<ul> <li>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:</li> <li>UUT stopped RF transmission at any time between triggering the deregistration and either A OR B occurs:         <ul> <li>A. UUT sending a Registration Request message, as this is not mandatory</li> <li>B. UUT sending a Deregistration Request message</li> </ul> </li> </ul>	∎ Pass	□ Fail



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### 7.6.3 WINNF.FT.C.DRG.5

#	Test Execution Steps	F	Results
1	<ul> <li>Ensure the following conditions are met for test entry:</li> <li>UUT has successfully completed SAS Discovery and Authentication with SAS Test Harness</li> <li>UUT has successfully registered with SAS Test Harness, with cbsdld=C</li> <li>UUT has received a valid grant with grantId = G</li> <li>UUT is in Grant State AUTHORIZED and is actively transmitting within the bounds of its grant.</li> <li>Invoke trigger to deregister UUT from the SAS Test Harness</li> </ul>		
2	UUT sends a Relinquishment request and receives Relinquishment response with responseCode=0		
3	<ul> <li>UUT sends Deregistration Request to SAS Test Harness with cbsdld = C.</li> </ul>		
4	<ul> <li>The SAS Test Harness sends the Deregistration Response Message to UUT with:</li> <li>cbsdld=C</li> <li>responseCode = 103</li> </ul>		
5	After completion of step 3, SAS Test Harness will not provide any additional positive response (responseCode=0) to further request messages from the UUT.		
6	<ul> <li>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:</li> <li>UUT stopped RF transmission at any time between triggering the deregistration and either A OR B occurs:</li> <li>UUT sending a Registration Request message, as this is not mandatory</li> <li>UUT sending a Deregistration Request message</li> </ul>	∎ Pass	□ Fail

### 7.7 CBSD Security Validation

### 8.7.1 WINNF.FT.C.SCS.1

#	Test Execution Steps	Res	sults
1	<ul> <li>UUT shall start CBSD-SAS communication with the security procedure</li> <li>The UUT shall establish a TLS handshake with the SAS Test Harness using configured certificate.</li> <li>Configure the SAS Test Harness to accept the security procedure and establish the connection</li> </ul>	∎ Pass	□ Fail
2	<ul> <li>Make sure that Mutual authentication happens between UUT and the SAS Test Harness.</li> <li>Make sure that UUT uses TLS v1.2</li> <li>Make sure that cipher suites from one of the following is selected,</li> <li>TLS_RSA_WITH_AES_128_GCM_SHA256</li> <li>TLS_RSA_WITH_AES_256_GCM_SHA384</li> <li>TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256</li> </ul>	∎ Pass	□ Fail



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	<ul> <li>TLS_ECDHE_ECDSA_WITH_AES_256_GCM_SHA384</li> <li>TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256</li> </ul>		
3	<ul> <li>A successful registration is accomplished using one of the test cases described in section 6.1.4.1, depending on CBSD capability.</li> <li>E. UUT sends a registration request to the SAS Test Harness and the SAS Test Harness sends a Registration Response with responseCode = 0 and cbsdld.</li> </ul>	∎ 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: <ul> <li>UUT shall not transmit RF</li> </ul>	∎ Pass	□ Fail

### 8.7.2 WINNF.FT.C.SCS.2

#	Test Execution Steps	Res	sults
4	<ul> <li>UUT shall start CBSD-SAS communication with the security procedures</li> </ul>		
1		Pass	Fail
2	<ul> <li>Make sure that UUT uses TLS v1.2 for security establishment.</li> <li>Make sure UUT selects the correct cipher suite.</li> <li>UUT shall use CRL or OCSP to verify the validity of the server certificate.</li> <li>Make sure that Mutual authentication does not happen between UUT and the SAS Test Harness.</li> </ul>	∎ Pass	□ Fail
3	F. UUT may retry for the security procedure which shall fail.	∎ Pass	□ Fail
4	<ul> <li>SAS Test-Harness shall not receive any Registration request or any application data.</li> </ul>		
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

### 8.7.3 WINNF.FT.C.SCS.3

#	Test Execution Steps	Results	
1	UUT shall start CBSD-SAS communication with the security procedures	∎ Pass	□ Fail
2	<ul> <li>Make sure that UUT uses TLS v1.2 for security establishment.</li> <li>Make sure UUT selects the correct cipher suite.</li> <li>UUT shall use CRL or OCSP to verify the validity of the server certificate.</li> <li>Make sure that Mutual authentication does not happen between UUT and the SAS Test Harness.</li> </ul>	∎ Pass	□ Fail
3	G. UUT may retry for the security procedure which shall fail.	∎ Pass	□ Fail



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	• SAS Test-Harness shall not receive any Registration request or any application		
4	data.		
	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:		
5	UUT shall not transmit RF	Pass	Fail

#### 8.7.4 WINNF.FT.C.SCS.4

#	Test Execution Steps	Res	sults
1	<ul> <li>UUT shall start CBSD-SAS communication with the security procedures</li> </ul>		
	······································	Pass	Fail
2	<ul> <li>Make sure that UUT uses TLS v1.2 for security establishment.</li> <li>Make sure UUT selects the correct cipher suite.</li> <li>UUT shall use CRL or OCSP to verify the validity of the server certificate</li> <li>Make sure that Mutual authentication does not happen between UUT and the SAS Test Harness.</li> </ul>	∎ Pass	□ Fail
3	H. UUT may retry for the security procedure which shall fail.	∎ Pass	□ Fail
4	<ul> <li>SAS Test-Harness shall not receive any Registration request or any application data.</li> </ul>		
5	<ul> <li>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:</li> <li>UUT shall not transmit RF</li> </ul>	∎ Pass	□ Fail



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### 8.7.5 WINNF.FT.C.SCS.5

#	Test Execution Steps	Res	sults
1	<ul> <li>UUT shall start CBSD-SAS communication with the security procedures</li> </ul>		
	· · · · · · · · · · · · · · · · · · ·	Pass	Fail
2	<ul> <li>Make sure that UUT uses TLS v1.2 for security establishment.</li> <li>Make sure UUT selects the correct cipher suite.</li> <li>UUT shall use CRL or OCSP to verify the validity of the server certificate</li> <li>Make sure that Mutual authentication does not happen between UUT and the SAS Test Harness.</li> </ul>	∎ Pass	□ Fail
3	I. UUT may retry for the security procedure which shall fail.	∎ Pass	□ Fail
4	<ul> <li>SAS Test-Harness shall not receive any Registration request or any application data.</li> </ul>		
5	<ul> <li>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:</li> <li>UUT shall not transmit RF</li> </ul>	∎ Pass	□ Fail

#### 8.8 **CBSD RF Power Measurement**

#### 8.8.1 WINNF.PT.C.HBT

#	Test Execution Steps	Re	sults
1	<ul> <li>Ensure the following conditions are met for test entry:</li> <li>UUT has successfully completed SAS Discovery and Authentication with the SAS Test Harness</li> <li>UUT has registered with the SAS, with CBSD ID = C</li> <li>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</li> <li>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</li> </ul>		
2	<ul> <li>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:</li> <li>UUT sends Heartbeat Request, including:</li> <li>O cbsdld = C</li> </ul>		



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	O grantId = G		
	<ul> <li>SAS Test Harness responds with Heartbeat Response, including: o cbsdld = C</li> <li>grantId = G</li> <li>transmitExpireTime = current UTC time + 200 seconds</li> <li>responseCode = 0</li> </ul>		
	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.		
3	J. Note: it may be required for the vendor to provide a method or configuration to bring the UUT to a mode which is required by the measurement methodology. Any such mode is vendor-specific and depends upon UUT behavior and the measurement methodology.	Pass	Fail



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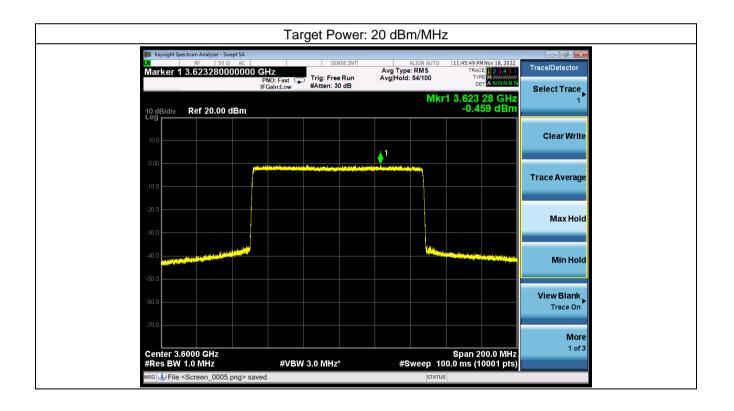
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RF measurement plot for Test Case:

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.

Frequency	Channel Bandwidth	Granted maxEIRP	Conducted PSD	Antenna Gain	MIMO factor	Cable Loss	maxEIRP
(MHz)	(MHz)	(dBm/MHz)	(dBm/MHz)	(dBi)	(dBi)	(dB)	(dBm/MHz)
3600	100	20	-0.459	5.800	3.000	5.000	13.341
3600	100	10	-4.779	5.800	3.000	5.000	9.021
3600	100	5	-10.273	5.800	3.000	5.000	3.527
3600	100	2	-13.516	5.800	3.000	5.000	0.284
Note:							

1.maxEIRP= Conducted PSD+ Antenna Gain+ Cable loss + MIMO factor 2.EUT support 2\*2 ULMIMO





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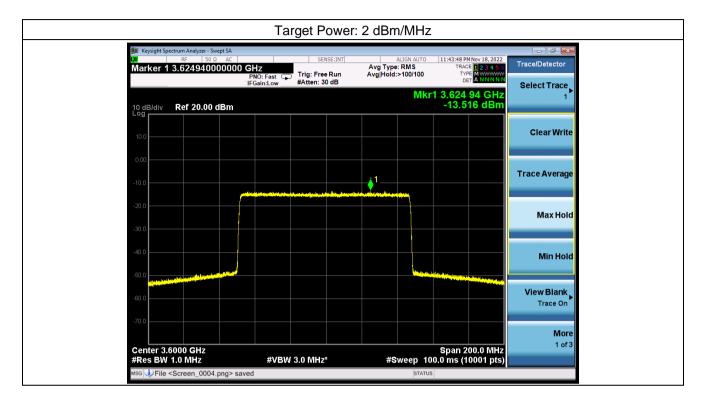


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## 9 Test Data Log

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

### 9.1 WINNF.FT.C.SCS.1

🚺 *以	大网 5				- 0	9
文件(E	编辑(E) 初	N图(V) 跳转(G) 捕获(C) 分析	f(A) 统计(S) 电话(Y) 无线	W) 工具(II) 帮助(II)		
1	201	🗎 🖹 🖓 ሩ 👄 🗮 🐺	🞍 📃 📃 @, @, @, 🖽			
tls					2	
o.	Tine	Source	Destination	Protocol	Length Info	
1	7 142.84	3 10.5.251.38	10.88.140.53	TLSv1.2	571 Client Hello	
18	7 142.84	3 10.88.140.53	10.5.251.38	TLSv1.2	1514 Server Hello	
18	7 142.84	3 10.88.140.53	10.5.251.38	TLSv1.2	1514 Certificate [TCP segment of a reassembled PDU]	
18	7 142.84	3 10.88.140.53	10.5.251.38	TLSv1.2	58 Certificate Request, Server Hello Done	
18	8 142.93	3 10.5.251.38	10.88.140.53	TCP	1514 51430 → 5003 [ACK] Seq=518 Ack=2925 Win=35072 Len=1460 [TCP segment of a reassembled PDU]	
18	8 142.93	3 10.5.251.38	10.88.140.53	TLSv1.2	1514 Certificate [TCP segment of a reassembled PDU]	
Ena	me 18780:	1514 bytes on wire (	12112 bits), 1514 byt	es captured (12112 bits) on inte	erface \Device\NPF {0CE3A0EC-75F3-46DE-BD1E-73C39F15F349}, id 0	
				), Dst: AdlinkTe 6b:23:da (00:30		
		otocol Version 4, Src:				
				t: 51430, Seq: 1, Ack: 518, Len:	: 1460	
		yer Security				
		ecord Layer: Handshake	e Protocol: Server He	110		
		Type: Handshake (22)				
		: TLS 1.2 (0x0303)				
	Length:					
	✓ Handsha	ke Protocol: Server H	ello			
		shake Type: Server Hel				
	Lengt	th: 82				
		ion: TLS 1.2 (0x0303)				
	> Rando	om: c6fda3885b6af6de2f	Feae53f2340988f7cbc5c6	392eca451d042c04218723e69		
	Sessi	ion ID Length: 32				
			2ea42953c2bfa4edd54b8	aaa4bfdf6d0a39d02c2540d2620dc		
	Ciphe	er Suite: TLS RSA WITH	AES 256 GCM SHA384	(0x009d)		
	Compr	ression Method: null (	(0)			
	Exter	nsions Length: 10				
	> Exter	nsion: renegotiation i	info (len=1)			
	> Exter	nsion: heartbeat (len=	=1)			
	[JA39	5 Fullstring: 771,157,	65281-15]			
	[JA35	6d37fb1b3306d6e9f87	75650d8eb74b4f]			
	00 30 60	4 6b 23 da 00 0e c6 b	16 72 67 08 00 45 00	•0dk#•••••••••		
		aff 40 00 80 06 fe 6		··Z·@··· ·c·X·5··		
		3 8b c8 e6 5a b8 1c 4		-&ZICP-		
		7 b3 00 00 16 03 03 0		· · · · · · · · · · · · · · · · · · ·		
0040	03 c6 fc	d a3 88 5b 6a f6 de 2	2f ea e5 3f 23 40 98	·····[j· ·/··?#@·		
0050	8f 7c bo	c 5c e3 92 ec a4 51 d	d0 42 c0 42 18 72 3e	· · · · · · · Q·B·B·r>		
07	Transport	Layer Security: Protocol		微信	分组: 22435 ・ 已显示: 23 (0.1%) 配置	∰:Def
				1.1.14		



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### 9.2 WINNF.FT.C.SCS.2

tla			1 👷 📃 @ @ @ H		X
	Tine	Source	Destination	Protocol Length Info	
-	2563 249.011	192.168.1.10	192.168.1.1	TLSv1.2 788 Application Data	
	2564 249.014	192.168.1.1	192.168.1.10	TLSv1.2 381 Application Data	
1	2591 251.998	192.168.1.10	192.168.1.1	TLSv1.2 1096 Application Data	
	2592 252.003	192.168.1.1	192.168.1.10	TLSv1.2 422 Application Data	
1	2597 252.863	10.5.251.113	10.88.140.53	TLSv1.2 571 Client Hello	
1	2598 252.863	10.88.140.53	10.5.251.113	TLSv1.2 1514 Server Hello	
1	2600 252.863	10.88.140.53	10.5.251.113	TLSv1.2 192 Certificate, Certificate Request, Server Hello Done	
1	2604 252.881	10.5.251.113	10.88.140.53	TLSv1.2 61 Alert (Level: Fatal, Description: Certificate Revoked)	
1	2610 254.008	192.168.1.10	192.168.1.1	TLSv1.2 1379 Application Data	
1	2612 254.052	192.168.1.1	192.168.1.10	TLSv1.2 912 Application Data	
4	2627 258.005	192.168.1.10	192.168.1.1	TLSv1.2 1096 Application Data	
4	2634 258.470	192.168.1.1	192.168.1.10	TLSv1.2 422 Application Data	
-	2640 258.533	10.5.251.113	10.88.140.53	TLSv1.2 571 Client Hello	
			40 5 354 443	TLSv1.2 1514 Server Hello	
4	2641 258.533	10.88.140.53	10.5.251.113	TLSVI.2 1514 Server Hello	
		10.88.140.53 10.88.140.53	10.5.251.113	TLSV1.2 1914 Server Hello TLSV1.2 192 Certificate, Certificate Request, Server Hello Done	
Fr Et	2643 258.533 2647 258.552 rame 2604: 61 thernet II, Su aternet Proto	10.88.140.53 10.5.251.113 bytes on wire (48 rc: AdlinkTe_6b:23 col Version 4, Src	10.5.251.113 10.88.140.53 40.46.53 40.46.45 8 bits), 61 bytes captured ( :da (00:30:64:6b:23:da), Dst : 10.5.251.113, Dst: 10.88.1	TLSV1.2 192 Certificate, Certificate Request, Server Hello Done TLSV1.2 61 Alert (Level: Fatal, Description: Certificate Revoked) Vient 4 Concertificate Date 1000 certificate Date AsixElec_b6:72:c7 (00:00:c6:b6:72:c7) .53	
Fr Et Ir Tr Tr	2643 258.533 2647 258.552 ame 2604: 61 thernet II, Si thernet Proto- ransmission Ci ansport Layer TLSv1.2 Reco Content Ty Version: 1 Length: 2 ~ Alert Mess	10.88.140.53 10.5.251.113 40.162.113 bytes on wire (48 rc: AdlnkTe_60:23 col Version 4, Src control Protocol, S r Security urd Layer: Alert (10 ype: Alert (21) TLS 1.2 (0x0303) Sage	10.5.251.113 10.88.140.53 40.46.53 40.46.45 8 bits), 61 bytes captured ( :da (00:30:64:6b:23:da), Dst : 10.5.251.113, Dst: 10.88.1	TLSV1.2 192 Certificate, Certificate Request, Server Hello Done TLSV1.2 61 Alert (Level: Fatal, Description: Certificate Revoked) Viet a Journal Control Control Certificate Revoked) AsixElec_b6:72:c7 (00:0e:c6:b6:72:c7) 3.53 7, Seq: 518, Ack: 3059, Len: 7	
Fr Et Ir Tr Tr	2643 258.533. 2647 258.552. State of the second s	10.88.140.53 10.5.251.113 40.400 400 400 bytes on wire (48 tr: Adlinkte,6b:23 col Version 4, Src ontrol Protocol, S r Security urd Layer: Alert (10 rpe: Alert (21) rLS 1.2 (0x0303) sage Fatal (2)	10.5.251.113 10.88.140.53 8 bits), 61 bytes captured ( id (00:30:46:0b:23:da), Dst : 10.5.251.113, Dst: 10.88.1 rc Port: 40878, Dst Port: 50 evel: Fatal, Description: Co	TLSV1.2 192 Certificate, Certificate Request, Server Hello Done TLSV1.2 61 Alert (Level: Fatal, Description: Certificate Revoked) Viet a Journal Control Control Certificate Revoked) AsixElec_b6:72:c7 (00:0e:c6:b6:72:c7) 3.53 7, Seq: 518, Ack: 3059, Len: 7	
Fr Et Ir Tr	2643 258.533. 2647 258.552. State of the second s	10.88.140.53 10.5.251.113 40.162.113 bytes on wire (48 rc: AdlnkTe_60:23 col Version 4, Src control Protocol, S r Security urd Layer: Alert (10 ype: Alert (21) TLS 1.2 (0x0303) Sage	10.5.251.113 10.88.140.53 8 bits), 61 bytes captured ( id (00:30:46:0b:23:da), Dst : 10.5.251.113, Dst: 10.88.1 rc Port: 40878, Dst Port: 50 evel: Fatal, Description: Co	TLSV1.2 192 Certificate, Certificate Request, Server Hello Done TLSV1.2 61 Alert (Level: Fatal, Description: Certificate Revoked) Viet a Journal Control Control Certificate Revoked) AsixElec_b6:72:c7 (00:0e:c6:b6:72:c7) 3.53 7, Seq: 518, Ack: 3059, Len: 7	
Fr Et Tr Tr	2643 258.533_ 2647 258.552_ name 2664:61 thernet II, Si thernet Proto- ansmission C. TLSV1.2 Reco Content TJ Version: 1 Length: 2 ~ Alert Mess Level: Descrip	10.88.140.53 10.5.251.113 bytes on wire (48 fcr: Adlinkre_6b:23 col Version 4, Src ontrol Protocol, S r Security rd Layer: Alert (1) TLS 1.2 (0x0303) sage Fatal (2) tion: Certificate	10.5.251.113 10.88.140.53 8 bits), 61 bytes captured ( id (00:30:46:0b:23:da), Dst : 10.5.251.113, Dst: 10.88.1 rc Port: 40878, Dst Port: 50 evel: Fatal, Description: Co	TLSVI.2 192 Certificate, Certificate Request, Server Hello Done TLSVI.2 63 Calert (Level: Fatal, Description: Certificate Revoked) TLSVI.2 60 Molection Fatal AsixElec_b6772:67 (00:00:c6:b6:72:c7) 3.53 7, Seq: S18, Ack: 3059, Len: 7 tificate Revoked)	
Fr Et Ir Tr Tr Y	2643 258.533 2647 258.552 2647 258.552 2647 258.552 264 258.552 264 258.552 264 264 264 264 264 264 264 264 264 264 264 264 264 264 264 264 264 264 264 264 264 264	10.88.140.53 10.5.251.113 10.5.251.113 bytes on wire (48 rc: Adlinkre_6b:23 col Version 4, Stro control Protocol, S r Security rd Layer: Alert (() rd Layer: Alert (21) rLS 1.2 (0x0303) sage Fatal (2) tion: Certificate 6 72 c7 00 30 64	10.5.251.113 10.88.140.53 10.88.140.53 10.80.140.53 10.80.140.53 10.60.236.45b123.430, Dst : 10.5.251.113, Dst: 10.88.1 rc Port: 40878, Dst Port: 50 evel: Fatal, Description: Co Revoked (44)	TLSV1.2 192 Certificate, Certificate Request, Server Hello Done TLSV1.2 61 Alert (Level: Fatal, Description: Certificate Revoked) Viet a Variantic Cata 88 bits) on interface \Device\WFF_{CCE3A0EC-75F3-46DE-BDIE-73C39F15F349}, id 0 AsixElec_b6:72:c7 (00:00:c6:b6:72:c7) 9.53 r, Seq: 518, Ack: 3059, Len: 7 tificate Revoked)	
Fr E1 Tr Tr Tr Tr V	2643 258.533 2647 258.552 arame 2664:61 thernet II, Si thernet Proto- ransport Layer TLSV1.2 Reco Content TJ Version: 1 Length: 2 Alert Mess Level: Descrip	10.88.140.53 10.5.251.113 10.5.251.113 bytes on wire (48 cr: Adlinkre_6b:23 col Version 4, Src ontrol Protocol, S r Security md Layer: Alert (1 TLS 1.2 (0x0303) Sage Fatal (2) tion: Certificate 6 72 c7 00 30 64 9 40 00 3f 06 8e	10.5.251.113 10.88.140.53 8 bits), 61 bytes captured ( id (00:30:64:6b:23:da), Dst : 10.5.251.113, Dst: 10.88.1 rc Port: 40878, Dst Port: 50 evel: Fatal, Description: Co Revoked (44) 6b 23 da 08 00 45 00r	TLSVI.2 192 Certificate, Certificate Request, Server Hello Done TLSVI.2 61 Alert (Level: Fatal, Description: Certificate Revoked) Mark Her_bole: Comparison of the server hello Pone AsixHer_bole: Comparison o	

SCS.2.pcapng

http			
Time Source	Destination		length Info
2654 260.000 192.168.5.120	192.168.5.115	НТТР/Ј	637 POST /public/cgi-bin/information.cgi HTTP/1.1 , JavaScript Object Notation (application/js
2657 260.165 192.168.5.115	192.168.5.120	HTTP	328 HTTP/1.0 200 OK (text/html)
2680 261.958 10.5.251.113	10.88.140.53	HTTP	138 GET /cbsd.crl HTTP/1.1
2682 261.971 10.88.140.53	10.5.251.113	HTTP	1090 HTTP/1.1 200 OK
2729 265.013 192.168.5.120	192.168.5.115	НТТР/Ј	637 POST /public/cgi-bin/information.cgi HTTP/1.1 , JavaScript Object Notation (application/js
2732 265.084 192.168.5.115	192.168.5.120	HTTP	328 HTTP/1.0 200 OK (text/html)
2769 270.008 192.168.5.120	192.168.5.115	НТТР/Ј	637 POST /public/cgi-bin/information.cgi HTTP/1.1 , JavaScript Object Notation (application/js
2781 270.636 192.168.5.115	192.168.5.120	HTTP	328 HTTP/1.0 200 OK (text/html)
2799 275.009 192.168.5.120	192.168.5.115	НТТР/Ј	637 POST /public/cgi-bin/information.cgi HTTP/1.1 , JavaScript Object Notation (application/js
2802 275.166 192.168.5.115	192.168.5.120	HTTP	328 HTTP/1.0 200 OK (text/html)
2834 279.999 192.168.5.120	192.168.5.115	HTTP/J	637 POST /public/cgi-bin/information.cgi HTTP/1.1 , JavaScript Object Notation (application/js
2837 280.245 192.168.5.115	192.168.5.120	HTTP	328 HTTP/1.0 200 OK (text/html)
2871 285.000 192.168.5.120	192.168.5.115	НТТР/Ј	637 POST /public/cgi-bin/information.cgi HTTP/1.1 , JavaScript Object Notation (application/js
2874 285.654 192.168.5.115	192.168.5.120	HTTP	328 HTTP/1.0 200 OK (text/html)
2908 290.002 192.168.5.120	192.168.5.115	НТТР/Ј	637 POST /public/cgi-bin/information.cgi HTTP/1.1 , JavaScript Object Notation (application/js
2911 290.073 192.168.5.115	192.168.5.120	HTTP	328 HTTP/1.0 200 OK (text/html)
2040 20E 010 102 100 E 120	402 400 5 445	итто / э	COT DOCT Inublicitati his linformation and UTTD/1 1 - Junctanink Object Matakian Ianalisation/ia
rame 2680: 138 bytes on wire (1	102 102 1 115 104 bits), 138 bytes captured (11	104 bits) on interface	\Device\NPF_{0CE3A0EC-75F3-46DE-BD1E-73C39F15F349}, id 0
rame 2680: 138 bytes on wire (1 thernet II, Src: AdlinkTe_6b:2	100 100 F 115 104 bits), 138 bytes captured (11 1:da (00:30:64:6b:23:da), Dst: Asi	104 bits) on interface ixElec_b6:72:c7 (00:0e	\Device\NPF_{0CE3A0EC-75F3-46DE-BD1E-73C39F15F349}, id 0
rame 2680: 138 bytes on wire (1 thernet II, Src: AdlinkTe_6b:23 nternet Protocol Version 4, Src	100 fc0 f 445 104 bits), 138 bytes captured (11 1:da (00:30:64:6b:23:da), Dst: Asi 1: 10.5.251.113, Dst: 10.88.140.5	L04 bits) on interface ixElec_b6:72:c7 (00:0e 3	\Device\NPF_{0CE3A0EC-75F3-46DE-BD1E-73C39F15F349}, id 0
rame 2680: 138 bytes on wire (1 thernet II, Src: AdlinkTe_6b:2: nternet Protocol Version 4, Src ransmission Control Protocol, 9	100 100 F 115 104 bits), 138 bytes captured (11 1:da (00:30:64:6b:23:da), Dst: Asi	L04 bits) on interface ixElec_b6:72:c7 (00:0e 3	\Device\NPF_{0CE3A0EC-75F3-46DE-BD1E-73C39F15F349}, id 0
rame 2680: 138 bytes on wire (1 thernet II, Src: AdlinkTe_6b:23 nternet Protocol Version 4, Src ransmission Control Protocol, 9 ypertext Transfer Protocol	100 fc0 f 445 104 bits), 138 bytes captured (11 1:da (00:30:64:6b:23:da), Dst: Asi 1: 10.5.251.113, Dst: 10.88.140.5	L04 bits) on interface ixElec_b6:72:c7 (00:0e 3	\Device\NPF_{0CE3A0EC-75F3-46DE-BD1E-73C39F15F349}, id 0
ann ann an Ann Ann Ann Ann Ann rame 2680: 138 bytes on wire (1 thernet II, Src: AdlinkTe_6b:2 nternet Protocol Version 4, Src ransmission Control Protocol, 5 ypertext Transfer Protocol GET /cbsd.crl HTTP/1.1\r\n	100 fc0 f 445 104 bits), 138 bytes captured (11 1:da (00:30:64:6b:23:da), Dst: Asi 1: 10.5.251.113, Dst: 10.88.140.5	L04 bits) on interface ixElec_b6:72:c7 (00:0e 3	\Device\NPF_{0CE3A0EC-75F3-46DE-BD1E-73C39F15F349}, id 0
rame 2680: 138 bytes on wire (1 thermet II, Src: AdlinkTe_Gb:2 Internet Protocol Version 4, Src ransmission Control Protocol, 5 ypertext Transfer Protocol GET /cbsd.crl HTTP/1.1\r\n Host: 10.88.140.53\r\n	100 fc0 f 445 104 bits), 138 bytes captured (11 1:da (00:30:64:6b:23:da), Dst: Asi 1: 10.5.251.113, Dst: 10.88.140.5	L04 bits) on interface ixElec_b6:72:c7 (00:0e 3	\Device\NPF_{0CE3A0EC-75F3-46DE-BD1E-73C39F15F349}, id 0
<pre>seds or_essiss is issue to read rame 2680: 138 bytes on wire (1 thernet II, Src: AdlinkTe_Gb:2 tternet Protocol Version 4, Src ransmission Control Protocol, 5 ypertext Transfer Protocol GET /cbsd.crl HTTP/1.1\r\n Host: 10.88.140.53\r\n User-Agent: curl/7.58.0\r\n</pre>	100 fc0 f 445 104 bits), 138 bytes captured (11 1:da (00:30:64:6b:23:da), Dst: Asi 1: 10.5.251.113, Dst: 10.88.140.5	L04 bits) on interface ixElec_b6:72:c7 (00:0e 3	\Device\NPF_{0CE3A0EC-75F3-46DE-BD1E-73C39F15F349}, id 0
nam Sort and the Learner of the second secon	100 fc0 f 445 104 bits), 138 bytes captured (11 1:da (00:30:64:6b:23:da), Dst: Asi 1: 10.5.251.113, Dst: 10.88.140.5	L04 bits) on interface ixElec_b6:72:c7 (00:0e 3	\Device\NPF_{0CE3A0EC-75F3-46DE-BD1E-73C39F15F349}, id 0
<pre>name 2680: 138 bytes on wire () thernet II, Src: AdlinkTe_Gb:2: Internet Protocol Version 4, Src: namsmission control Protocol, s ypertext Transfer Protocol GET /cbsd.crl HTP/1.1\r\n Host: 10.88.140.53\r\n USer-Agent: curl/7.58.0\r\n Accept: */*\r\n \r\n</pre>	104 bits), 138 bytes captured (1: 104 bits), 138 bytes captured (1: 144 (00:3364:6b:23:da), Dst: Asi 14.5.251.113, Dst: 10.88.140.5; 14.5.251.113, Dst: 10.88.140.5; 14.5.251.113, Dst: 10.88.140.5; 14.5.251.113, Dst: 10.88.140.5; 14.5.251.113, Dst: 10.88.140.5; 15.5.251.113, Dst: 10.88.140, Dst: 10.85.155, Dst: 10.85.	L04 bits) on interface ixElec_b6:72:c7 (00:0e 3	\Device\NPF_{0CE3A0EC-75F3-46DE-BD1E-73C39F15F349}, id 0
Tame 2680: 138 bytes on wire (1 thernet II, Src: AdlinkTe_6b:2: nternet Protocol Version 4, Src ansmission Control Protocol, 5 ypertext Transfer Protocol 6ET /cbbd.crl HTTp/1.1\r\n Host: 10.88.140.53\r\n User-Agent: curl/7.58.0\r\n Accept: */\r\n \r\n [full request URI: http://10.	104 bits), 138 bytes captured (1: 104 bits), 138 bytes captured (1: 144 (00:3364:6b:23:da), Dst: Asi 14.5.251.113, Dst: 10.88.140.5; 14.5.251.113, Dst: 10.88.140.5; 14.5.251.113, Dst: 10.88.140.5; 14.5.251.113, Dst: 10.88.140.5; 14.5.251.113, Dst: 10.88.140.5; 15.5.251.113, Dst: 10.88.140, Dst: 10.85.155, Dst: 10.85.	L04 bits) on interface ixElec_b6:72:c7 (00:0e 3	\Device\NPF_{0CE3A0EC-75F3-46DE-BD1E-73C39F15F349}, id 0
rame 2680: 138 bytes on wire (1 thernet II, Src: AdlinkTe_6b:2 Internet Protocol Version 4, Src ransmission Control Protocol, 5 ypertext Transfer Protocol GET /cbsd.crl HITP/1.1/r/n Host: 10.88.140.53/r/n User-Agent: curl/7.58.0/r/n Accept: */*/r/n /r/n [Full request UR1: http://10. [HTTP request 1/1]	104 bits), 138 bytes captured (1: 104 bits), 138 bytes captured (1: 144 (00:3364:6b:23:da), Dst: Asi 14.5.251.113, Dst: 10.88.140.5; 14.5.251.113, Dst: 10.88.140.5; 14.5.251.113, Dst: 10.88.140.5; 14.5.251.113, Dst: 10.88.140.5; 14.5.251.113, Dst: 10.88.140.5; 15.5.251.113, Dst: 10.88.140, Dst: 10.85.155, Dst: 10.85.	L04 bits) on interface ixElec_b6:72:c7 (00:0e 3	\Device\NPF_{0CE3A0EC-75F3-46DE-BD1E-73C39F15F349}, id 0
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And Dot         And Los         Los         Los           Tame 2680: 138 bytes on wire (1           thernet II, Src: AdlinkTe_6b:2:           Internet Protocol Version 4, Srr           ansmission Control Protocol, 5           ypertext Transfer Protocol           GET /cbsd.col HTTP/1.1\r\n           Host: 10.88.140.53\r\n           User-Agent: curl/7.58.0\r\n           Accept: "^*r\n           \r\n           [Full request URI: http://10.           [HTTP request 1/1]           [Response in frame: 2682]           0         00 6 c6 b6 72 c7 00 30 64           0         00 2 c7 40 30 46	103         4/3         5/4           104         bits), 138         bytes captured (11           1:da (00:30:64:6b:23:da), Dst: Asi           1:da (00:30:5251.113, Dst: 10.88.140.55           :rc Port: 59372, Dst Port: 80, Sec           88.140.53/cbsd.crl]           6b 23 da 08 00 45 00	dk#E. .Tq.X	\Device\NPF_{0CE3A0EC-75F3-46DE-BD1E-73C39F15F349}, id 0
Source are less to the less the le	Inclusion         Inclusion           104 bits), 138 bytes captured (1:         1:           1:         10:5.251.113, 0st: 10.88.140.5:           ::         10:5.251.113, 0st: 10.88.140.5:           ::         rc           ::         10:5.251.113, 0st: 10.88.140.5:           ::         rc           ::         10:5.251.113, 0st: 10.88.140.5:           ::         rc           ::         10:5.251.113, 0st: 10.88.140.5:           ::         10:5.251.113, 0st: 10:88.140.5:           ::         10:5.251.113, 0st: 10:88.140.1518.1518.1518.1518.1518.1518.1518.151	dk#         1000 /3           ixElec_b6:72:c7 (00:06         3           i: 1, Ack: 1, Len: 84         4           dk#        E           : 1 i (x)	\Device\NPF_{0CE3A0EC-75F3-46DE-BD1E-73C39F15F349}, id 0
<pre>Frame 2680: 138 bytes on wire (; Ethernet II, Src: Adlinkle_6b:2 Internet Protocol Version 4, Srr Transmission Control Protocol, 5 Hypertext Transfer Protocol &gt; GET /cbsd.crl HITP/1.1\r\n Host: 10.88.140.53\r\n User-Agent: curl/7.58.0\r\n Accept: */*\r\n \r\n [Full request URI: http://10. [HITP request 1/1]</pre>	103         1/3         bytes captured (11           140         bits), 138         bytes captured (11           1:da (00:30:64:6b:23:da), Dst: Asj           1:da (00:30:5251.113, Dst: 10.88.140.55           irc Port: 59372, Dst Port: 80, Sec           88.140.53/cbsd.crl]           6b 23 da 08 00 45 00        r.0           49 0a 05 fb 71 0a 58         -	Imports           Ide bits) on interface           ixElec_b6:72:c7 (00:06           3           1: 1, Ack: 1, Len: 84           dk#···E·           Iq.X           ·· IsAP·           / /cbsd.	\Device\NPF_{0CE3A0EC-75F3-46DE-BD1E-73C39F15F349}, id 0



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Report No.: KSCR221000195203 Page: 53 of 57

#### 93 WINNF.FT.C.SCS.3 🚄 SCS.3.pcapng 8 文件(E) 編輯(E) 视图(V) 跳转(G) 捕获(C) 分析(A) 统计(S) 电话(Y) 无线(W) 工具(I) 帮助(H) ◢ ▦ ∅ ◉ 📜 🖹 🗙 🙆 ٩. ಈ ಈ 🖀 ∓ 🖢 🚍 ٩. ٩. ٩. ٩. tls Protocol Length Info TLSV1.2 571 Client Hello TLSV1.2 571 Client Hello TLSV1.2 1514 Server Hello TLSV1.2 1514 Certificate [TCP segment of a reassembled PDU] TLSV1.2 58 Certificate Request, Server Hello Done TLSV1.2 1514 Server Hello TLSV1.2 1514 Server Hello TLSV1.2 1514 Certificate Request, Server Hello Done TLSV1.2 68 Certificate Request, Server Hello Done TLSV1.2 61 Alert (Level: Fatal, Description: Certificate Expired) TLSV1.2 61 Alert (Level: Fatal, Description: Certificate Expired) × - - + Tine Source 157 6.853036 10.5.251.38 158 6.853683 10.88.140.53 159 6.853683 10.88.140.53 160 6.853683 10.88.140.53 164 6.879857 10.5.251.38 273 11.925522 10.5.251.38 274 11.925738 10.88.140.53 274 11.927378 10.88.140.53 Destination 10.88.140.53 10.5.251.38 10.5.251.38 10.5.251.38 10.5.251.38 10.88.140.53 10.88.140.53 10.5.251.38 275 11.929738 10.88.140.53 276 11.929738 10.88.140.53 280 11.954836 10.5.251.38 10.5.251.38 10.5.251.38 10.88.140.53 Frame 164: 61 bytes on wire (488 bits), 61 bytes captured (488 bits) on interface \Device\NPF\_{0CE3A0EC-75F3-46DE-BDIE-73C39F15F349}, id 0 Ethernet II, src: AdlinkTe\_6bi23:da) (00:30:64:6bi23:da), Dst: AsixElec\_66:72:c7 (00:0e:c6:b6:72:c7) Internet Protocol Version 4, src: 10.5.251.38, Dst: 10.88.140.53 Transmission Control Protocol, src Port: 51438, Dst Port: 5003, Seq: 518, Ack: 2925, Len: 7 ansmission Control Protocol, Src Port: 51438, DSt Port: 5005, Seq: 518, ACK: ansport Layer Security TLSV1.2 Record Layer: Alert (Level: Fatal, Description: Certificate Expired) Content Type: Alert (21) Version: TLS 1.2 (0x0303) Length: 2 ✓ Alert Message Level: Fatal (2) Description: Certificate Expired (45) 0000 00 0e c6 b7 c7 c0 d8 c0 d4 b0 c1 <thc1</th> <thc1</th> <thc1</th> c1< ○ Z Transport Laver Security: Protocol 分组: 1724 · 已显示: 70 (4.1%) 9.4 WINNF.FT.C.SCS.4 σ 📕 SCS.4.pcapng tls × - + Protocol Length Info TLSV1.2 571 Client Hello TLSV1.2 1514 Server Hello TLSV1.2 1514 Certificate [TCP segment of a reassembled PDU] TLSV1.2 58 Certificate Request, Server Hello Done Time Source 130 5.807419 10.5.251.38 131 5.807745 10.88.140.53 132 5.807745 10.88.140.53 133 5.807745 10.88.140.53 10.88.140.53 10.5.251.38 10.5.251.38 10.5.251.38 $\begin{array}{c} 133 5.80/45 & 10.88.140.53 \\ 137 5.82092 & 10.5.251.38 \\ 240 10.875158 10.5.251.38 \\ 241 10.875579 10.88.140.53 \\ 242 10.875579 10.88.140.53 \\ 243 10.875579 10.88.140.53 \\ 243 10.875579 10.88.140.53 \\ 247 10.887688 10.5.251.38 \\ \end{array}$ TLSV1.2 61 Alert (Level: Fatal, Description: Unknown CA) 10.88.140.53 10.88.140.53 10.88.140.53 10.5.251.38 10.5.251.38 10.5.251.38 10.88.140.53 ILSY1.2 61 Alert (LeVel: Fatal, Description: Unknown CA) TLSY1.2 751 Client Hello TLSY1.2 1514 Server Hello TLSY1.2 1514 Certificate [TCP segment of a reassembled PDU] TLSY1.2 S8 Certificate Request, Server Hello Done TLSY1.2 61 Alert (Level: Fatal, Description: Unknown CA) Frame 137: 61 bytes on wire (488 bits), 61 bytes captured (488 bits) on interface \Device\WPF\_{0CE3A0EC-75F3-46DE-BDIE-73C39F15F349}, id 0 Ethernet II, Src: AdlinkTe\_6b:23:da) (00:30:64:6b:23:da), Dst: AsixElec\_b6:72:c7 (00:00:c6:b6:72:c7) Internet Protocol Version 4, Src: 10-5.251:38, Dst: 10-88.140-53 Iransmission Control Protocol, Src Port: 51498, Dst Port: 5003, Seq: 518, Ack: 2925, Len: 7 Transpission Control Protocol, Src Port: 51498, Dst Port: 5003, Seq: 5 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) Description: Unknown CA (48) 000 00 0e cc 6b 72 c7 00 30 64 6b 23 da 08 04 56 00 0010 00 2f 64 3d 55 4a 56 0a 58 0a 58 0a 58 0a 58 56 3d 55 4a 54 0a 0a 54 64 64 64 64 64 64 64 64 64 64 64 64 64 64 64 64 64 64 64 64 64 64 54 64 64 54 64 64 54 64 64 54 64 64 54 64 64 54 64 64 54 64 64 54 64 64 54 64 64 54 64 64 54 64 64 54 64 64 54 6 ·/b·@·?· =e···&·X ·5·\*··n· Y····~P· ○ Z Transport Layer Security: Protocol 分组: 1336 ・ 已显示: 55 (4.1%) 配需: Default



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#### 9.5

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tls					X
Tin	e Source	Destination	Protocol L	ength Info	
236 11.	122197 10.5.251.38	10.88.140.53	TLSv1.2	571 Client Hello	
237 11.	122558 10.88.140.53	10.5.251.38	TLSv1.2	1514 Server Hello	
238 11.	122558 10.88.140.53	10.5.251.38	TLSv1.2	1514 Certificate [TCP segment of a reassembled PDU]	
239 11.	.122558 10.88.140.53	10.5.251.38	TLSv1.2	58 Certificate Request, Server Hello Done	
243 11.	.146786 10.5.251.38	10.88.140.53	TLSv1.2	61 Alert (Level: Fatal, Description: Decrypt Error)	
354 16.	.196821 10.5.251.38	10.88.140.53	TLSv1.2	571 Client Hello	
355 16.	.197144 10.88.140.53	10.5.251.38	TLSv1.2	1514 Server Hello	
356 16.	.197144 10.88.140.53	10.5.251.38	TLSv1.2	1514 Certificate [TCP segment of a reassembled PDU]	
357 16.	.197144 10.88.140.53	10.5.251.38	TLSv1.2	58 Certificate Request, Server Hello Done	
361 16.	.221750 10.5.251.38	10.88.140.53	TLSv1.2	61 Alert (Level: Fatal, Description: Decrypt Error)	
~ Aler	gth: 2 rt Message evel: Fatal (2)				
	Description: Decrypt Erro	r (51)			
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000 00 0 010 00 2 020 8c 3 030 01 1	ef a2 41 40 00 3f 06 fd 85 c9 6e 13 8b 2b 39 d2	ce 0a 05 fb 26 0a 58 ·/·A@·?· b1 38 e5 3b ad 50 18 ·5·n··+9	·····&·X ··8·;·P·	//狙:1091 ・己島市:40 (3.76)	NE : D



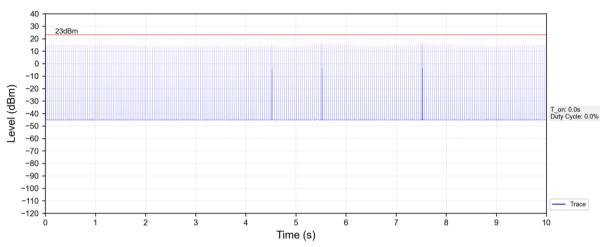
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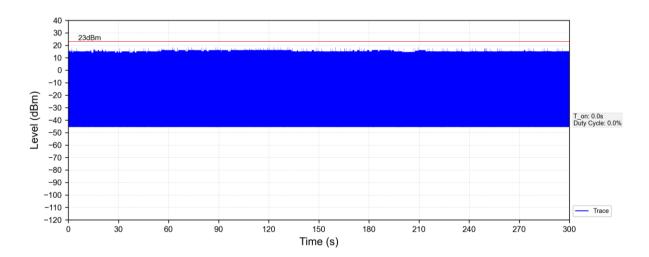
Report No.: KSCR221000195203 Page: 55 of 57

# 10 Result of Time test for getting Grant



### 10.1 1 second within any 10-second period





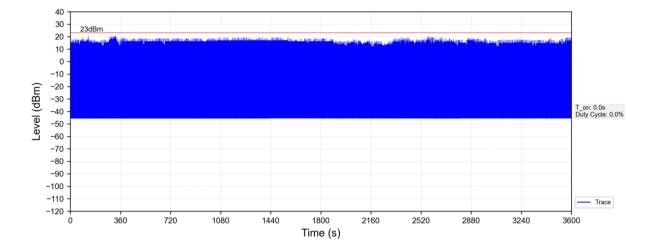


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### 10.3 20 seconds within any 3600-second period



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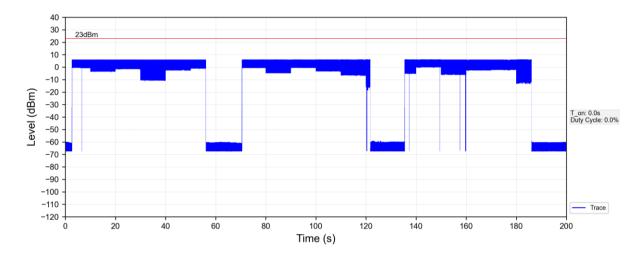
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# 11 Verify that the device will register with a SAS when operating below 23 dBm

Verified in test case WINNF.PT.C.HBT.1, the CPE-CBSD as UUT default EIRP is under 23 dBm and can register success with SAS. After granted, the CPE-CBSD UUT will adjust the EIRP by maxEirp.



### 12 Photographs

### 12.1 EUT Constructional Details (EUT Photos)

Please Refer to Integral and internal photos for details.

- End of the Report -



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