





TEST REPORT

No. I22Z62158-WMD01

for

Baicells Technologies Co., Ltd.

Product Name: 5G NR Base Station

Model Name: sBSC7048A1

FCC ID: 2AG32SBSC7048A1

with

Hardware Version: CBSD: Ver.A, DP: X86 6133 Software Version: CBSD: BaiBBU_QSS_1.1.7, DP: BaiOMC_8.2.4

Issued Date: 2022-11-16

Note:

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of CTTL.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S.Government.

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REPORT HISTORY

Report Number	Revision	Description	Issue Date
I22Z62158-WMD01	Rev.0	1 st edition	2022-11-16

Note: the latest revision of the test report supersedes all previous version.





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1. Test Laboratory

1.1. Introduction & Accreditation

Telecommunication Technology Labs, CAICT is an ISO/IEC 17025:2017 accredited test laboratory under NATIONAL VOLUNTARY LABORATORY ACCREDITATION PROGRAM (NVLAP) with lab code 600118-0 and is also an FCC accredited test laboratory (CN5017), ISED accredited test laboratory (CN0066), and OnGo alliance/WInnForum authorized test lab. The detail accreditation scope can be found on NVLAP website.

1.2. Testing Location

Address:

Location 1: CTTL(Huayuan North Road)

No. 52, Huayuan North Road, Haidian District, Beijing, P. R. China 100191.

1.3. Testing Environment

Normal Temperature:	15-35 ℃
Relative Humidity:	20-75%

1.4. Project data

Testing Start Date:	2022-10-10
Testing End Date:	2022-11-01

1.5. Signature



Dong Yuan (Prepared this test report)

Zhou Yu (Reviewed this test report)

赵慧麟

Zhao Hui Lin Deputy Director of the laboratory (Approved this test report)





2. Client Information

2.1. Applicant Information

Company Name:	Baicells Technologies Co., Ltd.
Address:	9-10F, 1stBldg., No.81 Beiqing Road, Haidian District, Beijing, China
City:	Beijing
Postal Code:	100094
Country:	China
Telephone:	010-62607100
Fax:	010-62607100

2.2. Manufacturer Information

Company Name:	Baicells Technologies Co., Ltd.
Address:	9-10F, 1stBldg., No.81 Beiqing Road, Haidian District, Beijing, China
City:	Beijing
Postal Code:	100094
Country:	China
Telephone:	010-62607100
Fax:	010-62607100





3. Equipment Under Test (EUT) and Ancillary Equipment (AE)

3.1. About EUT

Description	5G NR base station
Model Name	sBSC7048A1
FCC ID	2AG32SBSC7048A1
CBSD Category	Category B
EUT in Test	CBSD with Domain Proxy
CBSD HW Version	Ver.A
CBSD SW Version	BaiBBU_QSS_1.1.7
Domain Proxy HW Version	X86 6133
Domain Proxy SW Version	BaiOMC_8.2.4
Antenna Gain	13dBi
Supported Channel bandwidth	NR:10/20/30/40 MHz
Output Power	Conducted maximum 0.25W/MHz, maximum 10W
Number of Antenna ports	2
Frequency range	n48 3550MHz-3700MHz
Type of modulation	QPSK, 64QAM, 256QAM
Extreme Temperature	-40/+50℃
Normal Voltage	48V DC
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Note: This is a BTS-CBSD communication with Domain Proxy. Domain Proxy information show as below: Model No. of Domain Proxy:

3.2. Internal Identification of EUT used during the test

EUT ID*	SN or IMEI	HW Version	SW Version	Date of receipt
UT01a	12020005382283B0006	VER.A	BaiBBU_QSS_1.1.7	2022.10.10
UT02a	12020005382283B0022	VER.A	BaiBBU_QSS_1.1.7	2022.10.10

*EUT ID: is used to identify the test sample in the lab internally.





4. <u>Reference Documents</u>

4.1. Documents supplied by applicant

Supported features, referring to Annex A for detailed information, are supplied by the client or manufacturer, which is the basis of testing. CAICT is not responsible for the accuracy of customer supplied technical information that may affect the test results (for example, antenna gain and loss of customer supplied cable).

4.2. Reference Documents for testing

The following documents listed in this section are referred for testing.

Reference	Title	Version
WINNF-TS-0122	Test and Certification for Citizens Broadband Radio Service	V1.0.2
	(CBRS); Conformance and Performance Test Technical	
	Specification; CBSD/DP as Unit Under Test (UUT)	
ONGO-TS-9001	OnGo Release 1 Certification Test Plan	V1.2.1
FCC 47 CFR Part 96	Citizens Broadband Radio Service	10-1-21
		Edition
KDB 940660 D01	Certification And Test Procedures For Citizens Broadband Radio	Eqpt v03
	Service Devices Authorized Under Part 96	October 29
		2018





5. Test Results

5.1. Summary of Test Results

Test Case Name	Description	Verdict
WINNF.FT.D.REG.2	Domain Proxy Multi-Step registration	
WINNF.FT.D.REG.6	Domain Proxy Single-Step registration for CBSD with CPI signed data	
WINNF.FT.D.REG.9	Domain Proxy Missing Required parameters (responseCode 102)	Pass
WINNF.FT.D.REG.11	Domain Proxy Pending registration (responseCode 200)	Pass
WINNF.FT.D.REG.13	Domain Proxy Invalid parameters (responseCode 103)	Pass
WINNF.FT.D.REG.15	Domain Proxy Blacklisted CBSD (responseCode 101)	Pass
WINNF.FT.D.REG.17	Domain Proxy Unsupported SAS protocol version responseCode 100)	Pass
WINNF.FT.D.REG.19	Domain Proxy Group Error (responseCode 201)	Pass
WINNF.FT.C.GRA.1	Unsuccessful Grant responseCode=400 (INTERFERENCE)	Pass
WINNF.FT.C.GRA.2	Unsuccessful Grant responseCode=401 (GRANT CONFLICT)	Pass
WINNF.FT.D.HBT.2	Domain Proxy Heartbeat Success Case (first Heartbeat Response)	Pass
WINNF.FT.C.HBT.3	Heartbeat responseCode=105 (DEREGISTER)	Pass
WINNF.FT.C.HBT.5	Heartbeat responseCode=501 (SUSPENDED_GRANT) in First	Pass
	Heartbeat Response	
WINNF.FT.C.HBT.6	Heartbeat responseCode=501 (SUSPENDED_GRANT) in Subsequent	Pass
	Heartbeat Response	
WINNF.FT.C.HBT.7	Heartbeat responseCode=502 (UNSYNC OP PARAM)	Pass
WINNF.FT.D.HBT.8	Domain Proxy Heartbeat responseCode=500 (TEMIN/ATED_GRANT)	Pass
WINNF.FT.C.HBT.9	Heartbeat Response Absent (First Heartbeat)	Pass
WINNF.FT.C.HBT.10	Heartbeat Response Absent (Subsequent Heartbeat)	Pass
WINNF.FT.D.MES.2	Domain Proxy Registration Response contains measReportConfig	Pass
WINNF.FT.C.MES.3	Grant Response contains measReportConfig	Pass
WINNF.FT.D.MES.5	Domain Proxy Heartbeat Response contains measReportConfig	Pass
WINNF.FT.D.RLQ.2	Domain Proxy Successful Relinquishment	Pass
WINNF.FT.D.DRG.2	Domain Proxy Successful Deregistration	Pass
WINNF.FT.C.SCS.1	Successful TLS connection between UUT and SAS Test Harness	Pass
WINNF.FT.C.SCS.2	TLS failure due to revoked certificate	Pass
WINNF.FT.C.SCS.3	TLS failure due to expired server certificate	Pass
WINNF.FT.C.SCS.4	TLS failure when SAS Test Harness certificate is issue by unknown CA	
WINNF.FT.C.SCS.5	TLS failure when certificate at the SAS Test Harness is corrupted	Pass
WINNF.PT.C.HBT.1	UUT RF Transmit Power Measurement	Pass

Note: please refer to Annex B in this test report for the detailed test results.

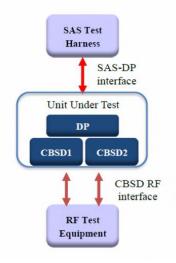
The following terms are used in the above table.

Pass	Amount of testcases with pass results in the given frequency band.
Fail	Amount of testcases with fail results in the given frequency band.
Inc	Amount of testcases with ambiguous results in the given frequency band.
Declare	Amount of testcases with conformity declaration from the client in the given
	frequency band.





5.2. Test Setup Diagram



5.3. Statements

5G NR Base Station, Model sBSC7048A1, manufactured by Baicells Technologies Co., Ltd. is an initial model for the test.

The CBSD1, CBSD2, OMC, EPC and the Laptop with SAS test harness were connected to a switch. DP software is deployed on the OMC. The RF antenna port on UUT was connected to spectrum analyzer with RF cable. UUT and the SAS Test Harnesses were UTC time synchronized. The WInnForum Test Harness Test Harness (V1.0.0.3) was used. The RF measurement was performed by conducted method.

CTTL has verified that the compliance of the tested device specified in section 3 of this test report is evaluated according to the procedure and test methods as defined in type certification requirement listed in section 4 of this test report.





6. <u>Test Facilities Utilized</u>

Test Equipment List

Description	Туре	Series Number	Manufacture	Cal Due Date	Calibration Interval
Signal Analyzer	FSV	101576	rohde&schwarz	2023-5-5	1 year
Signal Analyzer	9030B	MY57142378	Keysight	2023-3-1	1 year

Description of Support Units

Description	Model No.	Series Number	Manufacture
	KEY-		
5GC	8201SAS-	GSD7238780	Advantech
	AB00E		
OMC	1501000101	AD60B45FB07D181E7F20FE705C05	Baicells
Laptop(with SAS	Thinkpad	PF-136YPF	Longyo
Test Harness)	E480	PF-130TPF	Lenovo
Switch	S6520-16S-SI	210235A3J5H203000170	H3C
Hub	TL-SG1008D	1199C50004642	TP-Link

7. MEASUREMENT UNCERTAINTY

For a 95% confidence level, the measurement uncertainties for defined systems are:

Test Discipline	Measurement Uncertainty
Conducted RF power	0.75dB
Temperature	1°C
Humidity	3%





ANNEX A: Supported Features

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





ANNEX B: Detailed Test Results

Annex B.1 Terms used in Results column

Pass	This testcase has been tested, and EUT is conformant to the applied standards in the given frequency band.
Fail	This testcase has been tested, but EUT is not conformant to the applied standards in the given frequency band.
n/a	This test case is either not required/not applicable in the specified band or is not applicable according to the specific PICS/PIXIT for the EUT.
Inc	Test case result is ambiguous in the given frequency band.
Decl	Declaration is received from the client to demonstrate the conformity to the relevant specification in the given frequency band.
BR	This testcase is not tested in the given frequency band, but this testcase was tested with pass result for the initial model in the given frequency band.





Annex B.2 Testcases Results

1) [WINNF.FT.D.REG.2] Domain Proxy Multi-Step registration

This test is mandatory for the Domain proxy that is controlling CBSDs which support multi-step registration. This test validates that each of the required parameters appear within the registration request message. This test case applies to Domain Proxy supervising two CBSDs. The following are the test execution steps:

#	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 	PASS
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, fccId 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
3	 SAS Test Harness sends a CBSD Registration Response in the form of one 2-element Array or individual messages asfollows: cbsdId = Ci measReportConfig shall not be included responseCode = 0 for each CBSD 	PASS
4	After completion of step 3, SAS Test Harness will not provide any positive response (<i>responseCode</i> =0) to further request messages from the UUT.	PASS
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 not transmit RF	PASS





2) [WINNF.FT.D.REG.6] Domain Proxy Single-Step registration for CBSD with CPI signed data

The following are the test execution steps:

#	Test Execution Steps	Results
1	 Ensure the following conditions are met for test entry: UUT has successfully completed SAS Discovery and Authentication with SAS Test Harness UUT is in the Unregistered state All of the required and REG-Conditional parameters shall be configured and CPI signature provided 	PASS
2	 The DP with two CBSDs sends Registration requests in the form of one 2-element Array or as individual messages to the SAS Test Harness: The required userId, fccId and cbsdSerialNumber and REG-Conditional cbsdCategory, airInterface, measCapability and cpiSignatureData registration parameters shall be sent from the CBSD and conform to proper format and acceptable ranges. Any optional registration parameters that may be included in the message shall be verified that they conform to proper format and are within acceptable ranges. 	PASS
3	 SAS Test Harness sends a CBSD Registration Response in the form of one 2-element Array or as individual messages as follows: <i>cbsdId</i> = Ci <i>measReportConfig</i> for each CBSD shall not be included. <i>responseCode</i> = 0 for each CBSD 	PASS
4	After completion of step 3, SAS Test Harness will not provide any positive response (<i>responseCode</i> =0) to further request messages from the UUT.	PASS
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 not transmit RF 	PASS

If a waiver for the measurement capability has been obtained from the FCC for the CBSD, the WINNF.FT.D.REG.6_waiver test case shall be executed which is the same as above, but where measCapability is not required in the request message.





3) [WINNF.FT.D.REG.9] Domain Proxy Missing Required parameters(responseCode 102)

This test case applies to Domain Proxy supervising two CBSDs. The following are the test execution steps where the Registration response contains *responseCode* (Ri) = 102 for each CBSD:

#	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 	PASS
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.	PASS
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 <i>cbsdId</i>. <i>responseCode</i> = Ri for CBSD1 and CBSD2 	PASS
4	After completion of step 3, SAS Test Harness will not provide any positive response (<i>responseCode=</i> 0) to further request messages from the UUT.	PASS
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 not transmit RF	PASS

4) [WINNF.FT.D.REG.11] Domain Proxy Pending registration (responseCode 200)

The same steps provided for WINNF.FT.D.REG.9 shall be executed for this test, with the exception that the Registration response contains *responseCode* (Ri) = 200 for each CBSD.

#	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 	PASS
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.	PASS
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 <i>cbsdId</i>. – <i>responseCode</i> = Ri for CBSD1 and CBSD2 	PASS
4	After completion of step 3, SAS Test Harness will not provide any positive response (<i>responseCode</i> =0) to further request messages from the UUT.	PASS
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 not transmit RF	PASS





5) [WINNF.FT.D.REG.13] Domain Proxy Invalid parameters (responseCode 103)

The same steps provided for WINNF.FT.D.REG.9 shall be executed for this test, with the exception that the Registration response contains *responseCode* R1 = 0 for CBSD1 and R2 = 103 for CBSD2

#	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 	PASS
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.	PASS
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 <i>cbsdId</i>. <i>responseCode</i> = Ri for CBSD1 and CBSD2 	PASS
4	After completion of step 3, SAS Test Harness will not provide any positive response (<i>responseCode=</i> 0) to further request messages from the UUT.	PASS
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 not transmit RF 	PASS

6) [WINNF.FT.D.REG.15] Domain Proxy Blacklisted CBSD (responseCode 101)

The same steps provided for WINNF.FT.D.REG.9 shall be executed for this test, with the exception that the Registration response contains *responseCode* R1 = 0 for CBSD1 and R2 = 101 for CBSD2.

#	Test Execution Steps	Results	
	Ensure the following conditions are met for test entry:	DAGG	
1	UUT has successfully completed SAS Discovery and Authentication with SAS Test HarnessUUT is in the Unregistered state	PASS	
2	The DP with two CBSDs sends a Registration request in the form of one 2-element Array or as	PASS	
	individual messages to SAS Test Harness.		
	• SAS Test Harness sends a CBSD Registration Response in the form of one 2-element Array or		
3	as individual messages as follows:	PASS	
5	– SAS response does not include a <i>cbsdId</i> .		
	- responseCode = Ri for CBSD1 and CBSD2		
4	After completion of step 3, SAS Test Harness will not provide any positive response (<i>responseCode=</i> 0)	PASS	
4	to further request messages from the UUT.	TASS	
	Monitor the RF output of each UUT from start of test until 60 seconds after Step 3 is complete. This is		
5	the end of the test. Verify:	PASS	
	UUT shall not transmit RF		





7) [WINNF.FT.D.REG.17] Domain Proxy Unsupported SAS protocol version (responseCode 100)

The same steps provided for WINNF.FT.D.REG.9 shall be executed for this test, with the exception that the Registration response contains *responseCode* (Ri) = 100 for each CBSD.

#	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 	PASS
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.	PASS
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 <i>cbsdId</i>. <i>responseCode</i> = Ri for CBSD1 and CBSD2 	PASS
4	After completion of step 3, SAS Test Harness will not provide any positive response (<i>responseCode=</i> 0) to further request messages from the UUT.	PASS
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 not transmit RF 	PASS

8) [WINNF.FT.D.REG.19] Domain Proxy Group Error (responseCode 201)

The same steps provided for WINNF.FT.D.REG.9 shall be executed for this test, with the exception that the Registration response contains *responseCode* R1 = 0 for CBSD1 and R2 = 201 for CBSD2.

#	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 	PASS
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.	PASS
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 <i>cbsdId</i>. – <i>responseCode</i> = Ri for CBSD1 and CBSD2 	PASS
4	After completion of step 3, SAS Test Harness will not provide any positive response (<i>responseCode</i> =0) to further request messages from the UUT.	PASS
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 not transmit RF	PASS





9) [WINNF.FT.C.GRA.1] Unsuccessful Grant responseCode=400 (INTERFERENCE)

The following steps describe the test execution where the Grant response contains responseCode (R) = 400.

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

10) [WINNF.FT.C.GRA.2] Unsuccessful Grant responseCode=401(GRANT_CONFLICT)

The same steps provided for WINNF.FT.C.GRA.1 shall be executed for this test, with the exception that the Grant response contains *responseCode* (\mathbf{R}) = 401.

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





11) [WINNF.FT.D.HBT.2] Domain Proxy Heartbeat Success Case (first Heartbeat Response)

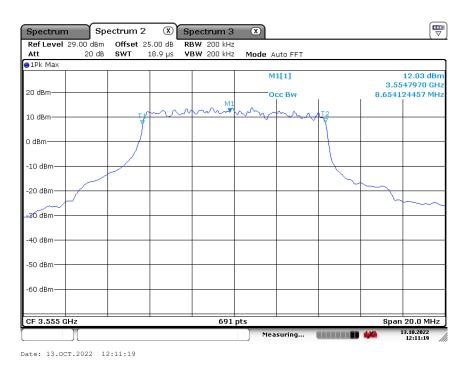
This test case applies to Domain Proxy supervising two CBSDs. The following are the test execution steps.

#	st case applies to Domain Proxy supervising two CBSDs. The following are the test execution steps. Test Execution Steps	Results
	Ensure the following conditions are met for test entry:	
1	• DP has two CBSD registered successfully with SAS Test Harness,	PASS
	• with $cbsdId = Ci$, $i = \{1,2\}$	
	DP sends a message:	
2	If message is a Spectrum Inquiry Request, go to step 3	PASS
2	 If message is a Grant Request, go to step 5 	1 155
	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	
3		PASS
3	Request message is formatted correctly for each CBSD, including for CBSDi, i={1,2}:	PASS
	• $cbsdId = Ci$	
	List of frequencyRange objects sent by DP are within the CBRS frequency range	
	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	
4	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	
	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, $i=\{1,2\}$:	
5	• $cbsdId = C$	PASS
	• 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	
6	If a separate Grant Request message was sent for each CBSD, the SAS Test Harness shall respond	/
6	to each Grant Request message with a separate Grant Response message.	/
	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,	
7		PASS
7	Verify Heartbeat Request message is formatted correctly for each CBSD, including,	PASS
7	Verify Heartbeat Request message is formatted correctly for each CBSD, including, for CBSDi i={1,2}:	PASS
7	<pre>Verify Heartbeat Request message is formatted correctly for each CBSD, including, for CBSDi i={1,2}:</pre>	PASS
7	 Verify Heartbeat Request message is formatted correctly for each CBSD, including, for CBSDi i={1,2}: <i>cbsdId</i> = Ci, i={1,2} 	PASS





	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:	
	• $cbsdId = Ci$	
	• $grantId = Gi$	
	• <i>transmitExpireTime</i> = current UTC time + 200 seconds	
	• $responseCode = 0$	
	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" 	
9	and SAS Test Harness responds with a Heartbeat Response message including the following	PASS
	parameters, for CBSDi	
	• $cbsdId = Ci$	
	• $grantId = Gi$	
	• <i>transmitExpireTime</i> = current UTC time + 200 seconds	
	• $responseCode = 0$	
	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:	
10	• UUT does not transmit at any time prior to completion of the first	PASS
	heartbeat response	
	• UUT transmits after step 8 is complete, and its transmission is limited to within the	
	bandwidth range Fi.	







12) [WINNF.FT.C.HBT.3] Heartbeat responseCode=105 (DEREGISTER)

#	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: o valid <i>cbsdId</i> = C o valid <i>grantId</i> = G o grant is for frequency range F, power P o <i>grantExpireTime</i> = UTC time greater than duration of the test UUT is in AUTHORIZED state and is transmitting within the grant bandwidth F on RF interface 	PASS
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
3	 SAS Test Harness sends a Heartbeat Response message, including the following parameters: <i>cbsdId</i> = C <i>grantId</i> = G <i>transmitExpireTime</i> = T = Current UTC time <i>responseCode</i> = 105 (DEREGISTER) 	PASS
4	After completion of step 3, SAS Test Harness shall not allow any further grants to the UUT.	PASS
5	 Monitor the RF output of the UUT. Verify: UUT shall stop transmission within (T + 60 seconds) of completion of step 3 	PASS





13) [WINNF.FT.C.HBT.5] Heartbeat responseCode=501 (SUSPENDED_GRANT) in First Heartbeat Response The following are the test execution steps.

#	Test Execution Steps	Results
	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:	
	o valid $cbsdId = C$	
1	o valid $grantId = G$	PASS
	o grant is for frequency range F, power P	
	o 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)	
	UUT sends a Heartbeat Request message.	
	Verify Heartbeat Request message is formatted correctly, including:	
2	• $cbsdId = C$	PASS
	• $grantId = G$	
	• <i>operationState</i> = "GRANTED"	
	SAS Test Harness sends a Heartbeat Response message, including the following parameters:	
	• $cbsdId = C$	
3	• $grantId = G$	PASS
	• <i>transmitExpireTime</i> = T = current UTC time	
	• <i>responseCode</i> = 501 (SUSPENDED_GRANT)	
4	After completion of step 3, SAS Test Harness shall not allow any further grants to the UUT.	PASS
	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:	
	• $cbsdId = C$	
	• $grantId = G$	
5	 operationState = "GRANTED" 	PASS
5	B. UUT sends a Relinquishment request message. Ensure message is	I ASS
	correctly formatted with parameters:	
	• $cbdsId = C$	
	• $grantId = G$	
	Monitor the RF output of the UUT. Verify:	
	UUT does not transmit at any time	





14) [WINNF.FT.C.HBT.6] Heartbeat responseCode=501 (SUSPENDED_GRANT) in Subsequent Heartbeat Response
The following are the test execution steps.

#	Test Execution Steps	Results
	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:	
	o valid $cbsdId = C$	
1	o valid $grantId = G$	PASS
	o grant is for frequency range F, power P	
	o 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	
	UUT sends a Heartbeat Request message.	
	Verify Heartbeat Request message is sent within latest specified	
2	heartbeatInterval, and is formatted correctly, including:	PASS
2	• $cbsdId = C$	FASS
	• $grantId = G$	
	• operationState = "AUTHORIZED"	
	SAS Test Harness sends a Heartbeat Response message, including the following parameters:	
	• $cbsdId = C$	
3	• $grantId = G$	PASS
	• <i>transmitExpireTime</i> = 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.	PASS
	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:	
	• $cbsdId = C$	
	• $grantId = G$	
5	 operationState = "GRANTED" 	PASS
5	B. UUT sends a Relinquishment Request message. Ensure message is	TASS
	correctly formatted with parameters:	
	• $cbdsId = C$	
	• $grantId = G$	
	Monitor the RF output of the UUT. Verify:	
	• UUT shall stop transmission within $(T + 60 \text{ seconds})$ of completion of step 3	





15) [WINNF.FT.C.HBT.7] Heartbeat responseCode=502 (UNSYNC_OP_PARAM)

#	Test Execution Steps	Results
	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:	
	o valid $cbsdld = C$	
1	o valid <i>grantId</i> = G	PASS
	o grant is for frequency range F, power P	
	o 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	
	UUT sends a Heartbeat Request message.	
	Verify Heartbeat Request message is sent within latest specified	
2	heartbeatInterval, and is formatted correctly, including:	PASS
	• $cbsdld = C$	r Ass
	• grantld = G	
	operationState = "AUTHORIZED"	
	SAS Test Harness sends a Heartbeat Response message, including the following	
	parameters:	
3	• $cbsdld = C$	PASS
5	• grantld = G	I ASS
	 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.	PASS
	Monitor the SAS-CBSD interface. Verify:	
	• UUT sends a Grant Relinquishment Request message. Verify message is correctly	
	formatted with parameters:	
5	\circ cbdsld = C	PASS
	\circ grantId = G	
	Monitor the RF output of the UUT. Verify:	
	• UUT shall stop transmission within (T+60) seconds of completion of step 3.	





16) [WINNF.FT.D.HBT.8] Domain Proxy Heartbeat responseCode=500(TERMINATED_GRANT)

This test case applies to Domain Proxy supervising two CBSDs. The following are the test execution steps.

#	est case applies to Domain Proxy supervising two CBSDs. The following are the test execution steps. Test Execution Steps	Results
	Ensure the following conditions are met for test entry:	itesuits
	DP has two CBSD registered successfully with SAS Test Harness	
	• Each CBSD {1,2} has a valid single grant as follows: o valid $cbsdld = Ci, i={1,2}$	
	o valid grant d = Gi, i={1,2}	
1	o grant is for frequency range Fi, power Pi	PASS
	o grantExpireTime = UTC time greater than duration of the test	
	• Both CBSD are in AUTHORIZED state and transmitting within their granted bandwidth on	
	RF interface	
	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 <i>heartbeatInterval</i> , and is	
2	formatted correctly for each CBSD, including, for CBSDi i={1,2}:	PASS
	• $cbsdld = Ci, i = \{1, 2\}$	
	• $grantId = Gi, i = \{1, 2\}$	
	operationState = "AUTHORIZED"	
	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.	
3	Parameters for each CBSD within the Heartbeat Response message should be as follows,	PASS
	for CBSDi:	
	• cbsdld = Ci	
	• grantId = Gi	
	• For CBSD1:	
	o <i>transmitExpireTime</i> = current UTC time + 200 seconds	
	o responseCode = 0	
	• For CBSD2:	
	o <i>transmitExpireTime</i> = T = current UTC time	
	o responseCode = 500 (TERMINATED_GRANT)	
	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:	D
4	• cbsdld = C1	PASS
	• grantId = G1	
	 transmitExpireTime = current UTC time + 200 seconds 	





	• Heartbeat Request message is within <i>heartbeatInterval</i> of previous Heartbeat Request	
	message	
	Monitor the RF output of CBSD2. Verify:	
5	• CBSD2 shall stop transmission within bandwidth F2 within (T + 60 seconds) of completion	PASS
	of step 3	

17) [WINNF.FT.C.HBT.9] Heartbeat Response Absent (First Heartbeat)

#	Test Execution Steps	Results
	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: o valid cbsdld = C 	
1	o valid <i>grantId</i> = G	DAGG
1	o grant is for frequency range F, power P	PASS
	o 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)	
	UUT sends a Heartbeat Request message.	
	Ensure Heartbeat Request message is sent within latest specified heartbeatInterval, and is	PASS
2	formatted correctly, including:	
2	• $cbsdld = C$	TASS
	• grantId = G	
	 operationState = "GRANTED" 	
3	After completion of Step 2, SAS Test Harness does not respond to any further messages	PASS
3	from UUT to simulate loss of network connection	rass
4	Monitor the RF output of the UUT from start of test to 60 seconds after step 3. Verify:	PASS
4	 At any time during the test, UUT shall not transmit on RF interface 	rass





18) [WINNF.FT.C.HBT.10] Heartbeat Response Absent (Subsequent Heartbeat)

#	Test Execution Steps	Results
	Ensure the following conditions are met for test entry:	
1	 UUT has registered successfully with SAS Test Harness 	
	• UUT has a valid single grant as follows: o valid <i>cbsdld</i> = C	
	o valid <i>grantId</i> = G	DACC
	o grant is for frequency range F, power P	PASS
	o 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	
	UUT sends a Heartbeat Request message.	
	Verify Heartbeat Request message is sent within the latest specified heartbeatInterval, and	
2	is formatted correctly, including:	PASS
2	• $cbsdld = C$	PASS
	• grantId = G	
	 operationState = "AUTHORIZED" 	
	SAS Test Harness sends a Heartbeat Response message, with the following parameters:	
	• $cbsdld = C$	
3	• grantId = G	PASS
	 transmitExpireTime = current UTC time + 200 seconds 	
	• responseCode = 0	
4	After completion of Step 3, SAS Test Harness does not respond to any further messages	PASS
4	from UUT	PASS
	Monitor the RF output of the UUT. Verify:	
5	• UUT shall stop all transmission on RF interface within (<i>transmitExpireTime</i> + 60 seconds),	PASS
	using the transmitExpireTime sent in Step 3.	





19) [WINNF.FT.D.MES.2] Domain Proxy Registration Response contains measReportConfig

This test case is mandatory for Domain Proxy supervising CBSD which support

RECEIVED_POWER_WITHOUT_GRANT.

The following steps describes the test execution steps:

#	Test Execution Steps	Results
	Ensure the following conditions are met for test entry:	
1	• DP has successfully completed SAS Discovery and Authentication with SAS Test Harness	PASS
	DP sends a Registration Request message for each of two CBSD. This may occur in a	
	separate Request message per CBSD, or together in a single Request message with array	
	of 2.	
	Verify Registration Request message contains all required parameters properly formatted	
2	for CBSDi, i={1,2}, and specifically:	PASS
	userId is present and correct	
	fccld is present and correct	
	cbsdSerialNumber is present and correct	
	 measCapability = "RECEIVED_POWER_WITHOUT_GRANT" 	
	If a separate Registration Request message was sent for each CBSD by the DP, the SAS	
	Test Harness shall respond to each Registration Request message with a separate	
	Registration Response message.	
	If a single Registration Request message was sent by the DP containing a 2-object array	
	(one per CBSD), the SAS Test Harness shall respond with a single Registration Response	
3	message containing a 2-object array.	PASS
	Parameters for each CBSD within the Registration Response message should be as follows,	
	for CBSDi:	
	• <i>cbsdld</i> = Ci	
	 measReportConfig= "RECEIVED_POWER_WITHOUT_GRANT" 	
	• responseCode = 0	
	UUT sends a message:	
4	 If message is type Spectrum Inquiry Request, go to step 5, or 	PASS
	 If message is type Grant Request, go to step 7 	
	UUT sends message type Spectrum Inquiry Request. This may occur in a separate message	
	per CBSD, or together in a single message with array of 2. Verify Spectrum Inquiry Request	
5	message contains all required parameters properly formatted for CBSDi, i= {1,2}, and	PASS
5	specifically:	rass
	• <i>cbsdld</i> = Ci	
	 measReport is present, and is a properly formatted rcvdPowerMeasReport. 	
	If a separate Spectrum Inquiry Request message was sent for each CBSD by the DP, the	
	SAS Test Harness shall respond to each Spectrum Inquiry Request message with a	
6	separate Spectrum Inquiry Response message.	PASS
	If a single Spectrum Inquiry Request message was sent by the DP 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.	
	Parameters for each CBSD within the Spectrum Inquiry Response message should be as	
	follows:	
	• <i>cbsdld</i> = Ci	
	 availableChannel is an array of availableChannel objects 	
	• responseCode = 0	
	UUT sends message type Grant Request message. This may occur in a separate message	
	per CBSD, or together in a single message with array of 2.	
7	Verify the Grant Request message contains all required parameters properly formatted for	DACC
7	CBSDi, i= {1,2}, and specifically:	PASS
	• <i>cbsdld</i> = Ci	
	 measReport is present, and is a properly formatted rcvdPowerMeasReport. 	





20) [WINNF.FT.C.MES.3] Grant Response contains measReportConfig

This test case is mandatory for UUT supporting RECEIVED_POWER_WITH_GRANT measurement reports.

The following steps describes the test execution steps:

#	Test Execution Steps	Results
	Ensure the following conditions are met for test entry:	
1	• UUT has successfully completed SAS Discovery and Authentication with SAS Test	
	Harness	PASS
	• UUT has successfully registered with SAS Test Harness, with cbsdld=C and	
	measCapability = "RECEIVED_POWER_WITH_GRANT"	
	UUT sends a Grant Request message.	
	Verify Grant Request message contains all required parameters properly formatted, and	
2	specifically:	PASS
	• $cbsdld = C$	
	 operationParam is present and format is valid 	
	SAS Test Harness sends a Grant Response message, with the following parameters:	
	• $cbsdld = C$	
	• grantId = G = valid grant ID	
2	 grantExpireTime = UTC time in the future 	DAGG
3	 heartbeatInterval = 60 seconds 	PASS
	 measReportConfig= "RECEIVED_POWER_WITH_GRANT" 	
	• channelType = "GAA"	
	• responseCode = 0	
	UUT sends a Heartbeat Request message. Verify message contains all required parameters	
	properly formatted, and specifically:	
4	• $cbsdld = C$	PASS
	• grantId = G	
	operationState = "GRANTED"	
	If Heartbeat Request message (step 4) contains measReport object, then:	
	 verify measReport is properly formatted as object rcvdPowerMeasReport 	
5	end test, with PASS result	PASS
5	else, if Heartbeat Request message (step 4) does not contain measReport object, then:	17100
	If number of Heartbeat Requests sent by UUT after Step 3 is = 5, then stop test with result	
	of FAIL	
	SAS Test Harness sends a Heartbeat Response message, containing all required	
	parameters properly formatted, and specifically:	
	• $cbsdld = C$	
6	• grantld = G	/
	 transmitExpireTime = current UTC time + 200 seconds 	,
	• responseCode = 0	
	Go to Step 4, above	





21) [WINNF.FT.D.MES.5] Domain Proxy Heartbeat Response contains measReportConfig

This test case is mandatory for Domain Proxy supervising CBSD which support

RECEIVED_POWER_WITH_GRANT measurement reports.

The following steps describes the test execution steps:

#	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 <i>cbsdld</i>=Ci, i={1,2} and <i>measCapability</i> = "RECEIVED_POWER_WITH_GRANT" DP has received a valid grant with <i>grantld</i> = Gi, i={1,2} for each CBSD Both CBSD are in Grant State AUTHORIZED and actively transmitting within the bounds of their grants. Grants have <i>heartbeatInterval</i> =60 seconds Verify 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 2. Verify Heartbeat Request message contains all required parameters properly formatted for 	PASS
2	 each CBSD, specifically, for CBSDi: cbsdld = Ci grantld = Gi operationState = "AUTHORIZED" 	PASS
3	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. Parameters for each CBSD within the Heartbeat Response message containing all required parameters properly formatted, and specifically: • <i>cbsdld</i> = Ci • grantId = Gi • <i>measReportConfig</i> = "RECEIVED_POWER_WITH_GRANT" • <i>responseCode</i> = 0	PASS
4	 Verify 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 2. Verify Heartbeat Request message contains all required parameters properly formatted for each CBSD, and specifically, for CBSDi, i = {1,2}: <i>cbsdld</i> = Ci <i>grantld</i> = Gi operationState = "AUTHORIZED" Check whether <i>measReport</i> is present, and if present, ensure it is a properly formatted <i>rcvdPowerMeasReport</i> object, and record its reception for each CBSDi, i = {1,2}. 	PASS





	If Heartbeat Request message (step 4) contains measReport object, then:	
	 Verify measReport is properly formatted as object rcvdPowerMeasReport 	
	 record which CBSD have successfully sent a measReport object 	
5	If all CBSDi, i = {1,2} have successfully sent a measReport object, then	PASS
	 end test, with PASS result 	
	else, if the number of Heartbeat Requests sent per CBSD is 5 or more, then stop test with	
	result of FAIL	
	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.	
6		PASS
	Parameters for each CBSD within the Heartbeat Response message containing all required	
	parameters properly formatted, and specifically:	
	• <i>cbsdld</i> = Ci	
	• grantId = Gi	
	• responseCode = 0	
	Go to Step 4, above.	1





22) [WINNF.FT.D.RLQ.2] Domain Proxy Successful Relinquishment

#	Test Execution Steps	Results
	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 <i>cbsdld</i> =Ci, i={1,2}	
1	 DP has received a valid grant with grantId = Gi, i={1,2} for each CBSD 	PASS
	• Both CBSD are in Grant State AUTHORIZED and actively transmitting within the bounds of	
	their grants.	
	Invoke trigger to relinquish each UUT Grant from the SAS Test Harness	
	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.	
2	Verify Relinquishment Request message contains all required parameters properly formatted	PASS
2	for each CBSD, specifically, for CBSDi:	11100
	• <i>cbsdld</i> = Ci	
	• grantld = Gi	
	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	
3	containing a 2-object array. Parameters for each CBSD within the Relinquishment Response	PASS
	shall be as follows:	
	• <i>cbsdld</i> = Ci	
	• grantld = Gi	
	• responseCode = 0	
4	After completion of step 3, SAS Test Harness will not provide any additional positive response	PASS
	(responseCode=0) to further request messages from the UUT.	
	Monitor the RF output of each UUT from start of test until 60 seconds after Step 3 is complete.	
5	This is the end of the test. Verify:	PASS
	• UUT shall stop RF transmission at any time between triggering the relinquishments and UUT	
	sending the relinquishment requests for each CBSD.	





23) [WINNF.FT.D.DRG.2] Domain Proxy Successful Deregistration

#	Test Execution Steps	Results
	Ensure the following conditions are met for test entry:	
1	 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 <i>cbsdld</i> =Ci,	PASS
1	i={1,2}	PASS
	 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 deregister each UUT from the SAS Test Harness	
2	UUT may send a Relinquishment request and receives Relinquishment response with	/
2	responseCode=0	/
	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.	
3	Verify Deregistration Request message contains all required parameters properly formatted	PASS
	for each CBSD, specifically, for CBSDi	
	• <i>cbsdld</i> = Ci	
	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	
4	(one per CBSD), the SAS Test Harness shall respond with a single Response message	PASS
	containing a 2-object array.	
	Parameters for each CBSD within the Deregistration Response shall be as follows:	
	• <i>cbsdld</i> = Ci	
	 responseCode = 0 	
5	After completion of step 4, SAS Test Harness will not provide any positive response	PASS
3	(responseCode=0) to further request messages from the UUT.	PASS
	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:	
6	• UUT stopped RF transmission at any time between triggering the deregistration and	PASS
6	either A OR B occurs:	rass
	A. UUT sending a Registration Request message, as this is not mandatory	
	B. UUT sending a Deregistration Request message	





24) [WINNF.FT.C.SCS.1] Successful TLS connection between UUT and SAS Test Harness

#	Test Execution Steps	Results
	UUT shall start CBSD-SAS communication with the security procedure	
	• The UUT shall establish a TLS handshake with the SAS Test Harness using configured	
1	certificate.	PASS
	· Configure the SAS Test Harness to accept the security procedure and establish the	
	connection	
	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, 	
2	 TLS_RSA_WITH_AES_128_GCM_SHA256 	PASS
2	 TLS_RSA_WITH_AES_256_GCM_SHA384 	rass
	 TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256 	
	 TLS_ECDHE_ECDSA_WITH_AES_256_GCM_SHA384 	
	 TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256 	
	A successful registration is accomplished using one of the test cases described in section	
3	6.1.4.1, depending on CBSD capability.	PASS
5	• UUT sends a registration request to the SAS Test Harness and the SAS Test Harness	IASS
	sends a Registration Response with <i>responseCode</i> = 0 and <i>cbsdId</i> .	
	Monitor the RF output of the UUT from start of test until 60 seconds after Step 3 is complete.	
4	This is the end of the test. Verify:	PASS
	• UUT shall not transmit RF	





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文件(F) 编辑(E) 视图(V) 跳转(G			工具(T) 帮助(H	1)		
1 🔳 🧟 🛞 📜 🔚 🔀 🛅 🔍	٩ ⇔ ⇒ ≌ T 🕹 📃	📃 Q Q Q 🎹				
ssl and ip.addr==192.192.1.101					<u>∧</u> × →	*
ime	Source	Destination	Protocol	Info		
022-10-14 07:33:17.666069	192.192.1.101	192.192.1.107	TLSv1.2	Client Hello		
022-10-14 07:33:17.666954	192.192.1.107	192.192.1.101	TLSv1.2	Server Hello		
022-10-14 07:33:17.666954	192.192.1.107	192.192.1.101	TLSv1.2	Certificate, Certificate Request, Server Hello Done		
022-10-14 07:33:17.671652	192.192.1.101	192.192.1.107	TLSv1.2	Certificate, Client Key Exchange		
022-10-14 07:33:17.698879	192.192.1.101	192.192.1.107	TLSv1.2	Certificate Verify		
022-10-14 07:33:17.698879	192.192.1.101	192.192.1.107	TLSv1.2	Change Cipher Spec		
022-10-14 07:33:17.699210	192.192.1.101	192.192.1.107	TLSv1.2	Encrypted Handshake Message		
22-10-14 07:33:17.700049	192.192.1.107	192.192.1.101	TLSv1.2	Change Cipher Spec, Encrypted Handshake Message		
022-10-14 07:33:17.702991	192.192.1.101	192.192.1.107	TLSv1.2	Application Data		
22-10-14 07:33:17.704125	192.192.1.107	192.192.1.101	TLSv1.2	Application Data		
22-10-14 07:33:17.708856	192.192.1.107	192.192.1.101	TLSv1.2	Application Data, Application Data, Application Data, Application Data		
022-10-14 07:33:17.722714	192.192.1.107	192.192.1.101	TLSv1.2	Application Data		
022-10-14 07:33:17.724195	192.192.1.101	192.192.1.107	TLSv1.2	Encrypted Alert		
022-10-14 07:33:17.737309	192.192.1.101	192.192.1.107	TLSv1.2	Client Hello		
022-10-14 07:33:17.738061	192.192.1.107	192.192.1.101	TLSv1.2	Server Hello		
022-10-14 07:33:17.738061	192.192.1.107	192.192.1.101	TLSv1.2	Certificate, Certificate Request, Server Hello Done		
022-10-14 07:33:17.740016	192.192.1.101	192.192.1.107	TLSv1.2	Certificate, Client Key Exchange		
022-10-14 07:33:17.757443	192.192.1.101	192.192.1.107	TLSv1.2	Certificate Verify		
Frame 79: 207 bytes on wir				c:16:45:26:58:b5)	>	
 Frame 79: 207 bytes on wir Ethernet II, Src: SuperMic Internet Protocol Version Transmission Control Proto 	re (1656 bits), 207 byte _ef:86:2e (ac:1f:6b:ef: 4, Src: 192.192.1.101,	es captured (1656 bi :86:2e), Dst: LCFCHe Dst: 192.192.1.107	ts) Fe_26:58:b5 (8	ic:16:45:26:58:b5)	>	-
 Frame 79: 207 bytes on wir Frame 79: 207 bytes on wir Ethernet II, Src: SuperMic Internet Protocol Version Transmission Control Proto Transport Layer Security 	re (1656 bits), 207 byte :_ef:86:2e (ac:1f:6b:ef: 4, Src: 192.192.1.101, pcol, Src Port: 33578, D	es captured (1656 bi :86:2e), Dst: LCFCHe Dst: 192.192.1.107 Dst Port: 5000, Seq:	ts) Fe_26:58:b5 (8	ic:16:45:26:58:b5)	>	
 Frame 79: 207 bytes on wir Ethernet II, Src: SuperMic Internet Protocol Version Transmission Control Proto Transport Layer Security TLSv1.2 Record Layer: H 	re (1656 bits), 207 byte :_ef:86:2e (ac:1f:6b:ef; 4, Src: 192.192.1.101, ocol, Src Port: 33578, D Wandshake Protocol: Clie	es captured (1656 bi :86:2e), Dst: LCFCHe Dst: 192.192.1.107 Dst Port: 5000, Seq:	ts) Fe_26:58:b5 (8	ic:16:45:26:58:b5)	>	
Frame 79: 207 bytes on wir Ethernet II, Src: SuperMic Internet Protocol Version Transmission Control Proto Transport Layer Security ~ TLSv1.2 Record Layer: H Content Type: Handshi	re (1656 bits), 207 byte :_ef:86:2e (ac:1f:6b:ef: 4, Src: 192.192.1.101, bcol, Src Port: 33578, D Handshake Protocol: Clie ake (22)	es captured (1656 bi :86:2e), Dst: LCFCHe Dst: 192.192.1.107 Dst Port: 5000, Seq:	ts) Fe_26:58:b5 (8	ic:16:45:26:58:b5)	>	•
 Frame 79: 207 bytes on wir Ethernet II, Src: SuperMic Internet Protocol Version Transmission Control Proto Transport Layer Security TLSV1.2 Record Layer: H Content Type: Handsh, Version: TLS 1.2 (0x) 	re (1656 bits), 207 byte :_ef:86:2e (ac:1f:6b:ef: 4, Src: 192.192.1.101, bcol, Src Port: 33578, D Handshake Protocol: Clie ake (22)	es captured (1656 bi :86:2e), Dst: LCFCHe Dst: 192.192.1.107 Dst Port: 5000, Seq:	ts) Fe_26:58:b5 (8	ic:16:45:26:58:b5)	>	
 Frame 79: 207 bytes on wir Ethernet II, Src: SuperMic Internet Protocol Version Transmission Control Proto Transport Layer Security TLSv1.2 Record Layer: H Content Type: Handsh Version: TLS 1.2 (0xt Length: 148 	re (1656 bits), 207 byte _ef:86:2e (ac:1f:6b:ef: 4, Src: 192.192.1.101, ccol, Src Port: 33578, D landshake Protocol: Clie ake (22) 0303)	es captured (1656 bi :86:2e), Dst: LCFCHe Dst: 192.192.1.107 Dst Port: 5000, Seq:	ts) Fe_26:58:b5 (8	ic:16:45:26:58:b5)	>	
Frame 79: 207 bytes on wir Ethernet II, Src: SuperMic Internet Protocol Version Transmission Control Proto Transport Layer Security ~ TLSv1.2 Record Layer: H Content Type: Handsh Version: TLS 1.2 (0xt Length: 148 ~ Handshake Protocol: 0	e (1656 bits), 207 byte :_ef:86:2e (ac:1f:6b:ef: 4, 5rc: 192.192.1.101, xcol, Src Port: 33578, D landshake Protocol: Clie ake (22) 0303) Client Hello	es captured (1656 bi :86:2e), Dst: LCFCHe Dst: 192.192.1.107 Dst Port: 5000, Seq:	ts) Fe_26:58:b5 (8	ic:16:45:26:58:b5)	>	
Frame 79: 207 bytes on wir Ethernet II, Src: SuperMic Internet Protocol Version Transmission Control Proto Transport Layer Security * TLSV1.2 Record Layer: H Content Type: Handsh Version: TLS 1.2 (0x Length: 148 * Handshake Protocol: Handshake Type: Cl	e (1656 bits), 207 byte :_ef:86:2e (ac:1f:6b:ef: 4, 5rc: 192.192.1.101, xcol, Src Port: 33578, D landshake Protocol: Clie ake (22) 0303) Client Hello	es captured (1656 bi :86:2e), Dst: LCFCHe Dst: 192.192.1.107 Dst Port: 5000, Seq:	ts) Fe_26:58:b5 (8	ic:16:45:26:58:b5)	>	
Frame 79: 207 bytes on wir Ethernet II, Src: SuperMic Internet Protocol Version Transmission Control Proto Transport Layer Security > TLSv1.2 Record Layer: H Content Type: Handshk Version: TLS 1.2 (Øx Length: 148 > Handshake Protocol: 0 Handshake Protocol: 0 Length: 144	re (1656 bits), 207 byte 	es captured (1656 bi :86:2e), Dst: LCFCHe Dst: 192.192.1.107 Dst Port: 5000, Seq:	ts) Fe_26:58:b5 (8	ic:16:45:26:58:b5)	>	
Frame 79: 207 bytes on wir Ethernet II, Src: SuperMic Internet Protocol Version Transmission Control Proto Transport Layer Security ~ TLSV1.2 Record Layer: H Content Type: Handsh Version: TLS 1.2 (8x Length: 148 ~ Handshake Type: Cl Length: 144 Version: TLS 1.2 (9)	e (1656 bits), 207 byte :_ef:86:2e (ac:1f:6b:ef: 4, 5rc: 192.192.1.101, col, Src Port: 33578, D landshake Protocol: Clie ake (22) 0303) Client Hello lient Hello (1) (0x0303)	es captured (1656 bi :86:2e), Dst: LCFCHe Dst: 192.192.1.107 Dst Port: 5000, Seq: ent Hello	ts) Fe_26:58:b5 (ξ	ic:16:45:26:58:b5)	>	
Frame 79: 207 bytes on wir Ethernet II, Src: SuperMit Internet Protocol Version Transmission Control Proto Transport Layer Security ~ TLSv1.2 Record Layer: H Content Type: Handsh Version: TLS 1.2 (0x Length: 148 ~ Handshake Type: Cl Length: 144 Version: TLS 1.2 ()	re (1656 bits), 207 byte _ef:86:2e (ac:1f:6b:ef: 4, Src: 192.192.1.101, scol, Src Port: 33578, D landshake Protocol: Clie ake (22) 0303) Client Hello Lient Hello (1) (0x0303) 45ad8d2c5ccaaabae2fbc34	es captured (1656 bi :86:2e), Dst: LCFCHe Dst: 192.192.1.107 Dst Port: 5000, Seq: ent Hello	ts) Fe_26:58:b5 (ξ	ic:16:45:26:58:b5)	>	
Frame 79: 207 bytes on wir Ethernet II, Src: SuperHic Internet Protocol Version Transmission Control Proto Transport Layer Security v TLSv1.2 Record Layer: H Content Type: Handsh Version: TLS 1.2 (Øx Length: 148 v Handshake Protocol: 0 Handshake Type: CI Length: 144 Version: TLS 1.2 (Øx Random: 6349103d4 Session ID Length:	<pre>e (1656 bits), 207 byte </pre>	es captured (1656 bi :86:2e), Dst: LCFCHe Dst: 192.192.1.107 Dst Port: 5000, Seq: ent Hello	ts) Fe_26:58:b5 (ξ	ic:16:45:26:58:b5)	>	
Frame 79: 207 bytes on wir Ethernet II, Src: SuperMic Internet Protocol Version Transmission Control Proto Transport Layer Security * TLSV1.2 Record Layer: H Content Type: Handsh Version: TLS 1.2 (0x Length: 148 * Handshake Protocol: : Handshake Type: Cl Length: 144 Version: TLS 1.2) Random: 634910344	<pre>e (1656 bits), 207 byte :_ef:86:2e (ac:1f:6b:ef: 4, 5rc: 192.192.1.101, scol, Src Port: 33578, D andshake Protocol: Clie ake (22) 0303) Client Hello Lient Hello (1) (0x0303) 45ad8d2c5ccaaabae2fbc34: 0 gth: 6</pre>	es captured (1656 bi :86:2e), Dst: LCFCHe Dst: 192.192.1.107 Dst Port: 5000, Seq: ent Hello	ts) Fe_26:58:b5 (ξ	ic:16:45:26:58:b5)	>	
Frame 79: 207 bytes on wir Ethernet II, Src: SuperMic Internet Protocol Version Transmission Control Proto Transport Layer Security * TLSV1.2 Record Layer: H Content Type: Handsh Version: TLS 1.2 (Øx Length: 148 * Handshake Protocol: (Handshake Type: C) Length: 144 Version: TLS 1.2 & Random: 6349103d4 Session ID Length: Cipher Suites Leng * Cipher Suites (3 :	<pre>c (1656 bits), 207 byte c (1656 bits), 207 byte c c (ac:1fr:6b:ef; 4, Src: 192.192.1.101, scol, Src Port: 33578, D landshake Protocol: Clie ake (22) 0303) Client Hello (lient Hello (lient Hello (1) (0x0303) 45ad8d225ccaaabae2fbc34; c 0 gth: 6 suites)</pre>	es captured (1656 bi 186:2e), Dst: LCFCHe Dst: 192.192.1.107 Dst Port: 5000, Seq: ent Hello	ts) Fe_26:58:b5 (ξ	ic:16:45:26:58:b5)	>	
Frame 79: 207 bytes on wir Ethernet II, Src: SuperMic Internet Protocol Version Transmission Control Proto Transport Layer Security * TLSV1.2 Record Layer: H Content Type: Handsh Version: TLS 1.2 (6x Length: 148 * Handshake Protocol: (1 Handshake Protocol: (2 Handshake Protocol: (2 Anadom: 634910344 Session ID Length: Cipher Suites Leng * Cipher Suites [3 : Cipher Suite: [3]	<pre>e (1656 bits), 207 byte :_ef:86:2e (ac:1f:6b:ef: 4, 5rc: 192.192.1.101, scol, Src Port: 33578, D andshake Protocol: Clie ake (22) 0303) Client Hello Lient Hello (1) (0x0303) 45ad8d2c5ccaaabae2fbc34: 0 gth: 6</pre>	es captured (1656 bi :86:2e), Dst: LCFCHe Dst: 192.192.1.107 Dst Port: 5000, Seq: ent Hello 56e4e9bfdc100235f83. M_SHA256 (0x009c)	ts) Fe_26:58:b5 (ε 1, Ack: 1, Le 245006232440a	ic:16:45:26:58:b5)	>	
 Frame 79: 207 bytes on wir Frame 79: 207 bytes on wir Ethernet II, Src: SuperMic Internet Protocol Version Transmission Control Proto Transport Layer Security TLSv1.2 Record Layer: H Content Type: Handsh Version: TLS 1.2 (0xi Length: 148 Handshake Protocol: (Handshake Type: CL Length: 144 Version: TLS 1.2 (0xi Random: 6349103d44 Session ID Length: Cipher Suites (3: s) Cipher Suites (3: s) Cipher Suite: T 	<pre>e (1656 bits), 207 byte </pre>	es captured (1656 bi :86:2e), Dst: LCFCHe Dst: 192.192.1.107 Dst Port: 5000, Seq: ent Hello 56e4e9bfdc100235f83 M_SHA256 (0x009c) 5_128_GCM_SHA256 (0x	<pre>.ts) FFe_26:58:b5 (ξ 1, Ack: 1, Le 245006232440a <cc02b)< pre=""></cc02b)<></pre>	ic:16:45:26:58:b5)	>	
Frame 79: 207 bytes on wir Ethernet II, Src: SuperMic Internet Protocol Version Transmission Control Proto Transport Layer Security ~ TLSv1.2 Record Layer: H Content Type: Handsh Version: TLS 1.2 (0xi Length: 148 ~ Handshake Protocol: (Handshake Type: Cl Length: 144 Version: TLS 1.2 (0xi Anadsma: 6349103d4 Session ID Length: Cipher Suites Leng ~ Cipher Suites (3 = Cipher Suite: T	<pre>e (1656 bits), 207 byte e (1656 bits), 207 byte eff86:2e (ac:1fr6b:eff 4, Src: 192.192.1.101, scol, Src Port: 33578, D landshake Protocol: Clie ake (22) 0303) Client Hello lient Hello (1) (0x0303) 45ad8d225ccaaabae2fbc34: e 0 gth: 6 suites) TLS_RSA_WITH_AES_128_GCT TLS_ECOHE_ECDSA_WITH_AES TLS_ECOHE_ECDSA_WITH_AES</pre>	es captured (1656 bi :86:2e), Dst: LCFCHe Dst: 192.192.1.107 Dst Port: 5000, Seq: ent Hello 56e4e9bfdc100235f83 M_SHA256 (0x009c) 5_128_GCM_SHA256 (0x	<pre>.ts) FFe_26:58:b5 (ξ 1, Ack: 1, Le 245006232440a <cc02b)< pre=""></cc02b)<></pre>	ic:16:45:26:58:b5)	>	
Frame 79: 207 bytes on wir Ethernet II, Src: SuperMic Internet Protocol Version Transmission Control Proto Transmission Control Proto Transport Layer Security * TLSV1.2 Record Layer: H Content Type: Handsh Version: TLS 1.2 (Øx Length: 148 * Handshake Protocol: (Handshake Type: C) Length: 144 Version: TLS 1.2 & Random: 6349103d44 Session ID Length- Cipher Suites Leng * Cipher Suites Leng Cipher Suites I Cipher Suite: T Cipher Suite: T	<pre>e (1656 bits), 207 byte </pre>	es captured (1656 bi :86:2e), Dst: LCFCHe Dst: 192.192.1.107 Dst Port: 5000, Seq: ent Hello 56e4e9bfdc100235f83 M_SHA256 (0x009c) 5_128_GCM_SHA256 (0x	<pre>.ts) FFe_26:58:b5 (ξ 1, Ack: 1, Le 245006232440a <cc02b)< pre=""></cc02b)<></pre>	ic:16:45:26:58:b5)	>	
Frame 79: 207 bytes on wir Ethernet II, Src: SuperMic Internet Protocol Version Transmission Control Proto Transport Layer Security ~ TLSV1.2 Record Layer: H Content Type: Handsh Version: TLS 1.2 (ex Length: 148 ~ Handshake Protocol: 0 Handshake Type: C Length: 144 Version: TLS 1.2 (ex Bandom: 6349163d4 Session ID Length: Cipher Suites II Cipher Suite: 1 Cipher Suite: 1 Compression Method	<pre>e (1656 bits), 207 byte </pre>	es captured (1656 bi :86:2e), Dst: LCFCHe Dst: 192.192.1.107 Dst Port: 5000, Seq: ent Hello 556e4e9bfdc100235f83: M_SHA256 (0x009c) 5_128_GCM_SHA256 (0xc0	<pre>.ts) FFe_26:58:b5 (8 1, Ack: 1, Le 245006232440a <cc02b) 32f)<="" pre=""></cc02b)></pre>	ic:16:45:26:58:b5)	>	

Packet capture sequence

25) [WINNF.FT.C.SCS.2] TLS failure due to revoked certificate Test prerequisite:

The certificate at the SAS Test Harness shall be marked as revoked.

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





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UUT CRL file download





WINNF.FT.C.SCS.2.pcap					
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文件(F) 编辑(E) 视图(V) 跳转(G)) 捕获(C) 分析(A) 统计(S)	电话(Y) 无线(W)	工具(T) 帮助(H)		
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Time	Source	Destination	Protocol	Info	
2022-10-14 07:41:32.976627	192.192.1.101	192.192.1.107	TLSv1.2	Client Hello	
2022-10-14 07:41:32.979591	192.192.1.107	192.192.1.101	TLSv1.2	Server Hello	
2022-10-14 07:41:32.979591	192.192.1.107	192.192.1.101	TLSv1.2	Certificate, Certificate Request, Server Hello Done	
2022-10-14 07:41:33.066360	192.192.1.101	192.192.1.107	TLSv1.2	Alert (Level: Fatal, Description: Certificate Unknown)	
 Frame 1930: 61 bytes on wir Ethernet II, Src: SuperMic_ 		2e), Dst: LCFCHe		:\NPF_{1684265B-1012-4F12-AE31-65D7962E1715}, id 6 26:58:b5)	
 > Internet Protocol Version 4 > Transmission Control Protocol 			154, Ack: 3197, Len:	7	
			154, Ack: 3197, Len:	7	
> Transmission Control Protoc	col, Src Port: 35050, Dst lert (Level: Fatal, Descri 21)	Port: 5000, Seq:		7	
> Transmission Control Protoc	col, Src Port: 35050, Dst ert (Level: Fatal, Descri 21) 303) 6b ef 86 2e 08 00 45 00	Port: 5000, Seq: ption: Certifica	te Unknown)	7	

Packet capture sequence

26) [WINNF.FT.C.SCS.3] TLS failure due to expired server certificate

Test case pre-requisite:

Configure the SAS Test Harness such that server certificate is valid but expired.

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



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CAICT
No. 122Z62158-WMD01
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me 022-10-14 07:30:39.540082	Source 192.192.1.101	Destination 192.192.1.107	Protocol TLSv1.2	Info Client Hello	
022-10-14 07:30:39.543775	192.192.1.107	192.192.1.101	TLSv1.2	Server Hello	
022-10-14 07:30:39.543775	192.192.1.107	192.192.1.101		Certificate, Certificate Request, Server Hello Done	
022-10-14 07:30:39.544282	192.192.1.101	192.192.1.107	TLSv1.2	Alert (Level: Fatal, Description: Certificate Expired)	
Ethernet II, Src: SuperMic_			eFe_26:58:b5 (80	::16:45:26:58:b5)	
Internet Protocol Version 4 Transmission Control Protoc			: 1. Ack: 1. Ler	1: 153	
Transport Layer Security	,,	,,	,,		
✓ TLSv1.2 Record Layer: Ha		ent Hello			
Content Type: Handsha					
Version: TLS 1.2 (0x0	303)				
Length: 148 ❤ Handshake Protocol: C	lient Hello				
Handshake Type: Cl:					
Length: 144					
Version: TLS 1.2 (
	66c534a9481e2ccb505275	10fb314314320341a49	6512a1b0407e2		
Session ID Length:					
Cipher Suites Leng ❤ Cipher Suites (3 s					
	uites) LS_RSA_WITH_AES_128_GC	M SHA256 (0x009c)			
	LS_ECDHE_ECDSA_WITH_AE		xc02b)		
	LS_ECDHE_RSA_WITH_AES_				
Compression Method					
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文件(F) 编辑(E) 视图(V) 跳转(G	 (⇒) ⇒ ≅ (⇒) ⇒ ≅ () ↓ □ () ↓ □<!--</td--><td>■ ④ ④ ● Ⅲ Destination 192.192.1.107</td><td>Protocol TLSv1.2</td><td>Info Client Hello</td><td></td>	■ ④ ④ ● Ⅲ Destination 192.192.1.107	Protocol TLSv1.2	Info Client Hello	
文件(F) 编辑(E) 视图(V) 跳转(G 《 《 》 《 》 》 》 》 》 《 《 《 ********************************	 ★ ⇒ ≤ Y ★ ⇒ Source 192.192.1.101 192.192.1.107 	Destination 192.192.1.107 192.192.1.101	Protocol TLSv1.2 TLSv1.2	Info Client Hello Server Hello	
文件(F) 编辑(E) 视题(V) 跳转(G 《 《 》 》 》 》 》 》 》 《 》 《 《 》 81 and ip.addr==192.192.1.101 ime 022-10-14 07:30:39.54375 022-10-14 07:30:39.543775	 ★ → ● ● ● ▲ ↓ Source 192.192.1.101 192.1.107 192.1.2.1.107 	Q Q Q III Destination 192.192.1.107 192.192.1.101 192.192.1.101	Protocol TLSv1.2 TLSv1.2 TLSv1.2 TLSv1.2	Info Client Hello Server Hello Certificate, Certificate Request, Server Hello Done	
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文件(F) 编辑(E) 视图(V) 跳转(G ▲ ● ② ● ● ● ● ○ ○ ● ● ○ ○ ○ ○ ■ sal and ip. addr==192.192.1.101 Time 0222-10-14 07:30:39.544082 1022-10-14 07:30:39.54475 1022-10-14 07:30:39.54475 1022-10-14 07:30:39.544282 < <	Source 192.192.1.101 192.192.1.107 192.192.1.107 192.192.1.107 192.192.1.101	Q Q Q III Destination 192.192.1.107 192.192.1.101 192.192.1.101 192.192.1.107	Protocol TLSv1.2 TLSv1.2 TLSv1.2 TLSv1.2 TLSv1.2 112 bits) on in	Info Client Hello Server Hello Certificate, Certificate Request, Server Hello Done Alert (Level: Fatal, Description: Certificate Expired) terface \Device\WPF_{16842658-1012-4F12-AE31-65D7962E1715}, id 6	
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022-10-14 07:	30:39.5437	75 :	92.192.	1.107		192.19	2.1.101	TLSv1.	2	Certificate, Certificate Requ	uest, S	ierver He	llo Done			
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 Frame 826: 6 Ethernet II, Internet Pro 	, Src: Supe otocol Vers	erMic_ef sion 4,	86:2e (Src: 192	ac:1f:6	b:ef:86: 101, Dst	2e), Ds : 192.1	t: LCFCHe 92.1.107	Fe_26:58	3:b5 (8c:	16:45:26:58:b5)	AE31-6	5D7962E1	715}, id	6	 	
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27) [WINNF.FT.C.SCS.4] TLS failure when SAS Test Harness certificate is issued by an unknown CA

Test case pre-requisite:

Equip the SAS Test Harness with certificate signed by an unknown CA to the CBSD.

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





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2022-10-14 07:20:25.716381	192.192.1.101	192.192.1.107	TLSv1.2	Client Hello	
2022-10-14 07:20:25.721436	192.192.1.107	192.192.1.101	TLSv1.2	Server Hello	
2022-10-14 07:20:25.721436	192.192.1.107	192.192.1.101	TLSv1.2	Certificate, Certificate Request, Server Hello Done	
2022-10-14 07:20:25.722813	192.192.1.101	192.192.1.107	TLSv1.2	Alert (Level: Fatal, Description: Unknown CA)	
C					
 Internet Protocol Version 4 Transmission Control Protocol 	, Src: 192.192.1.101, Ds	t: 192.192.1.107		,	
 Internet Protocol Version 4 Transmission Control Protocol Transport Layer Security TLSv1.2 Record Layer: Alect Content Type: Alert (2) Version: TLS 1.2 (0x03) 	, Src: 192.192.1.101, Ds ol, Src Port: 59080, Dst ert (Level: Fatal, Descr 21)	t: 192.192.1.107 Port: 5000, Seq:	154, Ack: 3090, I	5:45:26:58:b5)	
 > Internet Protocol Version 4 > Transmission Control Protoco > Transport Layer Security > TLSv1.2 Record Layer: Ale Content Type: Alert (2 Version: TLS 1.2 (0x0) Length: 2 	, Src: 192.192.1.101, Ds ol, Src Port: 59080, Dst ert (Level: Fatal, Descr 21)	t: 192.192.1.107 Port: 5000, Seq:	154, Ack: 3090, I	5:45:26:58:b5)	
 > Internet Protocol Version 4 > Transmission Control Protocol > Transport Layer Security > TLS'1.2 Record Layer: Alt Content Type: Alert (2 Version: TLS 1.2 (0x0) Length: 2 > Alert Message 	, Src: 192.192.1.101, Ds ol, Src Port: 59080, Dst ert (Level: Fatal, Descr 21)	t: 192.192.1.107 Port: 5000, Seq:	154, Ack: 3090, I	5:45:26:58:b5)	
 Transport Layer Security TLSV1.2 Record Layer: Alt Content Type: Alert (2 Version: TLS 1.2 (0x0): Length: 2 Alert Message Level: Fatal (2) 	, Src: 192.192.1.101, Ds ol, Src Port: 59080, Dst ert (Level: Fatal, Descr: 21) 303)	t: 192.192.1.107 Port: 5000, Seq:	154, Ack: 3090, I	5:45:26:58:b5)	
 > Internet Protocol Version 4 > Transmission Control Protocol > Transport Layer Security > TLS'1.2 Record Layer: Alt Content Type: Alert (2 Version: TLS 1.2 (0x0) Length: 2 > Alert Message 	, Src: 192.192.1.101, Ds ol, Src Port: 59080, Dst ert (Level: Fatal, Descr: 21) 303)	t: 192.192.1.107 Port: 5000, Seq:	154, Ack: 3090, I	5:45:26:58:b5)	
 > Internet Protocol Version 4 > Transmission Control Protocol > Transport Layer Security > TLS'1.2 Record Layer: Alt Content Type: Alert (2 Version: TLS 1.2 (0x0) Length: 2 > Alert Message Level: Fatal (2) Description: Unknow 	, Src: 192.192.1.101, Ds ol, Src Port: 59080, Dst ert (Level: Fatal, Descr: 21) 303) un CA (48) el 42 d3 <u>1c af</u> 5c 50 11	t: 192.192.1.107 Port: 5000, Seq: iption: Unknown CA	154, Ack: 3090, I	5:45:26:58:b5)	





28) [WINNF.FT.C.SCS.5] TLS failure when certificate at the SAS Test Harness is corrupted

Test case pre-requisite:

• The end-entity certificate at the SAS Test Harness shall be corrupted.

The following steps describe the test execution.

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

文件(F) 编辑(E) 视图(V) 跳转(G) 捕获(C) 分析(A) 统计(S) 电话(V) 无线(W) 工具(T) 帮助(H) ▲ ■ ② ③ ■ 盈 瓷 ⑤ ④ ● ※ ※ ④ ④ ④ ④ ④ ④ ● ■ ◎ ■ and ip. addr==192.192.1.101 △ ⊠ ■ ■	
◢ ■ ∅ ◎ ▮ Ё 🗙 🖻 ९ ⇔ ⇔ 🕾 🖗 💂 🚍 🔍 ९ ९ ९ 1	
)+
Time Source Destination Protocol Info	2
2022-10-14 07:17:59.612256 192.192.1.101 192.192.1.107 TL5v1.2 Client Hello	
2022-10-14 07:17:59.615169 192.192.1.107 192.192.1.101 TLSv1.2 Server Hello	
2022-10-14 07:17:59.615169 192.192.1.107 192.192.1.101 TLSv1.2 Certificate, Certificate Request, Server Hello Done	
2022-10-14 07:17:59.617543 192.192.1.101 192.192.1.107 TLSv1.2 Alert (Level: Fatal, Description: Unknown CA)	
	>
<pre>> Ethernet II, Src: SuperMic_ef:86:2e (ac:1f:6b:ef:86:2e), Dst: LCFCHeFe_26:58:b5 (8c:16:45:26:58:b5) > Internet Protocol Version 4, Src: 192.192.1.101, Dst: 192.192.1.107 > Transmission Control Protocol, Src Port: 58546, Dst Port: 5000, Seq: 154, Ack: 3061, Len: 7 * Transport Layer Security</pre>	
0000 Bc 16 45 26 58 b5 ac 1f 6b ef 86 2e 08 00 ••••• ••••• 0010 00 2f 1c fa 40 00 49 06 99 7e c0 00 16 5c 0 c0 •••••• 0010 00 2f 1c fa 40 00 49 06 99 7e c0 00 16 5c 0 c0 ••••••• 0010 00 2f 1c fa 40 00 49 06 99 7e c0 01 65 c0 c0 •••••••• 0010 00 2f 1c fa 40 00 49 06 99 7e c0 01 65 c0 c0 ••••••••• 0010 00 2f 1c fa 40 00 49 06 99 7e c0 01 65 c0 c0 •••••••••••• 0010 00 2f 1c fa 40 00 49 06 99 7e c0 01 65 c0 c0 ••••••••••••••••••••••••••••••••••••	^ ~
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29) [WINNF.PT.C.HBT.1] UUT RF Transmit Power Measurement

#	Test Execution Steps	Results
	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	
1	the duration of this test case	PASS
•		11100
	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.	
	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:	
	\circ cbsdld = C	
2	\circ grantId = G	DACC
2	- CAS Test Herness responds with Hearthast Despenses including	PASS
	 SAS Test Harness responds with Heartbeat Response, including: cbsdld = C 	
	 grantid = G transmitExpireTime = current UTC time + 200 seconds 	
	 responseCode = 0 	
	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 fulfil the requirements of the	
-	power measurement method.	
3		PASS
	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.	

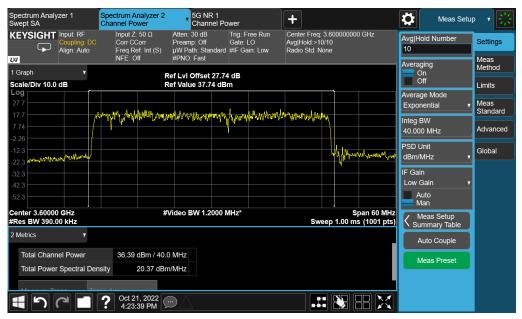




Frequency [MHz]	Bandwidth [MHz]	Granted maxEIRP [dBm/MHz]	Tx1 Conducted PSD [dBm/MHz]	Array Gain [dB]	Antenna Gain [dBi]	maxEIRP PSD [dBm/MHz]	verdict
3600	40	37	20.37	3.01	13	36.38	PASS
3600	40	30	13.26	3.01	13	29.27	PASS
3600	40	15	-6.30	3.01	13	9.71	PASS

Note:

- 1. Array Gain=10log(n), n is the antenna number, for this CBSD the n=2
- 2. From output power pretest results, the Tx1 is the maximum output power antenna port.
- 3. maxEIRP PSD = worst port Tx1 Conducted PSD + Array Gain + Antenna Gain
- 4. The conducted PSD test results include a correction factor for cable loss. The antenna gain is provided by the customer.



Target Power: 37dBm/MHz





Spectrum Analy Swept SA	/zer 1	Spectrum Analyzer 2 Channel Power	5G NR 1 Channel Po	wer	+		\$	Frequency	- * 崇
	Input: RF Coupling: DC Align: Auto	Input Ζ: 50 Ω Corr CCorr Freq Ref: Int (S) NFE: Off		Trig: Free Run Gate: LO #IF Gain: Low	Center Freq: 3.6 Avg Hold: 56/10 Radio Std: None	00	Center Fi 3.60000 Span	requency 0000 GHz	Settings
1 Graph Scale/Div 10.0	₹ dB		ef Lvi Offset 27.74 tef Value 37.74 dBr				60.000	ИНz	
Log 27.7 17.7 -2.26 -12.3 -22.3 -32.3 -42.3 -52.3		alph,MhrandiyAyAnanathan	undurante and the second	ante for the second	Alman Anna		CF Step 6.00000 Auto Man Freq Offs 0 Hz)	
Center 3.60000 #Res BW 390.0		#\	Video BW 1.2000 N	1Hz*	Sweep	Span 60 MHz 1.00 ms (1001 pts)			
2 Metrics Total Chann Total Power	nel Power r Spectral Des								

Target Power: 30dBm/MHz

Spectrum Analyzer 1 Swept SA	Spectrum Analyzer 2 Channel Power	5G NR 1 Channel Power	+	Amplitude	,崇
KEYSIGHT Input: RF Coupling: DC Align: Auto	Input Ζ: 50 Ω Corr CCorr Freq Ref: Int (S) NFE: Off	Atten: 8 dB Trig: Free Run Preamp: Off Gate: LO μW Path: Standard #IF Gain: Low #PNO: Fast Fast	Center Freq: 3.60000000 GHz Avg Hold:>10/10 Radio Std: None	18.74 dBm	Y Scale Attenuation
1 Graph v Scale/Div 10.0 dB		ef Lvi Offset 27.74 dB ef Value 18.74 dBm		10.0 dB	Signal Path
Log 8.74 -1.26 -1.13 -21.3 -31.3 -41.3 -51.3 -61.3 -61.3 -7.2	an marine for a second	adusdum,obigan,oortalasia fajilikaa		dBm v Ref Level Offset 27.74 dB On Off Ref Position Top v Auto Scaling On	
71.3 Center 3.60000 GHz #Res BW 390.00 kHz 2 Metrics Total Channel Power Total Power Spectral Der	9.73 dBm / 40.0		Span 60 MH: Sweep 1.00 ms (1001 pts	Off	

Target Power: 15dBm/MHz





Annex C: Accreditation Certificate

United States Department of Commerce National Institute of Standards and Technology	_
NVLAP LAB CODE: 600118-0	•
Telecommunication Technology Labs, CAICT Beijing China	
is accredited by the National Voluntary Laboratory Accreditation Program for specific services, listed on the Scope of Accreditation, for:	
Electromagnetic Compatibility & Telecommunications	
This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communique dated January 2009).	
2022-10-01 through 2023-09-30 Effective Dates For the National Voluntacy Datoratory Accreditation Progra	am

END OF REPORT