



WINNF-TS-0122 TEST REPORT

FCC ID : NKR-R2210-048L
Equipment : Indoor O-RAN Radio Unit
Brand Name : WNC
Model Name : R2210-048L
Applicant : Wistron NeWeb Corporation
20 Park Avenue II, Hsinchu Science Park, Hsinchu, 308 Taiwan
Manufacturer : Wistron NeWeb Corporation
20 Park Avenue II, Hsinchu Science Park, Hsinchu, 308 Taiwan
Standard : WINNF-TS-0122 Version V1.0.2

The product was received on Aug. 14, 2024, and testing was started from Aug. 14, 2024 and completed on Aug. 22, 2024. We, Sporton International Inc. Hsinchu Laboratory, would like to declare that the tested sample has been evaluated in accordance with the procedures given in WINNF-TS-0122 Version V1.0.2 and shown compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International Inc. Hsinchu Laboratory, the test report shall not be reproduced except in full.

Approved by: Rex Liao

Sporton International Inc. Hsinchu Laboratory

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Summary of Test Result

Report Clause	Ref Std. Clause	CBSD	DP	Required for Cert.	Test Case ID	Test Case Title	Result (PASS/FAIL)	Remark
-	6.1.4.1.1	X	-	C1	WINNF.FT.C.REG.1	Multi-Step registration	N/A	-
-	6.1.4.1.2	-	X	C1	WINNF.FT.D.REG.2	Domain Proxy Multi-Step registration	N/A	-
-	6.1.4.1.3	X	-	C2	WINNF.FT.C.REG.3	Single-Step registration for Category A CBSD	N/A	-
	6.1.4.1.4	-	X	C2	WINNF.FT.D.REG.4	Domain Proxy Single-Step registration for Cat A CBSD	N/A	-
3.1	6.1.4.1.5	X	-	C3	WINNF.FT.C.REG.5	Single-Step registration for CBSD with CPI signed data	PASS	-
-	6.1.4.1.6	-	X	C3	WINNF.FT.D.REG.6	Domain Proxy Single-Step registration for CBSD with CPI signed data	N/A	-
3.2	6.1.4.1.7	X	X	C6	WINNF.FT.C.REG.7	Registration due to change of an installation parameter	PASS	-
3.3	6.1.4.2.1	X	-	M	WINNF.FT.C.REG.8	Missing Required parameters (responseCode 102)	PASS	-
-	6.1.4.2.2	-	X	M	WINNF.FT.D.REG.9	Domain Proxy Missing Required parameters (responseCode 102)	N/A	-
3.4	6.1.4.2.3	X	-	M	WINNF.FT.C.REG.10	Pending registration (responseCode 200)	PASS	-
-	6.1.4.2.4	-	X	M	WINNF.FT.D.REG.11	Domain Proxy Pending registration (responseCode 200)	N/A	-
3.5	6.1.4.2.5	X	-	M	WINNF.FT.C.REG.12	Invalid parameter (responseCode 103)	PASS	-
-	6.1.4.2.6	-	X	M	WINNF.FT.D.REG.13	DomainProxyInvalidparameters (responseCode103)	N/A	-
3.6	6.1.4.2.7	X	-	M	WINNF.FT.C.REG.14	Blacklisted CBSD (responseCode 101)	PASS	-
-	6.1.4.2.8	-	X	M	WINNF.FT.D.REG.15	Domain Proxy Blacklisted CBSD (responseCode 101)	N/A	-
3.7	6.1.4.2.9	X	-	M	WINNF.FT.C.REG.16	UnsupportedSASprotocolversion (responseCode100)	PASS	-
-	6.1.4.2.10	-	X	M	WINNF.FT.D.REG.17	Domain Proxy Unsupported SAS protocol version (responseCode 100)	N/A	-
3.8	6.1.4.2.11	X	-	M	WINNF.FT.C.REG.18	Group Error (responseCode 201)	PASS	-
-	6.1.4.2.12	-	X	M	WINNF.FT.D.REG.19	Domain Proxy Group Error (responseCode 201)	N/A	-



-	6.1.4.3.1	X	X	C2	WINNF.FT.C.REG.20	Category A CBSD location Update	N/A	-
3.9	6.3.4.2.1	X	X	M	WINNF.FT.C.GRA.1	Unsuccessful Grant responseCode=400 (INTERFERENCE)	PASS	-
3.10	6.3.4.2.2	X	X	M	WINNF.FT.C.GRA.2	Unsuccessful Grant responseCode=401 (GRANT_CONFLICT)	PASS	-
3.11	6.4.4.1.1	X	-	M	WINNF.FT.C.HBT.1	Heartbeat Success Case (first Heartbeat Response)	PASS	-
-	6.4.4.1.2	-	X	M	WINNF.FT.D.HBT.2	Domain Proxy Heartbeat Success Case (first Heartbeat Response)	N/A	-
3.12	6.4.4.2.1	X	X	M	WINNF.FT.C.HBT.3	Heartbeat responseCode=105 (DEREGISTER)	PASS	-
3.13	6.4.4.2.2	X	-	M	WINNF.FT.C.HBT.4	Heartbeat responseCode=500 (TERMINATED_GRANT)	PASS	-
3.14	6.4.4.2.3	X	X	M	WINNF.FT.C.HBT.5	Heartbeat responseCode=501 (SUSPENDED_GRANT) in First Heartbeat Response	PASS	-
3.15	6.4.4.2.4	X	X	M	WINNF.FT.C.HBT.6	Heartbeat responseCode=501 (SUSPENDED_GRANT) in Subsequent Heartbeat Response	PASS	-
3.16	6.4.4.2.5	X	X	M	WINNF.FT.C.HBT.7	Heartbeat responseCode=502 (UNSYNC_OP_PARAM)	PASS	-
-	6.4.4.2.6	-	X	M	WINNF.FT.D.HBT.8	Domain Proxy Heartbeat responseCode=500 (TERMINATED_GRANT)	N/A	-
3.17	6.4.4.3.1	X	X	M	WINNF.FT.C.HBT.9	Heartbeat Response Absent (First Heartbeat)	PASS	-
3.18	6.4.4.3.2	X	X	M	WINNF.FT.C.HBT.10	Heartbeat Response Absent (Subsequent Heartbeat)	PASS	-
3.19	6.4.4.4.1	X	X	O	WINNF.FT.C.HBT.11	SuccessfulGrantRenewalin HeartbeatTestCase	PASS	-
3.20	6.5.4.2.1	X	-	C4	WINNF.FT.C.MES.1	Registration Response contains measReportConfig	PASS	-
-	6.5.4.2.2	-	X	C4	WINNF.FT.D.MES.2	Domain Proxy Registration Response contains measReportConfig	N/A	-
3.21	6.5.4.2.3	X	X	C5	WINNF.FT.C.MES.3	Grant Response contains measReportConfig	PASS	-
3.22	6.5.4.2.4	X	-	C5	WINNF.FT.C.MES.4	Heartbeat Response contains measReportConfig	PASS	-
-	6.5.4.2.5	-	X	C5	WINNF.FT.D.MES.5	Domain Proxy Heartbeat Response contains measReportConfig	N/A	-
3.23	6.6.4.1.1	X	-	M	WINNF.FT.C.RLQ.1	Successful Relinquishment	PASS	-
-	6.6.4.1.2	-	X	M	WINNF.FT.D.RLQ.2	Domain Proxy Successful Relinquishment	N/A	-



3.24	6.6.4.2.1	X	-	O	WINNF.FT.C.RLQ.3	Unsuccessful Relinquishment, responseCode=102	PASS	-
-	6.6.4.2.2	-	X	O	WINNF.FT.D.RLQ.4	Domain Proxy Unsuccessful Relinquishment, responseCode=102	N/A	-
3.25	6.6.4.3.1	X	-	O	WINNF.FT.C.RLQ.5	Unsuccessful Relinquishment, responseCode=103	PASS	-
-	6.6.4.3.2	-	X	O	WINNF.FT.D.RLQ.6	Domain Proxy Unsuccessful Relinquishment, responseCode=103	N/A	-
3.26	6.7.4.1.1	X	-	M	WINNF.FT.C.DRG.1	Successful Deregistration	PASS	-
-	6.7.4.1.2	-	X	M	WINNF.FT.D.DRG.2	Domain Proxy Successful Deregistration	N/A	-
3.27	6.7.4.2.1	X	-	O	WINNF.FT.C.DRG.3	Deregistration responseCode=102	PASS	-
-	6.7.4.2.2	-	X	O	WINNF.FT.D.DRG.4	Domain Proxy Deregistration responseCode=102	N/A	-
3.28	6.7.4.3.1	X	X	O	WINNF.FT.C.DRG.5	Deregistration responseCode=103	PASS	-
3.29	6.8.4.1.1	X	X	M	WINNF.FT.C.SCS.1	Successful TLS connection between UUT and SAS Test Harness	PASS	-
3.30	6.8.4.2.1	X	X	M	WINNF.FT.C.SCS.2	TLS failure due to revoked certificate	PASS	-
3.31	6.8.4.2.2	X	X	M	WINNF.FT.C.SCS.3	TLS failure due to expired server certificate	PASS	-
3.32	6.8.4.2.3	X	X	M	WINNF.FT.C.SCS.4	TLS failure when SAS Test Harness certificate is issue by unknown CA	PASS	-
3.33	6.8.4.2.4	X	X	M	WINNF.FT.C.SCS.5	TLS failure when certificate at the SAS Test Harness is corrupted	PASS	-
3.34	7.1.4.1.1	X	X	M	WINNF.PT.C.HBT.1	UUT RF Transmit Power Measurement	PASS	-

Note1:

- ◆ M: Mandatory for certification
- ◆ O: Optional. Not required for certification.
- ◆ C: Conditional. Mandatory if CBSD supports relevant functionality.

Note2:

The unit under test type is CBSD without Domain Proxy and Conditional Test Case Definitions are C3, C4, C5 and C6.



Conformity Assessment Condition:

1. The test results (PASS/FAIL) with all measurement uncertainty excluded are presented against the regulation limits or in accordance with the requirements stipulated by the applicant/manufacturee who shall bear all the risks of non-compliance that may potentially occur if measurement uncertainty is taken into account.
2. The measurement uncertainty please refer to each test result in the chapter "Measurement Uncertainty".

Disclaimer:

The product specifications of the EUT presented in the test report that may affect the test assessments are declared by the manufacturer who shall take full responsibility for the authenticity.

Reviewed by: Sam Chen

Report Producer: Cathy Chiu



1 General Description

1.1 Product Feature of Equipment Under Test

Product Feature of Equipment Under Test	
EUT Type	CBSD
Power Type	From power adapter or PoE
Category of EUT	<input checked="" type="checkbox"/> Category A <input type="checkbox"/> Category B
Professional Installation	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
EUT in Test ID	<input type="checkbox"/> EUT with Domain Proxy <input checked="" type="checkbox"/> EUT without Domain Proxy
CBSD Firmware Version	1.0
CBSD Software Version	N/A
CBSD Hardware Version	1.0

Note: The above information was declared by manufacturer.



1.2 Accessories

Accessories				
Equipment Name	Brand Name	Model Name	Rating	Remark
Adapter	FSP	FSP075-DHAN3	INPUT: 100-240V~, 1.2A, 50/60Hz OUTPUT: 12.0V, 6.25A, 75.0W	DC cable, non-shielded, 1.65m
Others				
Power cable*1, non-shielded, 1.8m				

1.3 Support Equipment

Support Equipment				
No.	Equipment	Brand Name	Model Name	FCC ID
A	Notebook	acer	TravelMate P2 14	N/A
B	Notebook	acer	TravelMate P2 14	N/A
C	UE	MOXA	CCG-1510-US-T	N/A
D	Notebook	acer	TravelMate P2 14	N/A

1.4 Testing Location

Testing Location Information	
Test Lab. : Sporton International Inc. Hsinchu Laboratory	
Hsinchu ADD: No.8, Ln. 724, Bo'ai St., Zhubei City, Hsinchu County 302010, Taiwan (R.O.C.)	
(TAF: 3787) TEL: 886-3-656-9065 FAX: 886-3-656-9085	
Test site Designation No. TW3787 with FCC.	
Conformity Assessment Body Identifier (CABID) TW3787 with ISED.	

Test Condition	Test Site No.	Test Engineer	Test Environment (°C / %)	Test Date
RF Conducted	TH03-CB	Caster Chang	23.2~23.7 / 56~61	Aug. 14, 2024~ Aug. 22, 2024



2 Measurement Environment

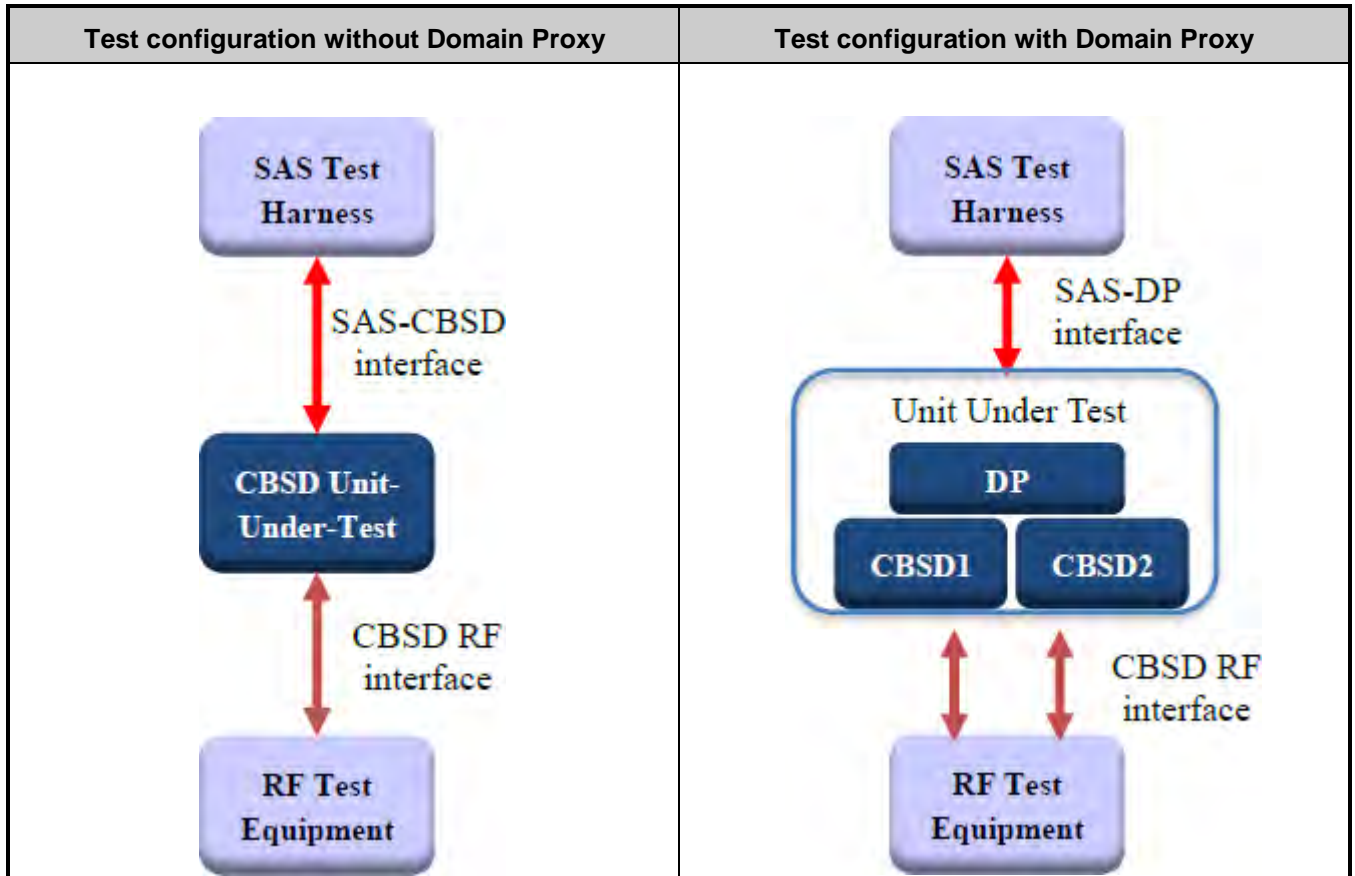
Measurement Environment Information	
Test Harness version	1.0.0.3
Operating System	win10
TLS version	1.2
Python	2.7.13

2.1 Conditional Test Case

<input type="checkbox"/>	C1	Mandatory for UUT which supports multi-step registration message
<input type="checkbox"/>	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.
<input checked="" type="checkbox"/>	C3	Mandatory for UUT which supports single-step registration containing CPI-signed data in the registration message.
<input checked="" type="checkbox"/>	C4	Mandatory for UUT which supports RECEIVED_POWER_WITHOUT_GRANT measurement report type.
<input checked="" type="checkbox"/>	C5	Mandatory for UUT which supports RECEIVED_POWER_WITH_GRANT measurement report type.
<input checked="" type="checkbox"/>	C6	Mandatory for UUT which supports parameter change being made at the UUT and prior to sending a deregistration.

Note: The above information was declared by manufacturer.

2.2 Test Configuration





3 Protocol Test Results

3.1 WINNF.FT.C.REG.5 - Single-Step registration for CBSD with CPI signed data

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: <ul style="list-style-type: none">• UUT has successfully completed SAS Discovery and Authentication with SAS Test Harness• UUT is in the Unregistered state• All of the required and REG-Conditional parameters shall be configured and CPI signature provided	--	--
2	CBSD sends Registration request to the SAS Test Harness: <ul style="list-style-type: none">• TherequireduserId,fcclidandcbsdSerialNumberandREG- 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	<ul style="list-style-type: none">• SAS Test Harness sends a CBSD Registration Response as follows:<ul style="list-style-type: none">– <i>cbsdId</i> = C– <i>measReportConfig</i> shall not be included.– <i>responseCode</i> = 0	--	--
4	After completion of step 3, SAS Test Harness does not provide any positive response (<i>responseCode</i> =0) to further request messages from the UUT.	--	--
5	Monitor the RF output of the UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify: <ul style="list-style-type: none">• UUT shall not transmit RF	PASS	--



3.2 WINNF.FT.C.REG.7 - Registration due to change of an installation parameter

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: <ul style="list-style-type: none">• UUT has successfully completed SAS Discovery and Authentication with SAS Test Harness	--	--
2	UUT has successfully registered with SAS Test Harness	--	--
3	Change an installation parameters at the UUT (time T) Tester need to record the current time at which the parameter change is executed.	--	--
4	Monitor the SAS-CBSD interface. UUT sends a deregistration Request to the SAS Test Harness The deregistration request shall be sent within (T + 60 seconds) from step 3.	PASS	--



3.3 WINNF.FT.C.REG.8 - Missing Required parameters (responseCode 102)

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: <ul style="list-style-type: none">• UUT has successfully completed SAS Discovery and Authentication with SAS Test Harness• UUT is in the Unregistered state	--	--
2	CBSD sends a Registration request to SAS Test Harness.	--	--
3	SAS Test Harness rejects the request by sending a CBSD Registration Response as follows: <ul style="list-style-type: none">– SAS response does not include <i>cbsdId</i>– <i>responseCode</i> = R	--	--
4	After completion of step 3, SAS Test Harness does not provide any positive response (<i>responseCode</i> =0) to further request messages from the UUT.	--	--
5	Monitor the RF output of the UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify: <ul style="list-style-type: none">• UUT shall not transmit RF	PASS	--



3.4 WINNF.FT.C.REG.10 - Pending registration (responseCode 200)

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: <ul style="list-style-type: none">• UUT has successfully completed SAS Discovery and Authentication with SAS Test Harness• UUT is in the Unregistered state	--	--
2	CBSD sends a Registration request to SAS Test Harness.	--	--
3	SAS Test Harness rejects the request by sending a CBSD Registration Response as follows: <ul style="list-style-type: none">- SAS response does not include <i>cbsdId</i>- <i>responseCode</i> = R	--	--
4	After completion of step 3, SAS Test Harness does not provide any positive response (<i>responseCode</i> =200) to further request messages from the UUT.	--	--
5	Monitor the RF output of the UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify: <ul style="list-style-type: none">• UUT shall not transmit RF	PASS	--



3.5 WINNF.FT.C.REG.12 - Invalid parameter (responseCode 103)

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: <ul style="list-style-type: none">• UUT has successfully completed SAS Discovery and Authentication with SAS Test Harness• UUT is in the Unregistered state	--	--
2	CBSD sends a Registration request to SAS Test Harness.	--	--
3	SAS Test Harness rejects the request by sending a CBSD Registration Response as follows: <ul style="list-style-type: none">– SAS response does not include <i>cbsdId</i>– <i>responseCode</i> = R	--	--
4	After completion of step 3, SAS Test Harness does not provide any positive response (<i>responseCode</i> =103) to further request messages from the UUT.	--	--
5	Monitor the RF output of the UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify: <ul style="list-style-type: none">• UUT shall not transmit RF	PASS	--



3.6 WINNF.FT.C.REG.14 - Blacklisted CBSD (responseCode 101)

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: <ul style="list-style-type: none">• UUT has successfully completed SAS Discovery and Authentication with SAS Test Harness• UUT is in the Unregistered state	--	--
2	CBSD sends a Registration request to SAS Test Harness.	--	--
3	SAS Test Harness rejects the request by sending a CBSD Registration Response as follows: <ul style="list-style-type: none">– SAS response does not include <i>cbsdId</i>– <i>responseCode</i> = R	--	--
4	After completion of step 3, SAS Test Harness does not provide any positive response (<i>responseCode</i> =101) to further request messages from the UUT.	--	--
5	Monitor the RF output of the UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify: <ul style="list-style-type: none">• UUT shall not transmit RF	PASS	--



3.7 WINNF.FT.C.REG.16 - Unsupported SAS protocol version (responseCode 100)

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: <ul style="list-style-type: none">• UUT has successfully completed SAS Discovery and Authentication with SAS Test Harness• UUT is in the Unregistered state	--	--
2	CBSD sends a Registration request to SAS Test Harness.	--	--
3	SAS Test Harness rejects the request by sending a CBSD Registration Response as follows: <ul style="list-style-type: none">– SAS response does not include <i>cbsdId</i>– <i>responseCode</i> = R	--	--
4	After completion of step 3, SAS Test Harness does not provide any positive response (<i>responseCode</i> =100) to further request messages from the UUT.	--	--
5	Monitor the RF output of the UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify: <ul style="list-style-type: none">• UUT shall not transmit RF	PASS	--



3.8 WINNF.FT.C.REG.18 - Group Error (responseCode 201)

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: <ul style="list-style-type: none">• UUT has successfully completed SAS Discovery and Authentication with SAS Test Harness• UUT is in the Unregistered state	--	--
2	CBSD sends a Registration request to SAS Test Harness.	--	--
3	SAS Test Harness rejects the request by sending a CBSD Registration Response as follows: <ul style="list-style-type: none">– SAS response does not include <i>cbsdId</i>– <i>responseCode</i> = R	--	--
4	After completion of step 3, SAS Test Harness does not provide any positive response (<i>responseCode</i> =201) to further request messages from the UUT.	--	--
5	Monitor the RF output of the UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify: <ul style="list-style-type: none">• UUT shall not transmit RF	PASS	--



3.9 WINNF.FT.C.GRA.1 - Unsuccessful Grant responseCode=400 (INTERFERENCE)

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: <ul style="list-style-type: none">UUT has registered successfully with SAS Test Harness, with <i>cbsdId = C</i>	--	--
2	UUT sends valid Grant Request.	--	--
3	SAS Test Harness sends a Grant Response message, including <ul style="list-style-type: none"><i>cbsdId=C</i><i>responseCode = R</i>	--	--
4	After completion of step 3, SAS Test Harness does not provide any positive response(<i>responseCode=0</i>) to further request messages from the UUT.	--	--
5	Monitor the RF output of the UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify: <ul style="list-style-type: none">UUT shall not transmit RF	PASS	--



3.10 WINNF.FT.C.GRA.2 - Unsuccessful Grant responseCode=401 (GRANT_CONFLICT)

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: <ul style="list-style-type: none">• UUT has registered successfully with SAS Test Harness, with <i>cbstdId = C</i>	--	--
2	UUT sends valid Grant Request.	--	--
3	SAS Test Harness sends a Grant Response message, including <ul style="list-style-type: none">• <i>cbstdId=C</i>• <i>responseCode =R</i>	--	--
4	After completion of step 3, SAS Test Harness does not provide any positive response (<i>responseCode=401</i>) to further request messages from the UUT.	--	--
5	Monitor the RF output of the UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify: <ul style="list-style-type: none">• UUT shall not transmit RF	PASS	--



3.11 WINNF.FT.C.HBT.1 - Heartbeat Success Case (first Heartbeat Response)

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: <ul style="list-style-type: none">UUT has registered successfully with SAS Test Harness, with <i>cbsdId = C</i>	--	--
2	UUT sends a message: <ul style="list-style-type: none">If message is type Spectrum Inquiry Request, go to step 3, orIf message is type Grant Request, go to step 5	--	--
3	UUT sends Spectrum Inquiry Request. Validate: <ul style="list-style-type: none"><i>cbsdId = C</i>List of frequencyRange objects sent by UUT are within the CBRS frequency range	PASS	--
4	SAS Test Harness sends a Spectrum Inquiry Response message, including the following parameters: <ul style="list-style-type: none"><i>cbsdId = C</i><i>availableChannel</i> is an array of availableChannel objects<i>responseCode = 0</i>	--	--
5	UUT sends Grant Request message. Validate: <ul style="list-style-type: none"><i>cbsdId = C</i><i>maxEIRP</i> is at or below the limit appropriate for CBSD category as defined by Part 96<i>operationFrequencyRange, F</i>, sent by UUT is a valid range within the CBRS band	PASS	--
6	SAS Test Harness sends a Grant Response message, including the parameters: <ul style="list-style-type: none"><i>cbsdId = C</i><i>grantId = G</i> = a valid grant ID<i>grantExpireTime</i> = UTC time greater than duration of the test<i>responseCode = 0</i>	--	--
7	UUT sends a first Heartbeat Request message. VerifyHeartbeatRequest message is formatted correctly, including: <ul style="list-style-type: none"><i>cbsdId = C</i><i>grantId = G</i><i>operationState = "GRANTED"</i>	PASS	--
8	SAS Test Harness sends a Heartbeat Response message, with the following parameters: <ul style="list-style-type: none"><i>cbsdId = C</i><i>grantId = G</i><i>transmitExpireTime</i> = current UTC time + 200 seconds<i>responseCode = 0</i>	--	--



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



3.12 WINNF.FT.C.HBT.3 - Heartbeat responseCode=105 (DEREGISTER)

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: <ul style="list-style-type: none">• UUT has registered successfully with SAS Test Harness• UUT has a valid single grant as follows:<ul style="list-style-type: none">○ valid <i>cbsdId</i> =C○ valid <i>grantId</i> =G○ grant is for frequency range F, power P○ <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	--	--
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: <ul style="list-style-type: none">• <i>cbsdId</i> =C• <i>grantId</i> =G• <i>operationState</i> =“AUTHORIZED”	PASS	--
3	SAS Test Harness sends a Heartbeat Response message, including the following parameters: <ul style="list-style-type: none">• <i>cbsdId</i> =C• <i>grantId</i> =G• <i>transmitExpireTime</i> = T = Current UTC time• <i>responseCode</i> = 105 (DEREGISTER)	--	--
4	After completion of step 3, SAS Test Harness shall not allow any further grants to the UUT.	--	--
5	Monitor the RF output of the UUT. Verify: <ul style="list-style-type: none">• UUT shall stop transmission within (T + 60 seconds) of completion of step 3	PASS	--



3.13 WINNF.FT.C.HBT.4 - Heartbeat responseCode=500 (TERMINATED_GRANT)

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: <ul style="list-style-type: none">• UUT has registered successfully with SAS Test Harness• UUT has a valid single grant as follows:<ul style="list-style-type: none">○ valid <i>cbsdId</i> =C○ valid <i>grantId</i> =G○ grant is for frequency range F, power P○ <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	--	--
2	UUT sends a Heartbeat Request message. Ensure Heartbeat Request message is sent within latest specified heartbeatInterval, and is formatted correctly, including: <ul style="list-style-type: none">• <i>cbsdId</i> =C• <i>grantId</i> =G• <i>operationState</i> =“AUTHORIZED”	PASS	--
3	SAS Test Harness sends a Heartbeat Response message, including the following parameters: <ul style="list-style-type: none">• <i>cbsdId</i> =C• <i>grantId</i> =G• <i>transmitExpireTime</i> =T =current UTC time• <i>responseCode</i> =500 (TERMINATED_GRANT)	--	--
4	After completion of step 3, SAS Test Harness shall not allow any further grants to the UUT.	--	--
5	Monitor the RF output of the UUT. Verify: <ul style="list-style-type: none">• UUT shall stop transmission within (T + 60 seconds) of completion of step 3	PASS	--



3.14 WINNF.FT.C.HBT.5 - Heartbeat responseCode=501 (SUSPENDED_GRANT) in First Heartbeat Response

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: <ul style="list-style-type: none"> • UUT has registered successfully with SAS Test Harness • UUT has a valid single grant as follows: <ul style="list-style-type: none"> ○ valid <i>cbsdId</i> = C ○ valid <i>grantId</i> = G ○ grant is for frequency range F, power P ○ <i>grantExpireTime</i> = UTC time greater than duration of the test • UUT is in GRANTED, but not AUTHORIZED state (i.e. has not performed its first Heartbeat Request) 	--	--
2	UUT sends a Heartbeat Request message. Verify Heartbeat Request message is formatted correctly, including: <ul style="list-style-type: none"> • <i>cbsdId</i> = C • <i>grantId</i> = G • <i>operationState</i> = "GRANTED" 	PASS	--
3	SAS Test Harness sends a Heartbeat Response message, including the following parameters: <ul style="list-style-type: none"> • <i>cbsdId</i> = C • <i>grantId</i> = G • <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.	--	--
5	Monitor the SAS-CBSD interface. Verify either A OR B occurs: <p>A. UUT sends a Heartbeat Request message. Ensure message is sent within latest specified heartbeatInterval, and is correctly formatted with parameters:</p> <ul style="list-style-type: none"> • <i>cbsdId</i> = C • <i>grantId</i> = G • <i>operationState</i> = "GRANTED" <p>B. UUT sends a Relinquishment request message. Ensure message is correctly formatted with parameters:</p> <ul style="list-style-type: none"> • <i>cbdsId</i> = C • <i>grantId</i> = G Monitor the RF output of the UUT. Verify: <ul style="list-style-type: none"> • UUT does not transmit at any time 	PASS	--



3.15 WINNF.FT.C.HBT.6 - Heartbeat responseCode=501 (SUSPENDED_GRANT) in Subsequent Heartbeat Response

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: <ul style="list-style-type: none"> • UUT has registered successfully with SAS Test Harness • UUT has a valid single grant as follows: <ul style="list-style-type: none"> ○ valid <i>cbsdlId</i> =C ○ valid <i>grantId</i> =G ○ grant is for frequency range F, power P ○ <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 	--	--
2	UUT sends a Heartbeat Request message. Verify Heartbeat Request message is sent within latest specified heartbeatInterval, and is formatted correctly, including: <ul style="list-style-type: none"> • <i>cbsdlId</i> =C • <i>grantId</i> =G • <i>operationState</i> ="AUTHORIZED" 	PASS	--
3	SAS Test Harness sends a Heartbeat Response message, including the following parameters: <ul style="list-style-type: none"> • <i>cbsdlId</i> =C • <i>grantId</i> =G • <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.	--	--
5	Monitor the SAS-CBSD interface. Verify either A OR B occurs: <p>A. UUT sends a Heartbeat Request message. Ensure message is sent within latest specified heartbeatInterval, and is correctly formatted with parameters:</p> <ul style="list-style-type: none"> • <i>cbsdlId</i> =C • <i>grantId</i> =G • <i>operationState</i> ="GRANTED" <p>B. UUT sends a Relinquishment Request message. Ensure message is correctly formatted with parameters:</p> <ul style="list-style-type: none"> • <i>cbdsId</i> =C • <i>grantId</i> =G Monitor the RF output of the UUT. Verify: <ul style="list-style-type: none"> • UUT shall stop transmission within (T+60 seconds) of completion of step 3 	PASS	--



3.16 WINNF.FT.C.HBT.7 - Heartbeat responseCode=502 (UNSYNC_OP_PARAM)

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



3.17 WINNF.FT.C.HBT.9 - Heartbeat Response Absent (First Heartbeat)

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: <ul style="list-style-type: none">• UUT has registered successfully with SAS Test Harness• UUT has a valid single grant as follows:<ul style="list-style-type: none">○ valid <i>cbsdId</i> = C○ valid <i>grantId</i> = G○ grant is for frequency range F, power P○ <i>grantExpireTime</i> = UTC time greater than duration of the test• UUT is in GRANTED, but not AUTHORIZED state (i.e. has not performed its first Heartbeat Request)	--	--
2	UUT sends a Heartbeat Request message. Ensure Heartbeat Request message is sent within latest specified <i>heartbeatInterval</i> , and is formatted correctly, including: <ul style="list-style-type: none">• <i>cbsdId</i> = C• <i>grantId</i> = G• <i>operationState</i> = "GRANTED"	PASS	--
3	After completion of Step 2, SAS Test Harness does not respond to any further messages from UUT to simulate loss of network connection	--	--
4	Monitor the RF output of the UUT from start of test to 60 seconds after step 3. Verify: <ul style="list-style-type: none">• At any time during the test, UUT shall not transmit on RF interface	PASS	--



3.18 WINNF.FT.C.HBT.10 - Heartbeat Response Absent (Subsequent Heartbeat)

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



3.19 WINNF.FT.C.HBT.11 - Successful Grant Renewal in Heartbeat Test Case

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: <ul style="list-style-type: none"> • UUT has registered successfully with SAS Test Harness • UUT has a valid single grant as follows: <ul style="list-style-type: none"> ○ valid <i>cbsdId</i> =C ○ valid <i>grantId</i> =G ○ grant is for frequency range F, power P • UUT is in AUTHORIZED state and is transmitting within the grant bandwidth F on RF interface. • Grant has the following parameters at the start of the test: <ul style="list-style-type: none"> ○ <i>grantExpireTime</i> = UTC time equal to time at start of test + 300 seconds = Tgrant_expire ○ <i>transmitExpireTime</i> = UTC time equal to time at start of test + 200 seconds ○ <i>heartbeatInterval</i> = 60 seconds 	--	--
2	UUT sends a Heartbeat Request message. If Heartbeat Request message contains grantRenew = TRUE, go to Step 6, else go to Step 3.	--	--
3	Verify Heartbeat Request message is sent within the latest specified <i>heartbeatInterval</i> , and is formatted correctly, including: <ul style="list-style-type: none"> • <i>cbsdId</i> =C • <i>grantId</i> =G • <i>operationState</i> = "AUTHORIZED" 	PASS	--
4	SAS Test Harness sends a Heartbeat Response message, with the following parameters: <ul style="list-style-type: none"> • <i>cbsdId</i> =C • <i>grantId</i> =G • <i>transmitExpireTime</i> = current UTC + 200 seconds • <i>grantExpireTime</i> = same as Step 1 • <i>responseCode</i> =0 	--	--
5	Go to Step 2	--	--
6	Verify Heartbeat Request message is sent within the latest specified <i>heartbeatInterval</i> , and is formatted correctly, including: <ul style="list-style-type: none"> • <i>cbsdId</i> =C • <i>grantId</i> =G • <i>operationState</i> = "AUTHORIZED" • <i>grantRenew</i> = TRUE 	PASS	--



7	SAS Test Harness sends a Heartbeat Response message, with the following parameters: <ul style="list-style-type: none">• <i>cbsdId</i> = C• <i>grantId</i> = G• <i>grantExpireTime</i> = UTC time set far in the future• <i>transmitExpireTime</i> = current UTC time + 200 seconds• <i>responseCode</i> = 0	--	--
8	Continue to respond to any subsequent Heartbeat Request from CBSD with Heartbeat Response with the following parameters: <ul style="list-style-type: none">• <i>cbsdId</i> = C• <i>grantId</i> = G• <i>transmitExpireTime</i> = same as Step 7• <i>responseCode</i> = 0	--	--
9	Monitor RF transmission of UUT from start of test until Tgrant_expire + 60 seconds and ensure UUT continues to transmit throughout the time period.	PASS	--



3.20 WINNF.FT.C.MES.1 - Registration Response contains measReportConfig

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: <ul style="list-style-type: none"> • UUT has successfully completed SAS Discovery and Authentication with SAS Test Harness 	--	--
2	UUT sends a Registration Request message. Validate the Registration Request message is formatted correctly, including: <ul style="list-style-type: none"> • <i>userId</i> is present and correct • <i>fcclId</i> is present and correct • <i>cbsdSerialNumber</i> is present and correct • <i>measCapability</i> = "RECEIVED_POWER_WITHOUT_GRANT" 	PASS	--
3	SAS Test Harness sends a Registration Response message, with the following parameters: <ul style="list-style-type: none"> • <i>cbsdId</i> = C = valid <i>cbsdId</i> for this UUT • <i>measReportConfig</i> = "RECEIVED_POWER_WITHOUT_GRANT" • <i>responseCode</i> = 0 	--	--
4	UUT sends a message: <ul style="list-style-type: none"> • If message is type Spectrum Inquiry Request, go to step 5, or • If message is type Grant Request, go to step 7 	--	--
5	UUT sends message type Spectrum Inquiry Request. Verify message contains all required parameters properly formatted, and specifically: <ul style="list-style-type: none"> • <i>cbsdId</i> = C • <i>measReport</i> is present, and is a properly formatted <i>rcvdPowerMeasReport</i>. 	PASS	--
6	SAS Test Harness sends a Spectrum Inquiry Response, with the following parameters: <ul style="list-style-type: none"> • <i>cbsdId</i> = C • <i>availableChannel</i> is an array of <i>availableChannel</i> objects • <i>responseCode</i> = 0 	--	--
7	UUT sends message type Grant Request message. Verify message contains all required parameters properly formatted, and specifically: <ul style="list-style-type: none"> • <i>cbsdId</i> = C • <i>measReport</i> is present, and is a properly formatted <i>rcvdPowerMeasReport</i>. 	PASS	--



3.21 WINNF.FT.C.MES.3 - Grant Response contains measReportConfig

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: <ul style="list-style-type: none"> • UUT has successfully completed SAS Discovery and Authentication with SAS Test Harness • UUT has successfully registered with SAS Test Harness, with <i>cbsdId=C</i> and <i>measCapability = "RECEIVED_POWER_WITH_GRANT"</i> 	--	--
2	UUT sends a Grant Request message. VerifyGrantRequestmessagecontainsallrequiredparameters properly formatted, andspecifically: <ul style="list-style-type: none"> • <i>cbsdId =C</i> • <i>operationParam</i> is present and format is valid 	PASS	--
3	SAS Test Harness sends a Grant Response message, with the following parameters: <ul style="list-style-type: none"> • <i>cbsdId =C</i> • <i>grantId = G = valid grant ID</i> • <i>grantExpireTime = UTC time in the future</i> • <i>heartbeatInterval =60 seconds</i> • <i>measReportConfig="RECEIVED_POWER_WITH_GRANT"</i> • <i>operationParam</i> is set to valid operating parameters • <i>channelType = "GAA"</i> • <i>responseCode =0</i> 	--	--
4	UUT sends a Heartbeat Request message. Verify message contains all required parameters properly formatted, and specifically: <ul style="list-style-type: none"> • <i>cbsdId =C</i> • <i>grantId =G</i> • <i>operationState = "GRANTED"</i> 	PASS	--
5	If Heartbeat Request message (step 4) contains <i>measReport</i> object, then: <ul style="list-style-type: none"> • verify <i>measReport</i> is properly formatted as object <i>rcvdPowerMeasReport</i> • end test, with PASS result else, if Heartbeat Request message (step 4) does not contain <i>measReport</i> object, then: If number of Heartbeat Requests sent by UUT after Step 3 is= 5, then stop test with result of FAIL	PASS	--
6	SAS Test Harness sends a Heartbeat Response message, containing all required parameters properly formatted, and specifically: <ul style="list-style-type: none"> • <i>cbsdId =C</i> • <i>grantId =G</i> • <i>transmitExpireTime = current UTC time +200 seconds</i> • <i>responseCode =0</i> Go to Step 4, above	--	--



3.22 WINNF.FT.C.MES.4 - Heartbeat Response contains measReportConfig

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: <ul style="list-style-type: none"> • UUT has successfully completed SAS Discovery and Authentication with SAS Test Harness • UUT has successfully registered with SAS Test Harness, with <i>cbsdId=C</i> and <i>measCapability</i> = "RECEIVED_POWER_WITH_GRANT" • UUT has received a valid grant with <i>grantId = G</i> • UUT is in Grant State AUTHORIZED and is actively transmitting within the bounds of its grant. • Grant has <i>heartbeatInterval</i>= 60 seconds 	--	--
2	UUT sends a Heartbeat Request message. VerifyHeartbeatRequestmessagecontainsallrequiredparameters properly formatted, andspecifically: <ul style="list-style-type: none"> • <i>cbsdId = C</i> • <i>grantId = G</i> • <i>operationState = "AUTHORIZED"</i> 	PASS	--
3	SAS Test Harness sends a Heartbeat Response message, containing all required parameters properly formatted, and specifically: <ul style="list-style-type: none"> • <i>cbsdId = C</i> • <i>grantId = G</i> • <i>measReportConfig</i>="RECEIVED_POWER_WITH_GRANT" • <i>responseCode = 0</i> 	--	--
4	UUT sends a Heartbeat Request message. Verify message contains all required parameters properly formatted, and specifically: <ul style="list-style-type: none"> • <i>cbsdId = C</i> • <i>grantId = G</i> • <i>operationState = "AUTHORIZED"</i> 	PASS	--
5	If Heartbeat Request message (step 4) contains <i>measReport</i> object, then: <ul style="list-style-type: none"> • verify <i>measReport</i> is properly formatted as object <i>rcvdPowerMeasReport</i> • end test, with PASS result else, if Heartbeat Request message (step 4) does not contain <i>measReport</i> object, then: <ul style="list-style-type: none"> • If number of Heartbeat Requests sent by UUT after Step 3 is= 5, then stop test with result of FAIL 	PASS	--
6	SAS Test Harness sends a Heartbeat Response message, containing all required parameters properly formatted, and specifically: <ul style="list-style-type: none"> • <i>cbsdId = C</i> • <i>grantId = G</i> • <i>responseCode=0</i> Go to Step 4, above	--	--



3.23 WINNF.FT.C.RLQ.1 - Successful Relinquishment

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: <ul style="list-style-type: none">• UUT has successfully completed SAS Discovery and Authentication with SAS Test Harness• UUT has successfully registered with SAS Test Harness, with <i>cbsdId=C</i>• UUT has received a valid grant with <i>grantId= G</i>• UUT is in Grant State AUTHORIZED and is actively transmitting within the bounds of its grant. Invoke <i>triggertoRelinquishUUTGrant</i> from the SAS Test Harness	--	--
2	UUT sends a Relinquishment Request message. Verify message contains all required parameters properly formatted, and specifically: <ul style="list-style-type: none">• <i>cbsdId = C</i>• <i>grantId = G</i>	PASS	--
3	SAS Test Harness shall approve the request with a Relinquishment Response message with parameters: <ul style="list-style-type: none">– <i>cbsdId = C</i>– <i>grantId = G</i>– <i>responseCode = 0</i>	--	--
4	After completion of step 3, SAS Test Harness will not provide any additional positive response (<i>responseCode=0</i>) to further request messages from the UUT.	--	--
5	Monitor the RF output of the UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify: <ul style="list-style-type: none">• UUT shall stop RF transmission at any time between triggering the relinquishment and UUT sending the relinquishment request	PASS	--



3.24 WINNF.FT.C.RLQ.3 - Unsuccessful Relinquishment, responseCode=102

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: <ul style="list-style-type: none">• UUT has successfully completed SAS Discovery and Authentication with SAS Test Harness• UUT has successfully registered with SAS Test Harness, with <i>cbsdId=C</i>• UUT has received a valid grant with <i>grantId= G</i>• UUT is in Grant State AUTHORIZED and is actively transmitting within the bounds of its grant. Invoke trigger to Relinquish UUT Grant from the SAS Test Harness	--	--
2	UUT sends a Relinquishment Request message. Verify message contains all required parameters properly formatted, and specifically: <ul style="list-style-type: none">• <i>cbsdId=C</i>• <i>grantId=G</i>	--	--
3	SAS Test Harness shall send a Relinquishment Response message with parameters: <ul style="list-style-type: none">• <i>cbsdId=C</i>• No <i>grantId</i>• <i>responseCode=R</i>	--	--
4	After completion of step 3, SAS Test Harness will not provide any positive response (<i>responseCode=0</i>) to further request messages from the UUT.	--	--
5	Monitor the RF output of the UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify: <ul style="list-style-type: none">• UUT stopped RF transmission at any time between triggering the relinquishment and UUT sending the relinquishment request	PASS	--



3.25 WINNF.FT.C.RLQ.5 - Unsuccessful Relinquishment, responseCode=103

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: <ul style="list-style-type: none">• UUT has successfully completed SAS Discovery and Authentication with SAS Test Harness• UUT has successfully registered with SAS Test Harness, with <i>cbsdId=C</i>• UUT has received a valid grant with <i>grantId= G</i>• UUT is in Grant State AUTHORIZED and is actively transmitting within the bounds of its grant. Invoke trigger to Relinquish UUT Grant from the SAS Test Harness	--	--
2	UUT sends a Relinquishment Request message. Verify message contains all required parameters properly formatted, and specifically: <ul style="list-style-type: none">• <i>cbsdId = C</i>• <i>grantId = G</i>	--	--
3	SAS Test Harness shall send a Relinquishment Response message with parameters: <ul style="list-style-type: none">• <i>cbsdId = C</i>• No <i>grantId</i>• <i>responseCode = R</i>	--	--
4	After completion of step 3, SAS Test Harness will not provide any positive response (<i>responseCode=103</i>) to further request messages from the UUT.	--	--
5	Monitor the RF output of the UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify: <ul style="list-style-type: none">• UUT stopped RF transmission at any time between triggering the relinquishment and UUT sending the relinquishment request	PASS	--



3.26 WINNF.FT.C.DRG.1 - Successful Deregistration

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: <ul style="list-style-type: none"> • UUT has successfully completed SAS Discovery and Authentication with SAS Test Harness • UUT has successfully registered with SAS Test Harness, with <i>cbsdId=C</i> • UUT has received a valid grant with <i>grantId= G</i> • UUT is in Grant State AUTHORIZED and is actively transmitting within the bounds of its grant. Invoke trigger to deregister UUT from the SAS Test Harness	--	--
2	UUT sends a Relinquishment request and receives Relinquishment response with <i>responseCode=0</i>	--	--
3	UUT sends Deregistration Request to SAS Test Harness with <i>cbsdId=C</i> .	PASS	--
4	SAS Test Harness shall approve the request with a Deregistration Response message with parameters: <ul style="list-style-type: none"> • <i>cbsdId = C</i> • <i>responseCode = 0</i> 	--	--
5	After completion of step 3, SAS Test Harness will not provide any additional positive response (<i>responseCode=0</i>) to further request messages from the UUT.	--	--
6	Monitor the RF output of the UUT from start of test until 60 seconds after Step 4 is complete. This is the end of the test. Verify: <ul style="list-style-type: none"> • UUT stopped RF transmission at any time between triggering the deregistration and either A OR B occurs: <ul style="list-style-type: none"> A. UUT sending a Registration Request message, as this is not mandatory B. UUT sending a Deregistration Request message 	PASS	--



3.27 WINNF.FT.C.DRG.3 - Deregistration responseCode=102

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: <ul style="list-style-type: none">• UUT has successfully completed SAS Discovery and Authentication with SAS Test Harness• UUT has successfully registered with SAS Test Harness, with <i>cbsdId=C</i>• UUT has received a valid grant with <i>grantId= G</i>• UUT is in Grant State AUTHORIZED and is actively transmitting within the bounds of its grant. Invoke trigger to deregister UUT from the SAS Test Harness	--	--
2	UUT sends a Relinquishment request and receives Relinquishment response with <i>responseCode=0</i>	--	--
3	UUT sends Deregistration Request to SAS Test Harness with <i>cbsdId=C</i>	--	--
4	The SAS Test Harness sends the Deregistration Response Message to UUT with: <ul style="list-style-type: none">• No <i>cbsdId</i>• <i>responseCode = 102</i>	--	--
5	After completion of step 3, SAS Test Harness will not provide any positive response(<i>responseCode=0</i>) to further request messages from the UUT.	--	--
6	Monitor the RF output of the UUT from start of test until 60 seconds after Step 4 is complete. This is the end of the test. Verify: <ul style="list-style-type: none">• UUT stopped RF transmission at anytime between triggering the deregistration and either A OR B occurs: A. UUT sending a Registration Request message, as this is not mandatory B. UUT sending a Deregistration Request message	PASS	--



3.28 WINNF.FT.C.DRG.5 - Deregistration responseCode=103

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: <ul style="list-style-type: none">• UUT has successfully completed SAS Discovery and Authentication with SAS Test Harness• UUT has successfully registered with SAS Test Harness, with <i>cbsdlId=C</i>• UUT has received a valid grant with <i>grantId= G</i>• UUT is in Grant State AUTHORIZED and is actively transmitting within the bounds of its grant. Invoke trigger to deregister UUT from the SAS Test Harness	--	--
2	UUT sends a Relinquishment request and receives Relinquishment response with <i>responseCode=0</i>	--	--
3	UUT sends Deregistration Request to SAS Test Harness with <i>cbsdlId=C</i>	--	--
4	The SAS Test Harness sends the Deregistration Response Message to UUT with: <ul style="list-style-type: none">• No <i>cbsdlId</i>• <i>responseCode = 103</i>	--	--
5	After completion of step 3, SAS Test Harness will not provide any positive response(<i>responseCode=0</i>) to further request messages from the UUT.	--	--
6	Monitor the RF output of the UUT from start of test until 60 seconds after Step 4 is complete. This is the end of the test. Verify: <ul style="list-style-type: none">• UUT stopped RF transmission at any time between triggering the deregistration and either A OR B occurs: A. UUT sending a Registration Request message, as this is not mandatory B. UUT sending a Deregistration Request message	PASS	--



3.29 WINNF.FT.C.SCS.1 - Successful TLS connection between UUT and SAS Test Harness

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



3.30 WINNF.FT.C.SCS.2 - TLS failure due to revoked certificate

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



3.31 WINNF.FT.C.SCS.3 - TLS failure due to expired server certificate

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



3.32 WINNF.FT.C.SCS.4 - TLS failure when SAS Test Harness certificate is issued by an unknown CA

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

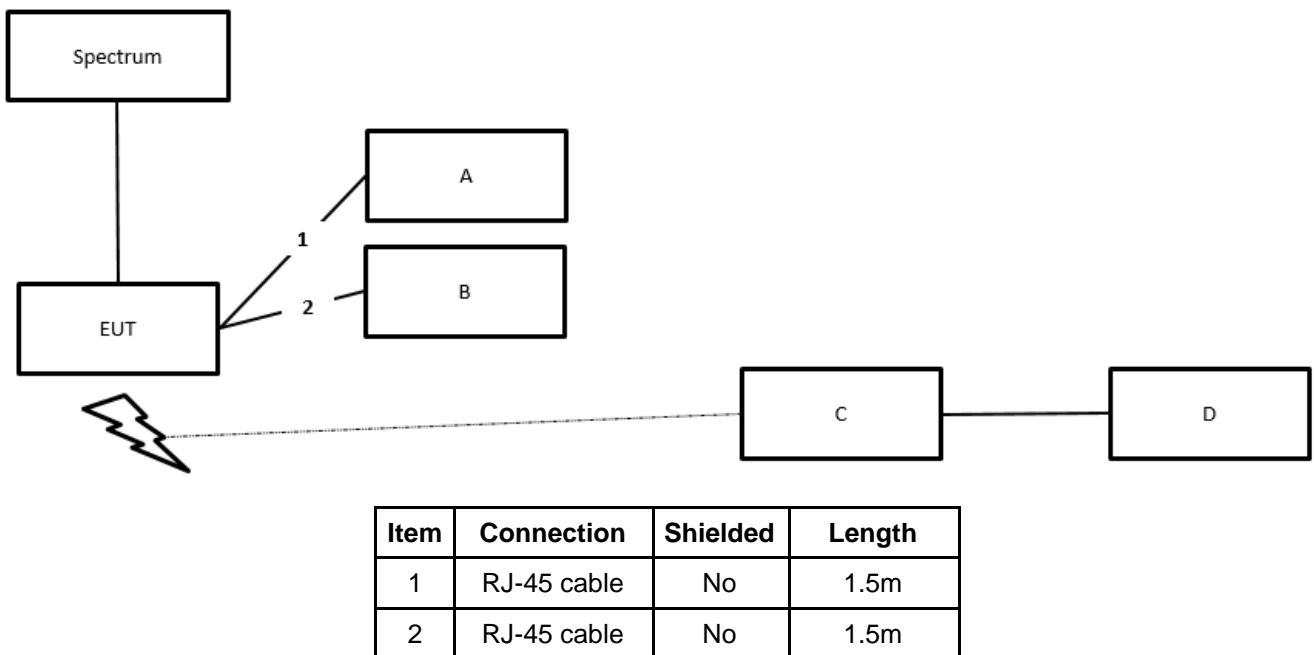


3.33 WINNF.FT.C.SCS.5 - TLS failure when certificate at the SAS Test Harness is corrupted

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

3.34 WINNF.PT.C.HBT.1 - UUT RF Transmit Power Measurement

Items	Parameters
Maximum rated power (EIRP, dBm/MHz)	20dBm/MHz
Transmit dynamic range (EIRP, dBm/MHz)	20, 18, 16, 14, 12, 10dBm/MHz
Occupied bandwidth (OBW)	20MHz
maxEirp values	20dBm/MHz



Note: To ensure EUT transmits with full power across the Bandwidth during the on duration of duty cycle, EUT is running maximum traffic during the test.



Spectrum Analyzer Setting	Parameters
Center Frequency	3600MHz
Frequency Span	30MHz
RBW / VBW	1 MHz / 3MHz
Channel Power Meas Bandwidth	10MHz
Sweep Time	1ms

#	Test Execution Steps	Results	
1	<p>Ensure the following conditions are met for test entry:</p> <ul style="list-style-type: none"> • UUT has successfully completed SAS Discovery and Authentication with the SAS Test Harness • UUT has registered with the SAS, with CBSID ID=C • UUT has a single valid grant G with parameters {lowFrequency = FL, highFrequency = FH, maxEirp = Pi}, with grant in AUTHORIZED state, and grantExpireTime set to a value far past the duration of this test case <p><i>Note: inorderfortheUUTtorequestagrantwiththeparameters {lowFrequency, highFrequency, maxEirp}, the SAS Test Harness may need to provide appropriate guidance in the availableChannel object ofthespectrumInquiry responsemessage, andtheoperationParam objectofthegrantresponsemessage. Alternately, theUUTvendor may provide the ability to set those parameters on the UUT so that the UUT will request a grant with those parameters.</i></p>	--	--
2	<p>UUT and SAS Test Harness perform a series of Heartbeat Request/Response cycles, which continues until the other test steps are complete. Messaging for each cycle is as follows:</p> <ul style="list-style-type: none"> • UUT sends Heartbeat Request, including: <ul style="list-style-type: none"> ○ cbsdId = C ○ grantId = G • SAS Test Harness responds with Heartbeat Response, including: <ul style="list-style-type: none"> ○ cbsdId = C ○ grantId = G ○ transmitExpireTime = currentUTCtime + 200seconds ○ responseCode = 0 	--	--



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

Freq. (MHz)	Bandwidth (MHz)	Ant. Gain (dBi)	Conducted PSD (dBm/MHz)				maxEirp (dBm/MHz)	Grant maxEirp (dBm/MHz)	Result
			Port 1	Port 2	Port 3	Port 4			
3600	20	6.36	-3.32	-3.06	-3.02	-2.95	9.29	20	PASS
3600	20	6.36	-8.50	-8.07	-8.41	-8.85	3.93	14	PASS
3600	20	6.36	-11.47	-11.49	-11.75	-12.89	0.52	10	PASS



4 Test Equipment and Calibration Data

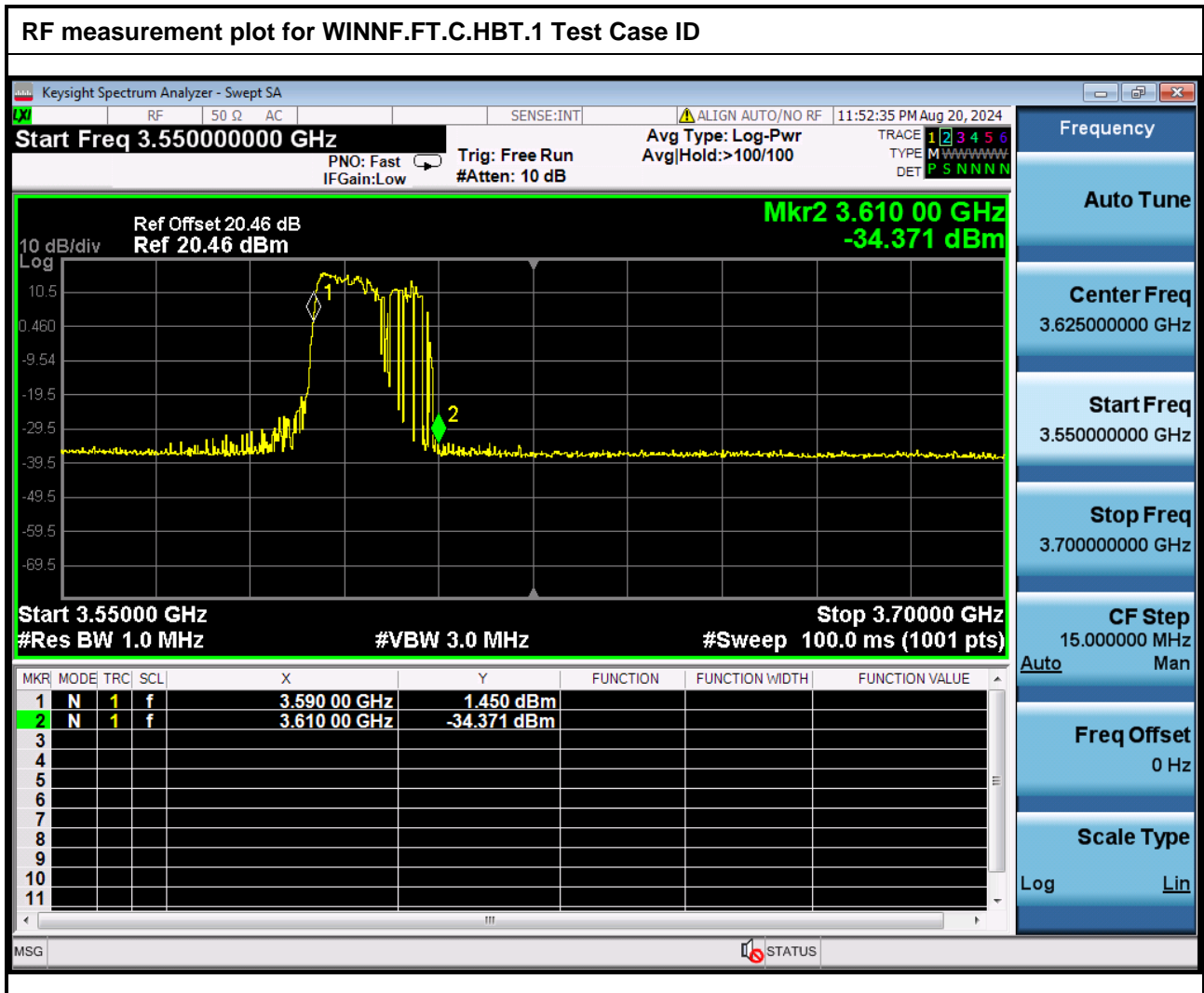
Instrument	Brand	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
Spectrum analyzer	R&S	FSV40	101028	9kHz~40GHz	Dec. 22, 2023	Dec. 21, 2024	Conducted (TH03-CB)
RF Cable	Woken	RG402	High Cable-11	30MHz ~18 GHz	Oct. 02, 2023	Oct. 01, 2024	Conducted (TH03-CB)
RF Cable	Woken	RG402	High Cable-12	30MHz ~18 GHz	Oct. 02, 2023	Oct. 01, 2024	Conducted (TH03-CB)
RF Cable	Woken	RG402	High Cable-13	30MHz ~18 GHz	Oct. 02, 2023	Oct. 01, 2024	Conducted (TH03-CB)
RF Cable-high	Woken	RG402	High Cable-14	1 GHz ~18 GHz	Oct. 02, 2023	Oct. 01, 2024	Conducted (TH03-CB)
RF Cable-high	Woken	RG402	High Cable-15	1 GHz ~18 GHz	Oct. 02, 2023	Oct. 01, 2024	Conducted (TH03-CB)
RF Power Divider	Woken	2 Way	TH03-DV01	1 ~ 6GHz	Oct. 03, 2023	Oct. 02, 2024	Conducted (TH03-CB)
RF Power Divider	Woken	4 Way	TH03-DV02	1 ~ 6GHz	Oct. 03, 2023	Oct. 02, 2024	Conducted (TH03-CB)

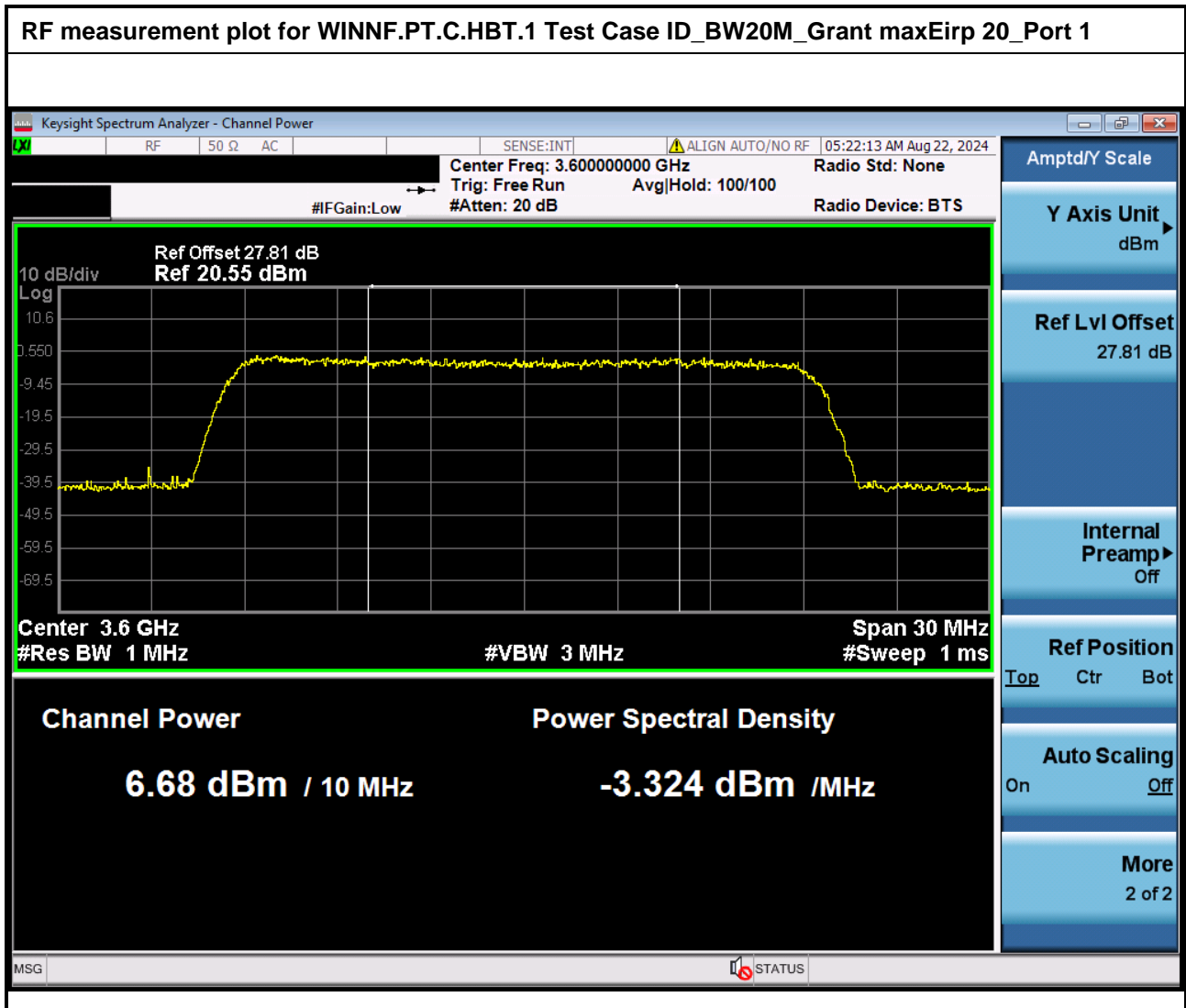
Note: Calibration Interval of instruments listed above is one year.

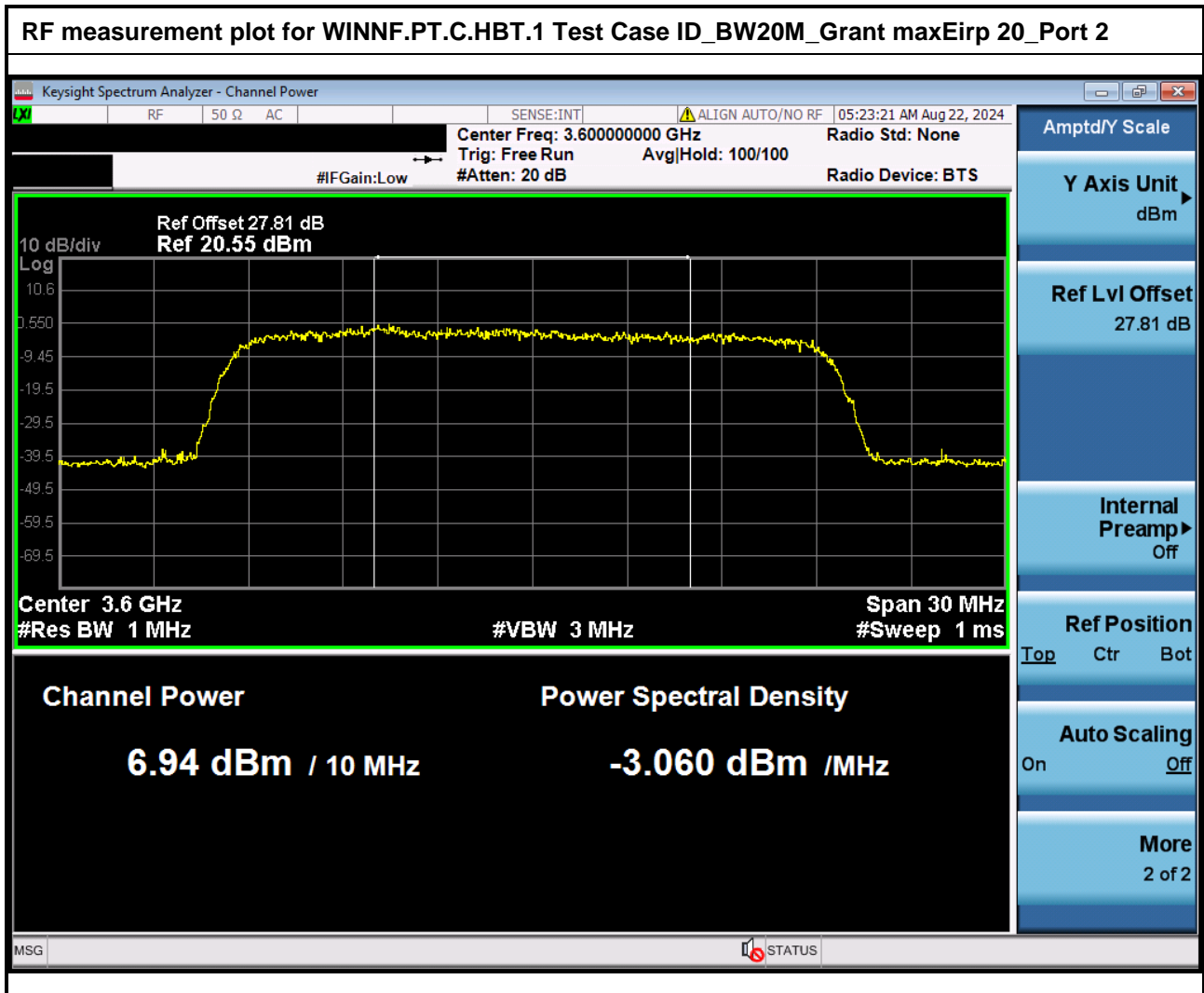


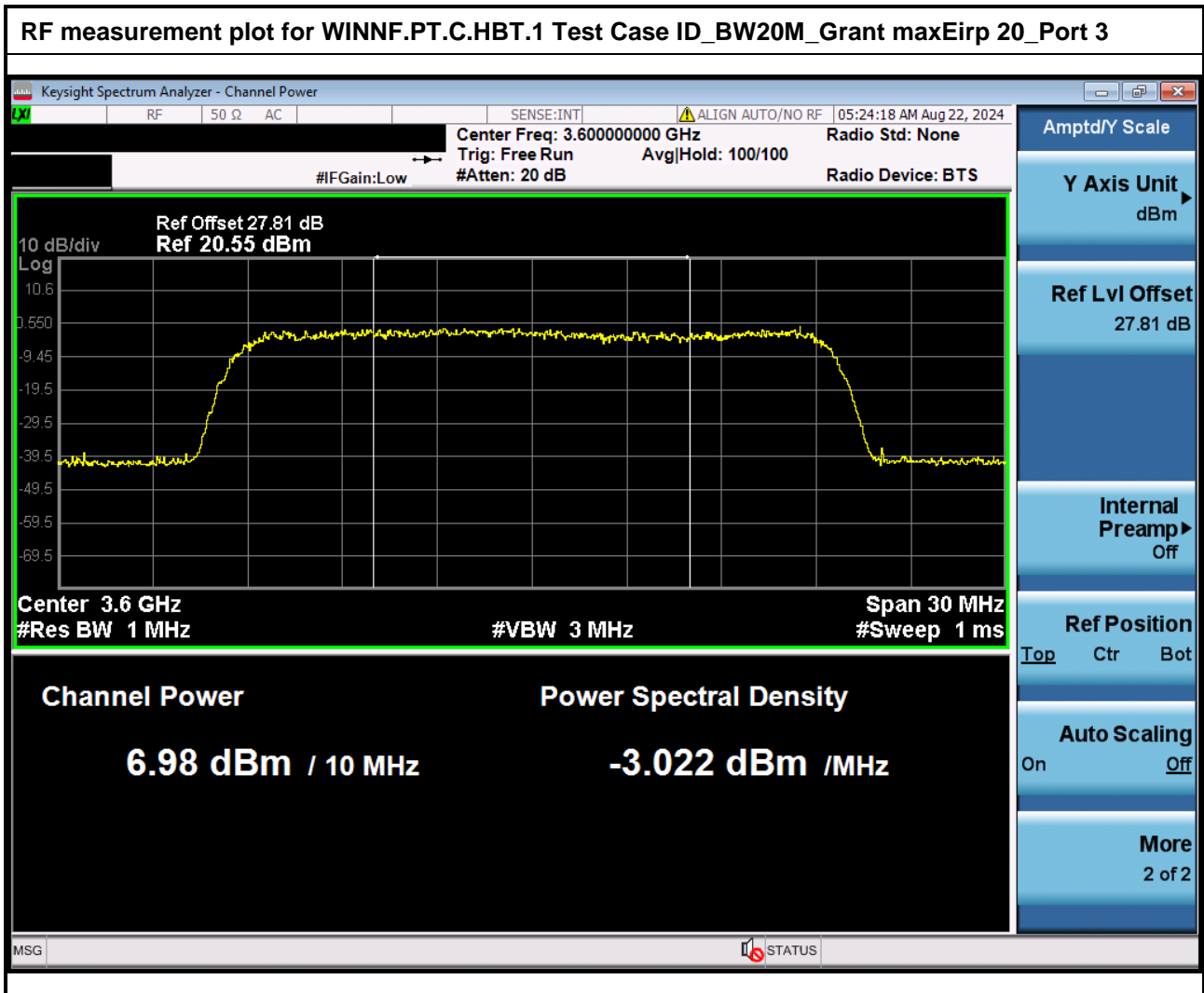
5 Measurement Uncertainty

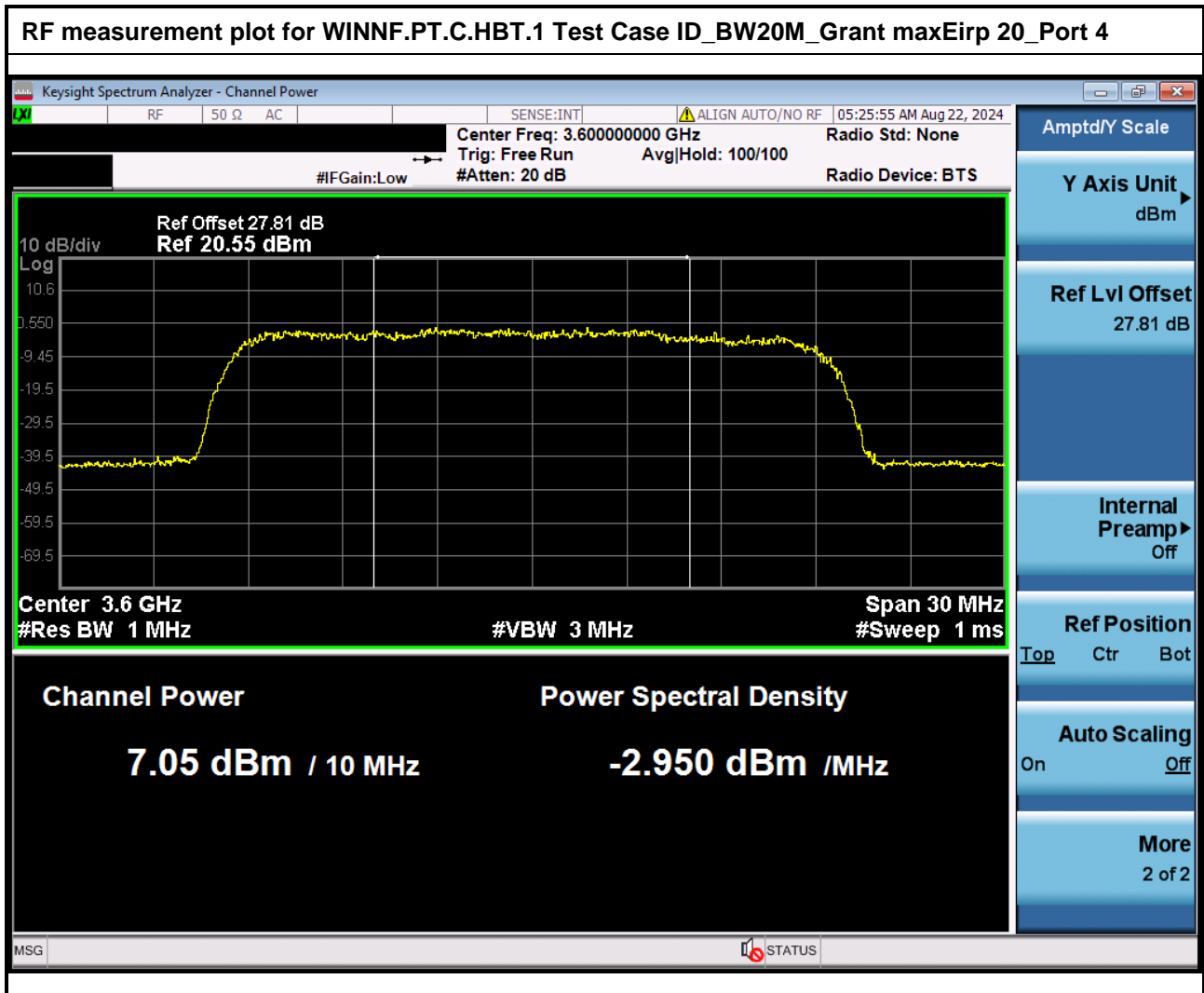
Test Items	Uncertainty	Remark
Conducted Emission	3.1 dB	Confidence levels of 95%

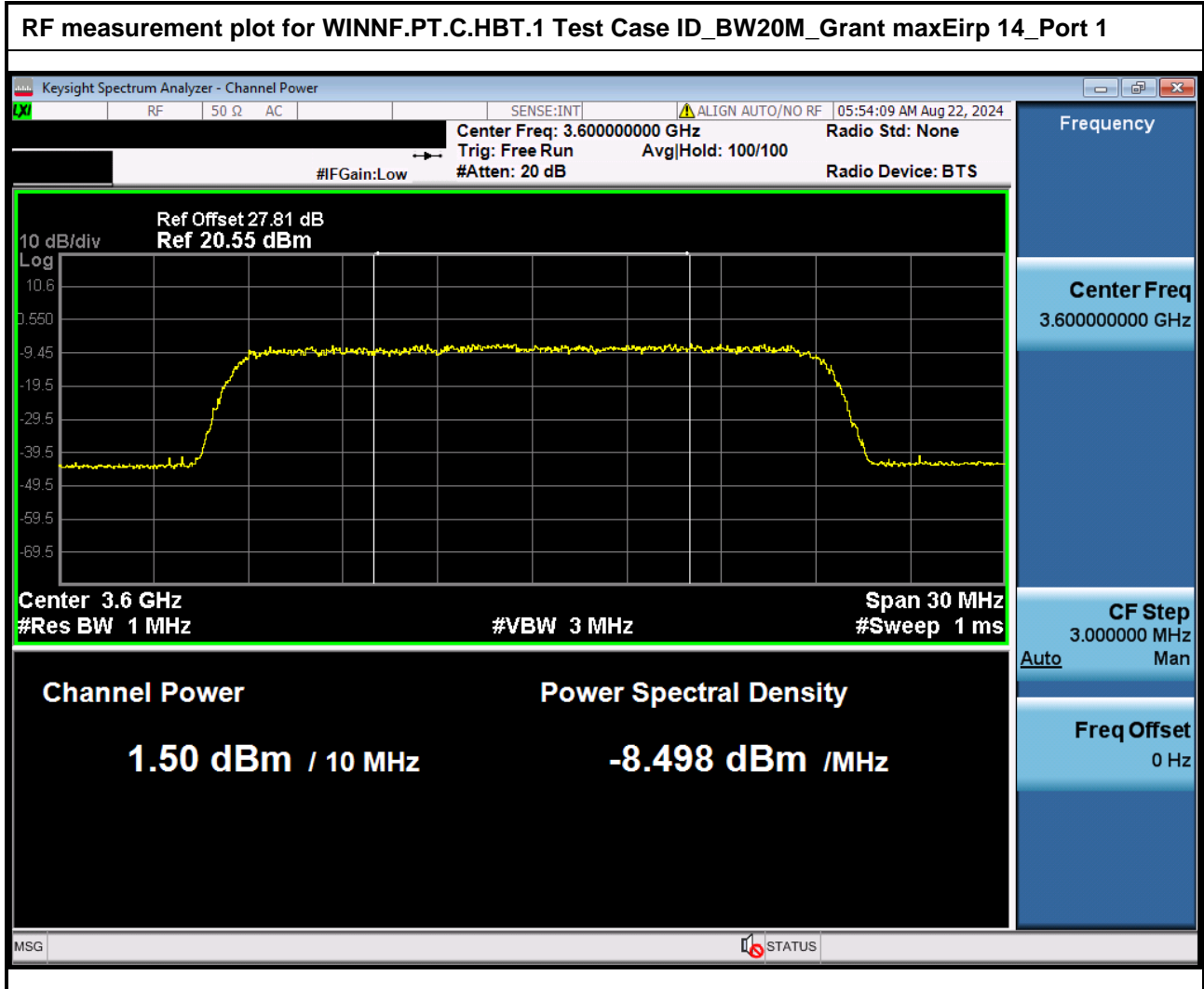


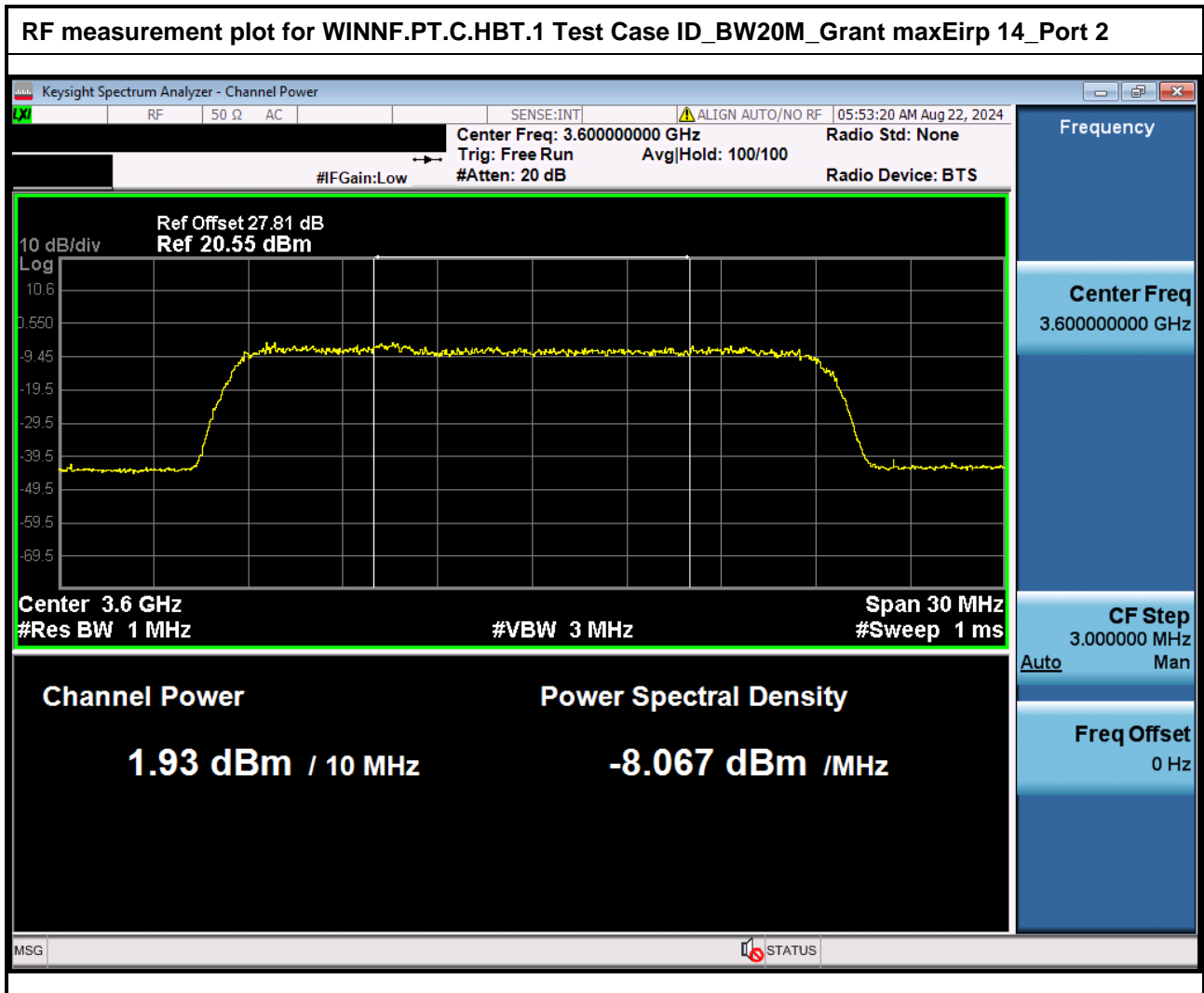


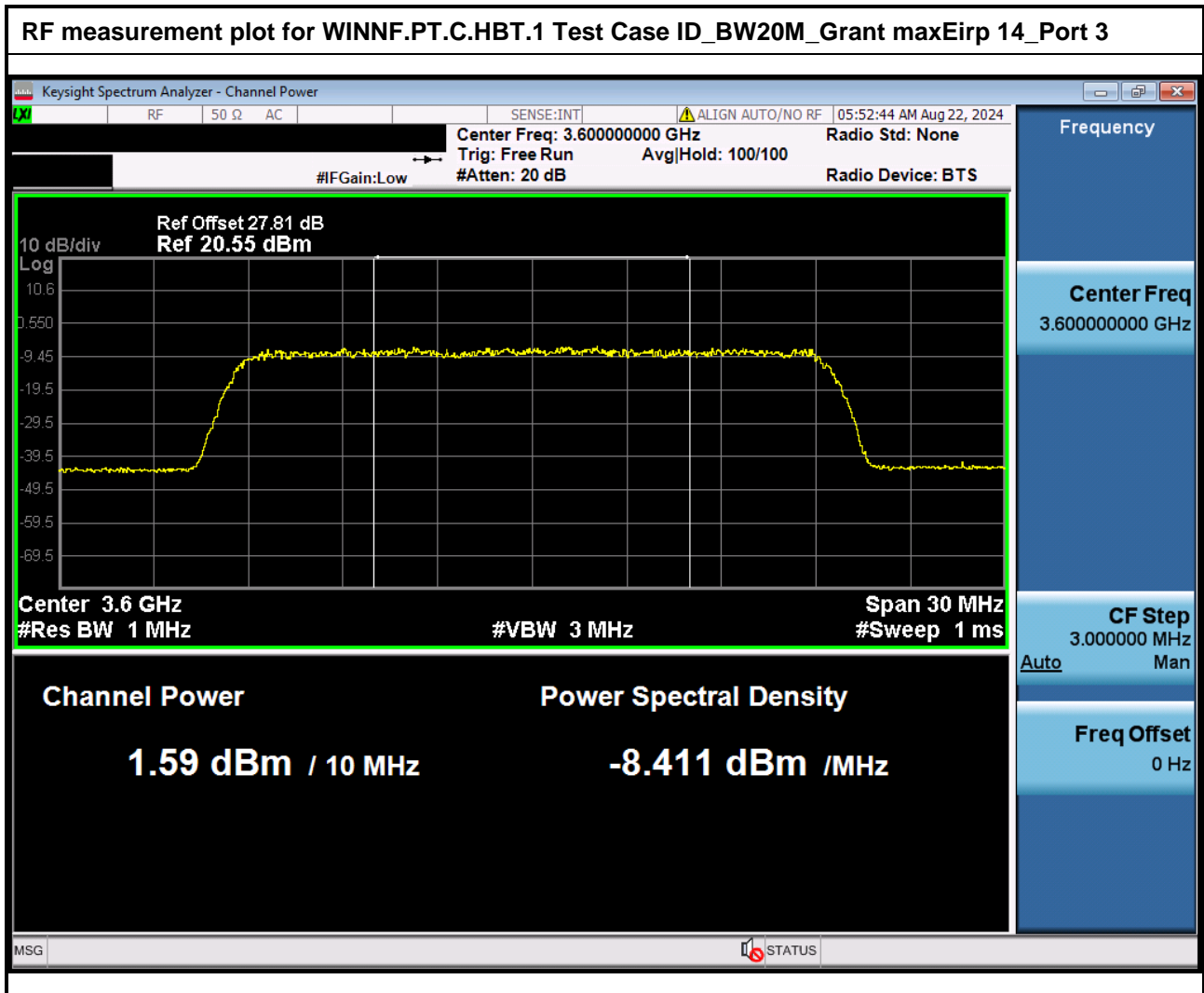


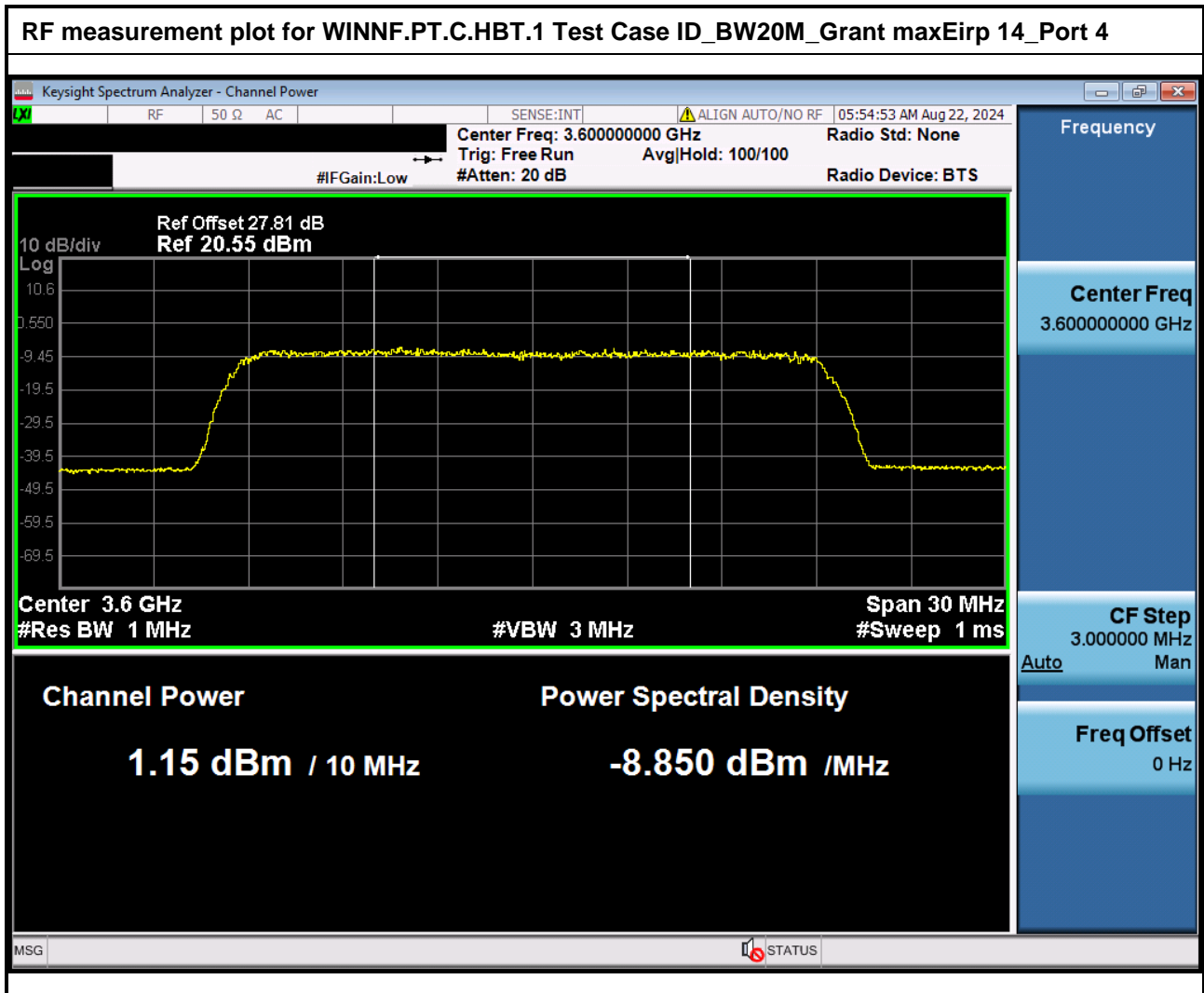


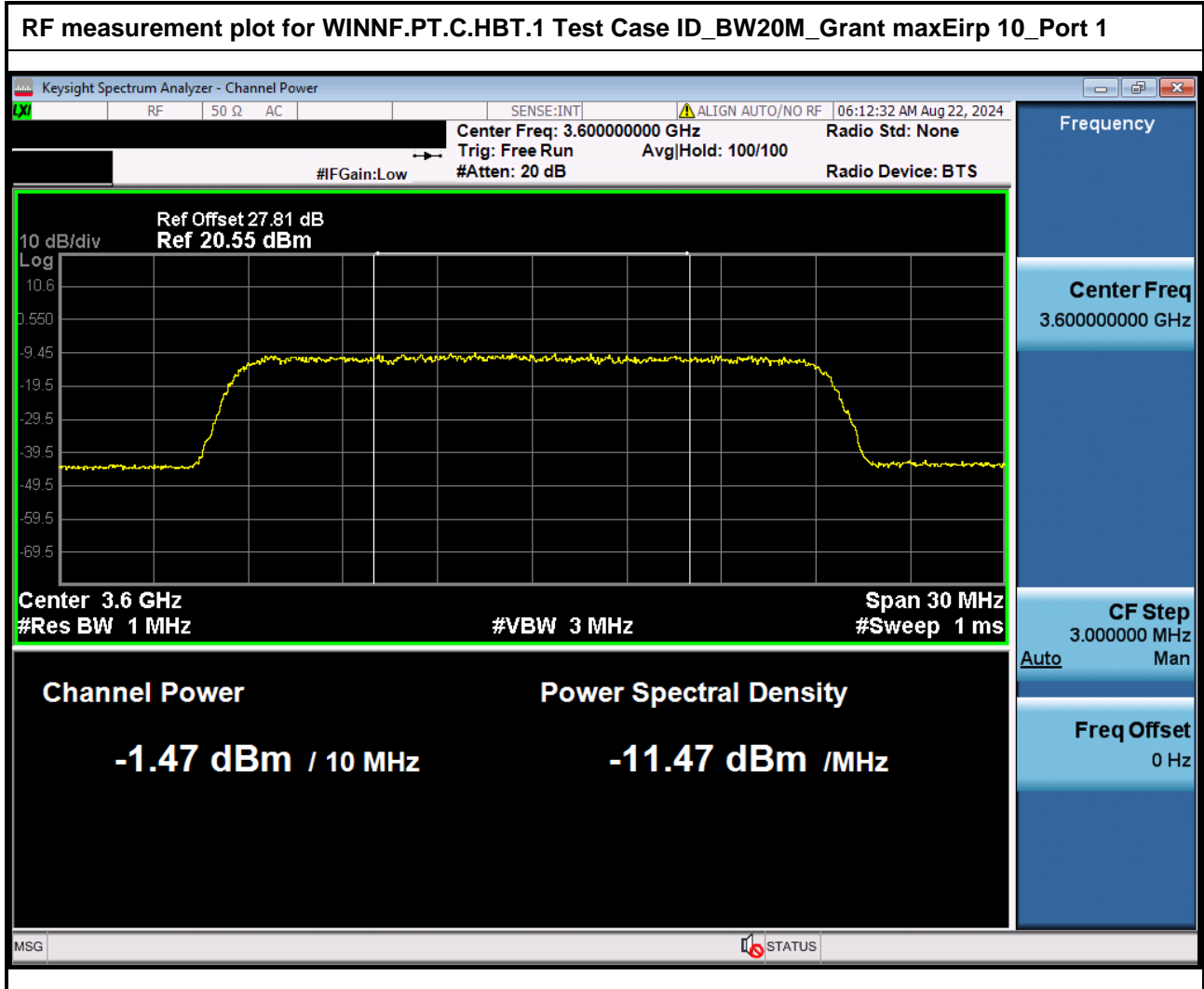


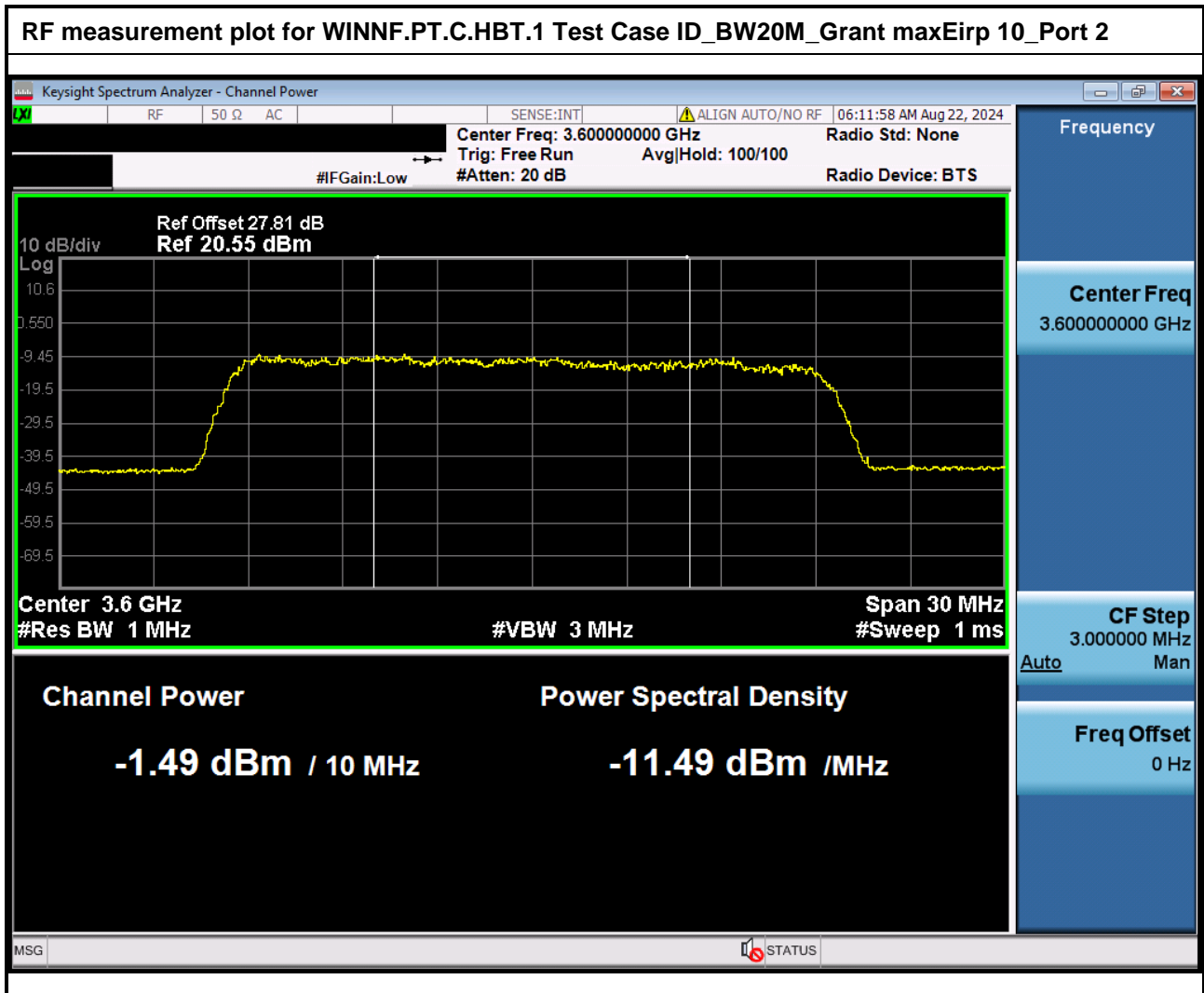


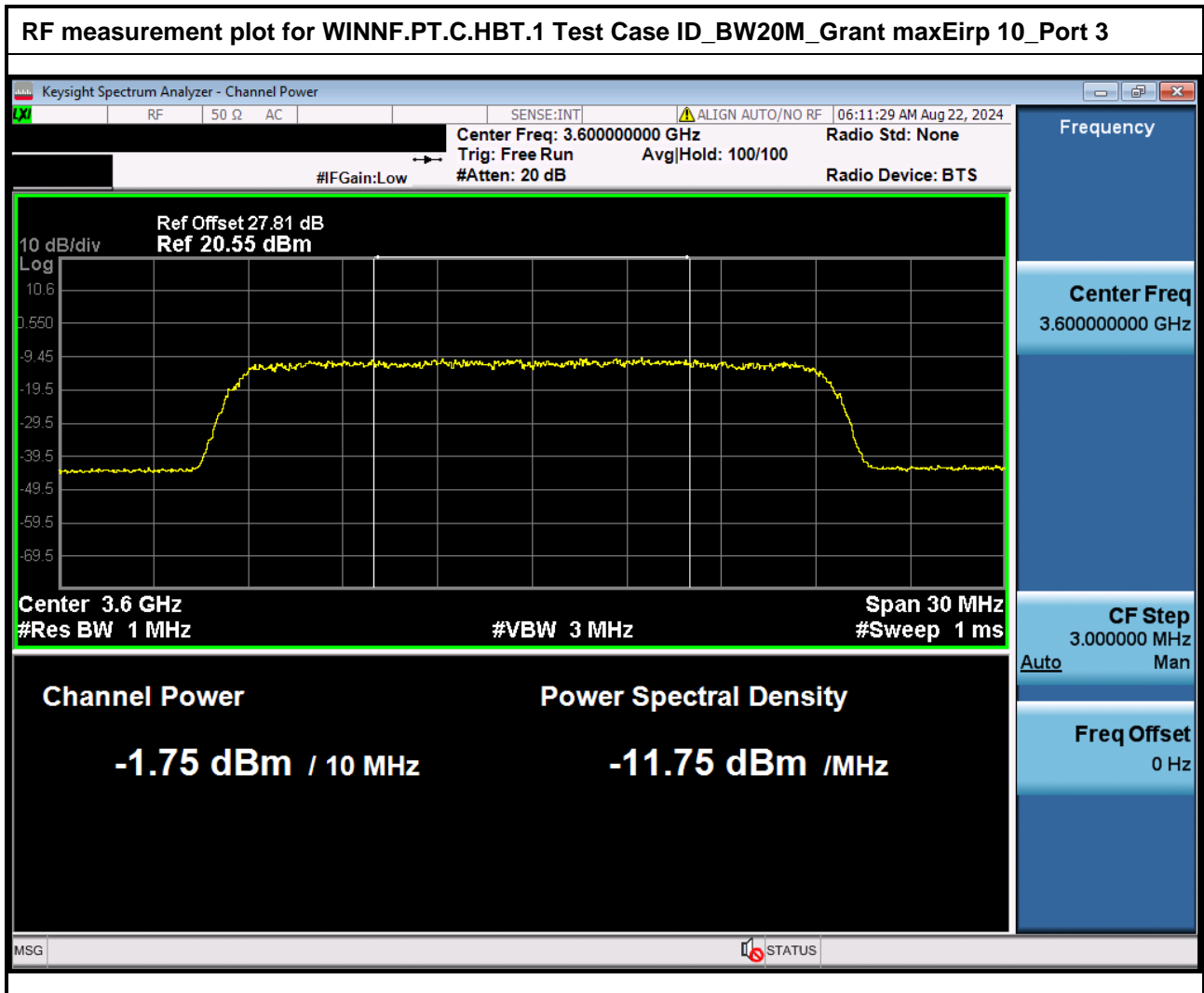


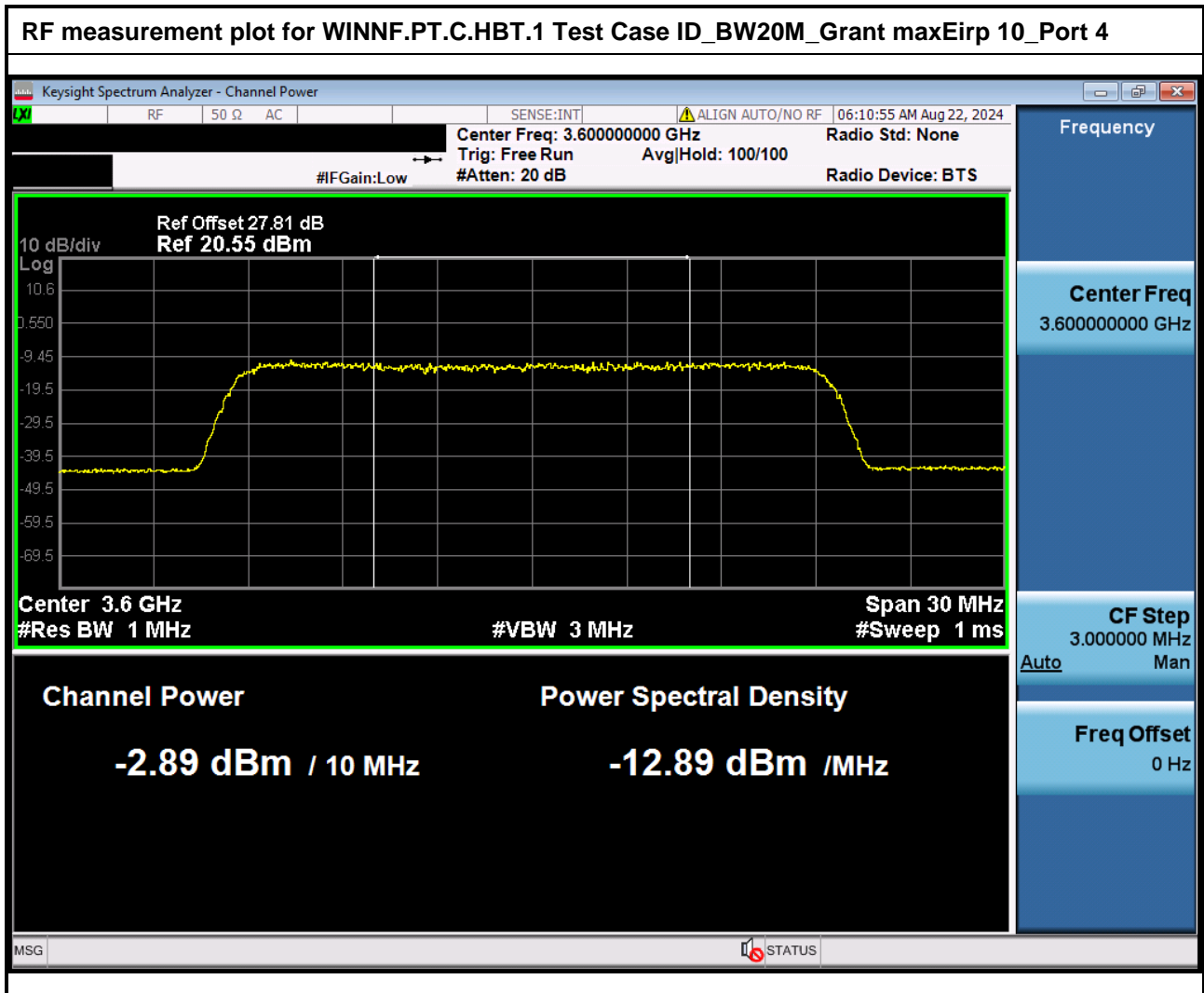




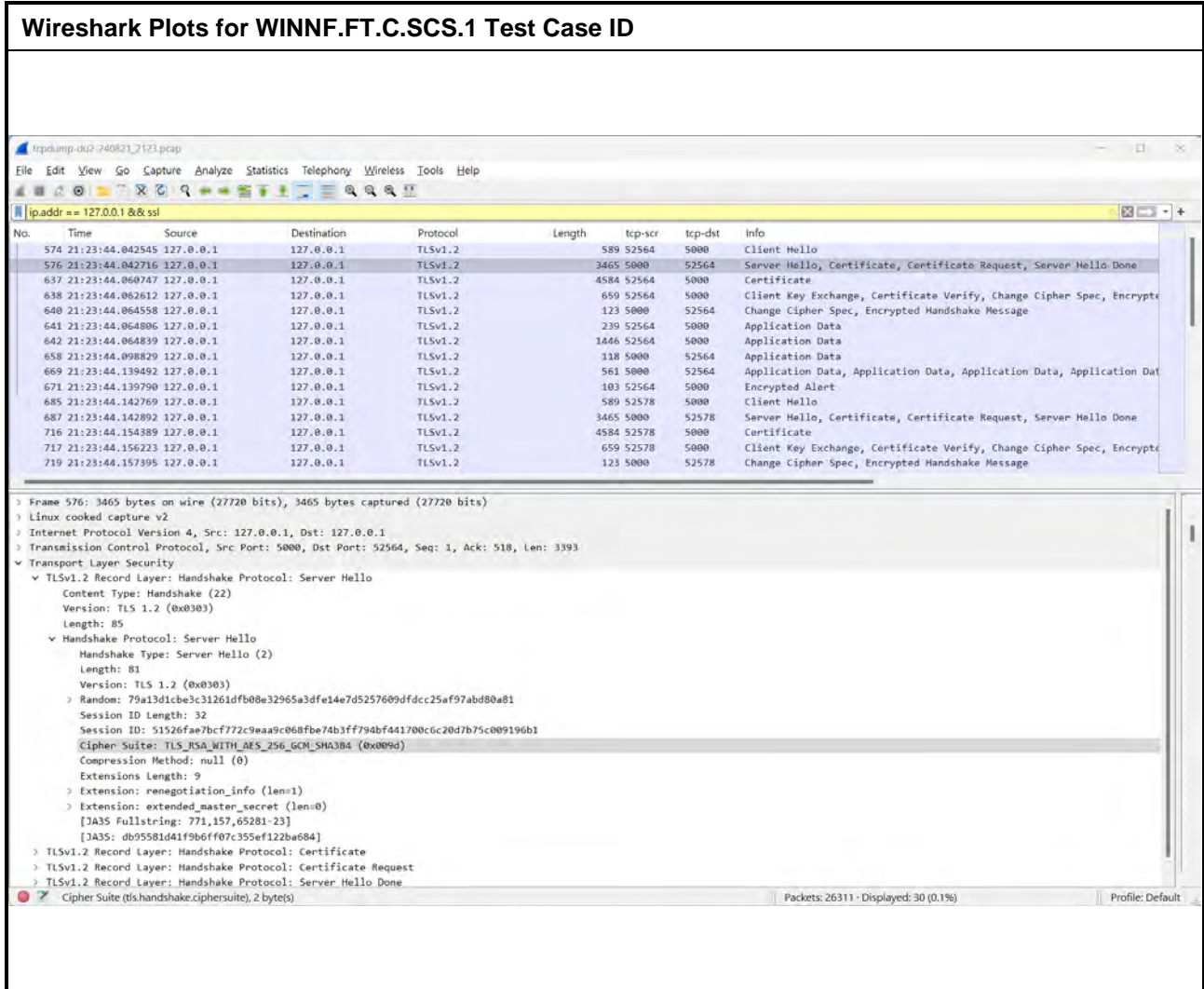








Wireshark Plots for WINNF.FT.C.SCS.1 Test Case ID

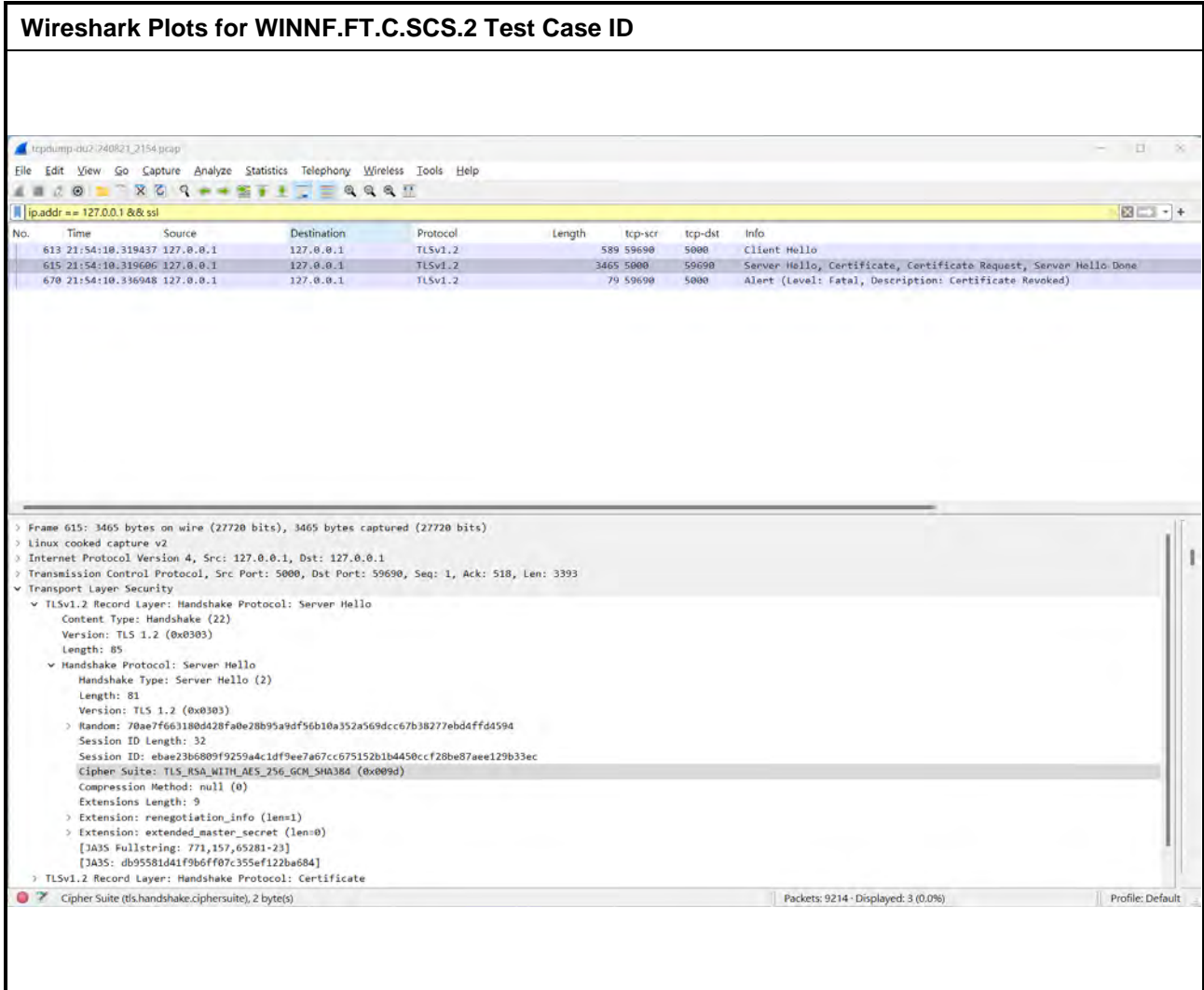


No.	Time	Source	Destination	Protocol	Length	tcp-scr	tcp-dst	Info
574	21:23:44.042545	127.0.0.1	127.0.0.1	TLSv1.2	589	52564	5000	Client Hello
576	21:23:44.042716	127.0.0.1	127.0.0.1	TLSv1.2	3465	5000	52564	Server Hello, Certificate, Certificate Request, Server Hello Done
637	21:23:44.060747	127.0.0.1	127.0.0.1	TLSv1.2	4584	52564	5000	Certificate
638	21:23:44.062612	127.0.0.1	127.0.0.1	TLSv1.2	659	52564	5000	Client Key Exchange, Certificate Verify, Change Cipher Spec, Encrypted
640	21:23:44.064558	127.0.0.1	127.0.0.1	TLSv1.2	123	5000	52564	Change Cipher Spec, Encrypted Handshake Message
641	21:23:44.064806	127.0.0.1	127.0.0.1	TLSv1.2	239	52564	5000	Application Data
642	21:23:44.064839	127.0.0.1	127.0.0.1	TLSv1.2	1446	52564	5000	Application Data
658	21:23:44.098829	127.0.0.1	127.0.0.1	TLSv1.2	118	5000	52564	Application Data
669	21:23:44.139492	127.0.0.1	127.0.0.1	TLSv1.2	561	5000	52564	Application Data, Application Data, Application Data, Application Data
671	21:23:44.139790	127.0.0.1	127.0.0.1	TLSv1.2	103	52564	5000	Encrypted Alert
685	21:23:44.142769	127.0.0.1	127.0.0.1	TLSv1.2	589	52578	5000	Client Hello
687	21:23:44.142892	127.0.0.1	127.0.0.1	TLSv1.2	3465	5000	52578	Server Hello, Certificate, Certificate Request, Server Hello Done
716	21:23:44.154389	127.0.0.1	127.0.0.1	TLSv1.2	4584	52578	5000	Certificate
717	21:23:44.156223	127.0.0.1	127.0.0.1	TLSv1.2	659	52578	5000	Client Key Exchange, Certificate Verify, Change Cipher Spec, Encrypted
719	21:23:44.157395	127.0.0.1	127.0.0.1	TLSv1.2	123	5000	52578	Change Cipher Spec, Encrypted Handshake Message

Frame 576: 3465 bytes on wire (27720 bits), 3465 bytes captured (27720 bits) on interface
 Linux cooked capture v2
 Internet Protocol Version 4, Src: 127.0.0.1, Dst: 127.0.0.1
 Transmission Control Protocol, Src Port: 5000, Dst Port: 52564, Seq: 1, Ack: 518, Len: 3393
 Transport Layer Security
 TLSv1.2 Record Layer: Handshake Protocol: Server Hello
 Content Type: Handshake (22)
 Version: TLS 1.2 (0x0303)
 Length: 85
 Handshake Protocol: Server Hello
 Handshake Type: Server Hello (2)
 Length: 81
 Version: TLS 1.2 (0x0303)
 Random: 79a13d1cbe3c31261dfb08e32965a3dfe14e7d5257609dfdc25af97abd80a81
 Session ID Length: 32
 Session ID: 51526fae7bcf772c9eaa9c068f8be74b3ff794bf441700c6c20d7b75c009196b1
 Cipher Suite: TLS_RSA_WITH_AES_256_GCM_SHA384 (0x009d)
 Compression Method: null (0)
 Extensions Length: 9
 Extension: renegotiation_info (len=1)
 Extension: extended_master_secret (len=0)
 [JA3S Fullstring: 771,157,05281-23]
 [JA3S: db95581d41f9b6ff07c355ef122ba684]
 TLSv1.2 Record Layer: Handshake Protocol: Certificate
 TLSv1.2 Record Layer: Handshake Protocol: Certificate Request
 TLSv1.2 Record Layer: Handshake Protocol: Server Hello Done
 Cipher Suite (tls.handshake.ciphersuite), 2 byte(s)

Packets: 26311 - Displayed: 30 (0.1%) Profile: Default

Wireshark Plots for WINNF.FT.C.SCS.2 Test Case ID



The screenshot shows a Wireshark capture of network traffic. The top pane displays a list of packets with the following details:

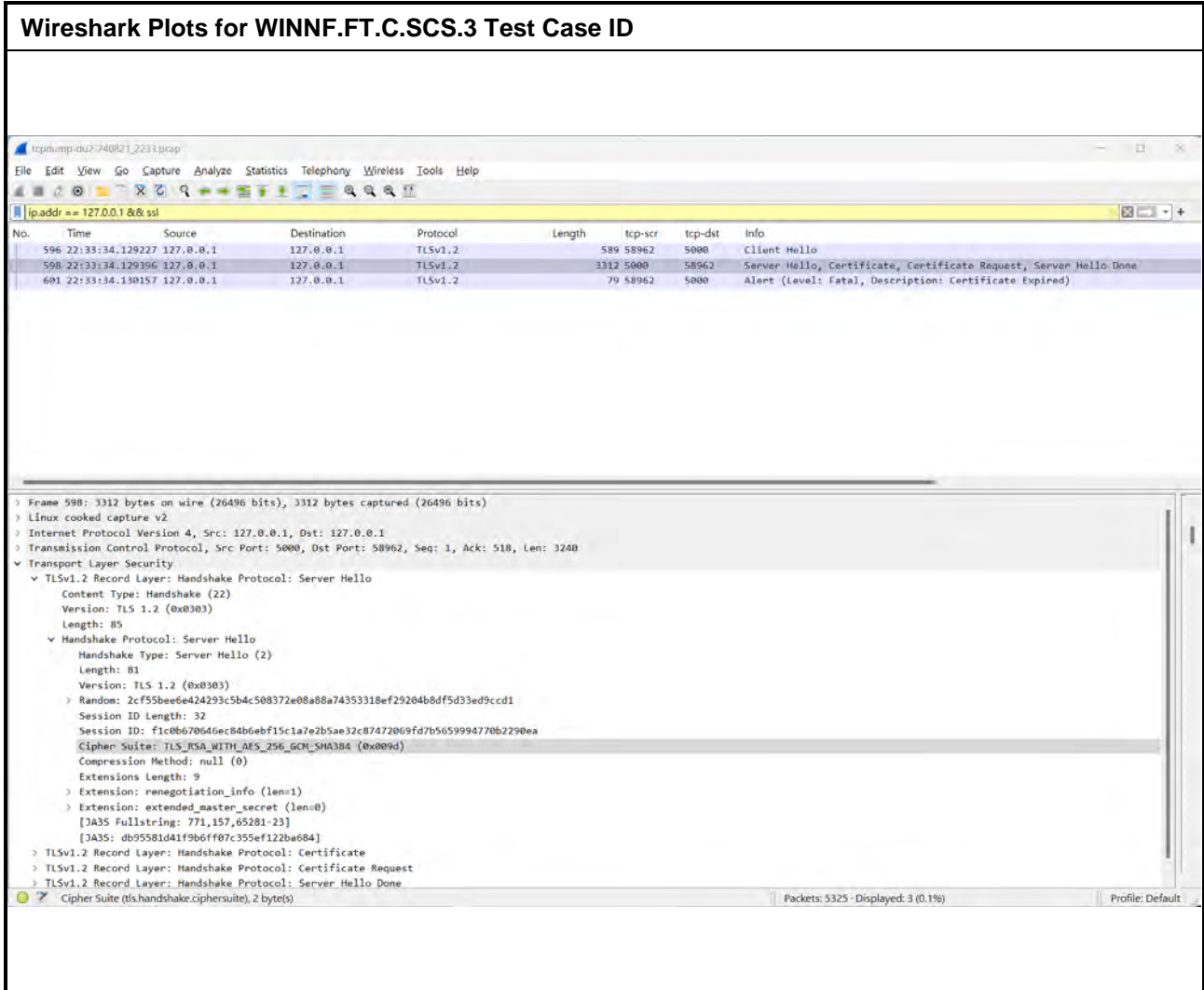
No.	Time	Source	Destination	Protocol	Length	tcp-scr	tcp-dst	Info
613	21:54:10.319437	127.0.0.1	127.0.0.1	TLSv1.2	589	59690	5000	Client Hello
615	21:54:10.319606	127.0.0.1	127.0.0.1	TLSv1.2	3465	5000	59690	Server Hello, Certificate, Certificate Request, Server Hello Done
670	21:54:10.336948	127.0.0.1	127.0.0.1	TLSv1.2	79	59690	5000	Alert (Level: Fatal, Description: Certificate Revoked)

The bottom pane shows the detailed view of the selected packet (Frame 615). The structure is as follows:

- Frame 615: 3465 bytes on wire (27720 bits), 3465 bytes captured (27720 bits)
- Linux cooked capture v2
- Internet Protocol Version 4, Src: 127.0.0.1, Dst: 127.0.0.1
- Transmission Control Protocol, Src Port: 5000, Dst Port: 59690, Seq: 1, Ack: 518, Len: 3393
- Transport Layer Security
 - TLSv1.2 Record Layer: Handshake Protocol: Server Hello
 - Content Type: Handshake (22)
 - Version: TLS 1.2 (0x0303)
 - Length: 85
 - Handshake Protocol: Server Hello
 - Handshake Type: Server Hello (2)
 - Length: 81
 - Version: TLS 1.2 (0x0303)
 - Random: 70ae7f663180d428fa0e28b95a9df56b10a352a569dcc67b38277ebd4ffd4594
 - Session ID Length: 32
 - Session ID: ebae23b6809f9259a4c1df9ee7a67cc675152b1b4450ccf28be87aee129b33ec
 - Cipher Suite: TLS_RSA_WITH_AES_256_GCM_SHA384 (0x009d)
 - Compression Method: null (0)
 - Extensions Length: 9
 - Extension: renegotiation_info (len=1)
 - Extension: extended_master_secret (len=0)
 - [JA3S Fullstring: 771,157,65281-23]
 - [JA3S: db95581d41f9b6ff07c355ef122ba684]
 - TLSv1.2 Record Layer: Handshake Protocol: Certificate

At the bottom, a status bar indicates: Cipher Suite (tls.handshake.ciphersuite), 2 byte(s) | Packets: 9214 - Displayed: 3 (0.0%) | Profile: Default

Wireshark Plots for WINNF.FT.C.SCS.3 Test Case ID

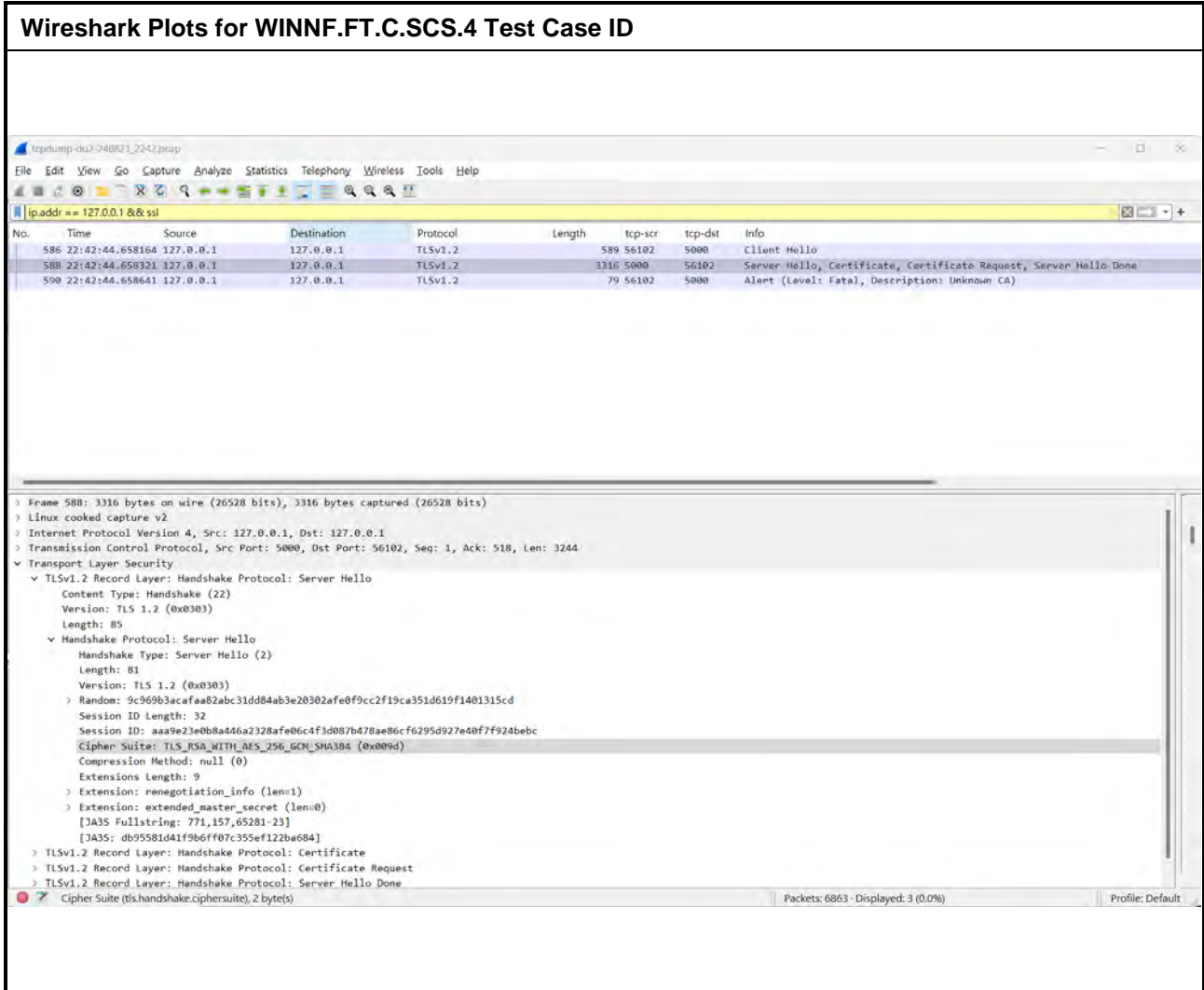


No.	Time	Source	Destination	Protocol	Length	tcp-scr	tcp-dst	Info
596	22:33:34.129227	127.0.0.1	127.0.0.1	TLSv1.2	589	58962	5000	Client Hello
598	22:33:34.129396	127.0.0.1	127.0.0.1	TLSv1.2	3312	5000	58962	Server Hello, Certificate, Certificate Request, Server Hello Done
601	22:33:34.130157	127.0.0.1	127.0.0.1	TLSv1.2	79	58962	5000	Alert (Level: Fatal, Description: Certificate Expired)

> Frame 598: 3312 bytes on wire (26496 bits), 3312 bytes captured (26496 bits)
 > Linux cooked capture v2
 > Internet Protocol Version 4, Src: 127.0.0.1, Dst: 127.0.0.1
 > Transmission Control Protocol, Src Port: 5000, Dst Port: 58962, Seq: 1, Ack: 518, Len: 3240
 > Transport Layer Security
 > TLSv1.2 Record Layer: Handshake Protocol: Server Hello
 Content Type: Handshake (22)
 Version: TLS 1.2 (0x0303)
 Length: 85
 > Handshake Protocol: Server Hello
 Handshake Type: Server Hello (2)
 Length: 81
 Version: TLS 1.2 (0x0303)
 Random: 2cf55bee6e424293c5b4c508372e08a88a74353318ef29204b8df5d33ed9ccd1
 Session ID Length: 32
 Session ID: f1c0b670646ec84b6ebf15c1a7e2b5ae32c87472069fd7b5659994770b2290ea
 Cipher Suite: TLS_RSA_WITH_AES_256_GCM_SHA384 (0x009d)
 Compression Method: null (0)
 Extensions Length: 9
 > Extension: renegotiation_info (len=1)
 > Extension: extended_master_secret (len=0)
 [JA3S Fullstring: 771,157,65281-23]
 [JA3S: db95581d41f9b6ff07c355ef122ba684]
 > TLSv1.2 Record Layer: Handshake Protocol: Certificate
 > TLSv1.2 Record Layer: Handshake Protocol: Certificate Request
 > TLSv1.2 Record Layer: Handshake Protocol: Server Hello Done
 Cipher Suite (tls.handshake.ciphersuite), 2 byte(s)

Packets: 5325 - Displayed: 3 (0.1%) Profile: Default

Wireshark Plots for WINNF.FT.C.SCS.4 Test Case ID



The screenshot shows a Wireshark capture of a TLSv1.2 handshake. The packet list pane shows the following packets:

No.	Time	Source	Destination	Protocol	Length	tcp-scr	tcp-dst	Info
586	22:42:44.658164	127.0.0.1	127.0.0.1	TLSv1.2	589	56102	5000	Client Hello
588	22:42:44.658321	127.0.0.1	127.0.0.1	TLSv1.2	3316	5000	56102	Server Hello, Certificate, Certificate Request, Server Hello Done
590	22:42:44.658641	127.0.0.1	127.0.0.1	TLSv1.2	79	56102	5000	Alert (Level: Fatal, Description: Unknown CA)

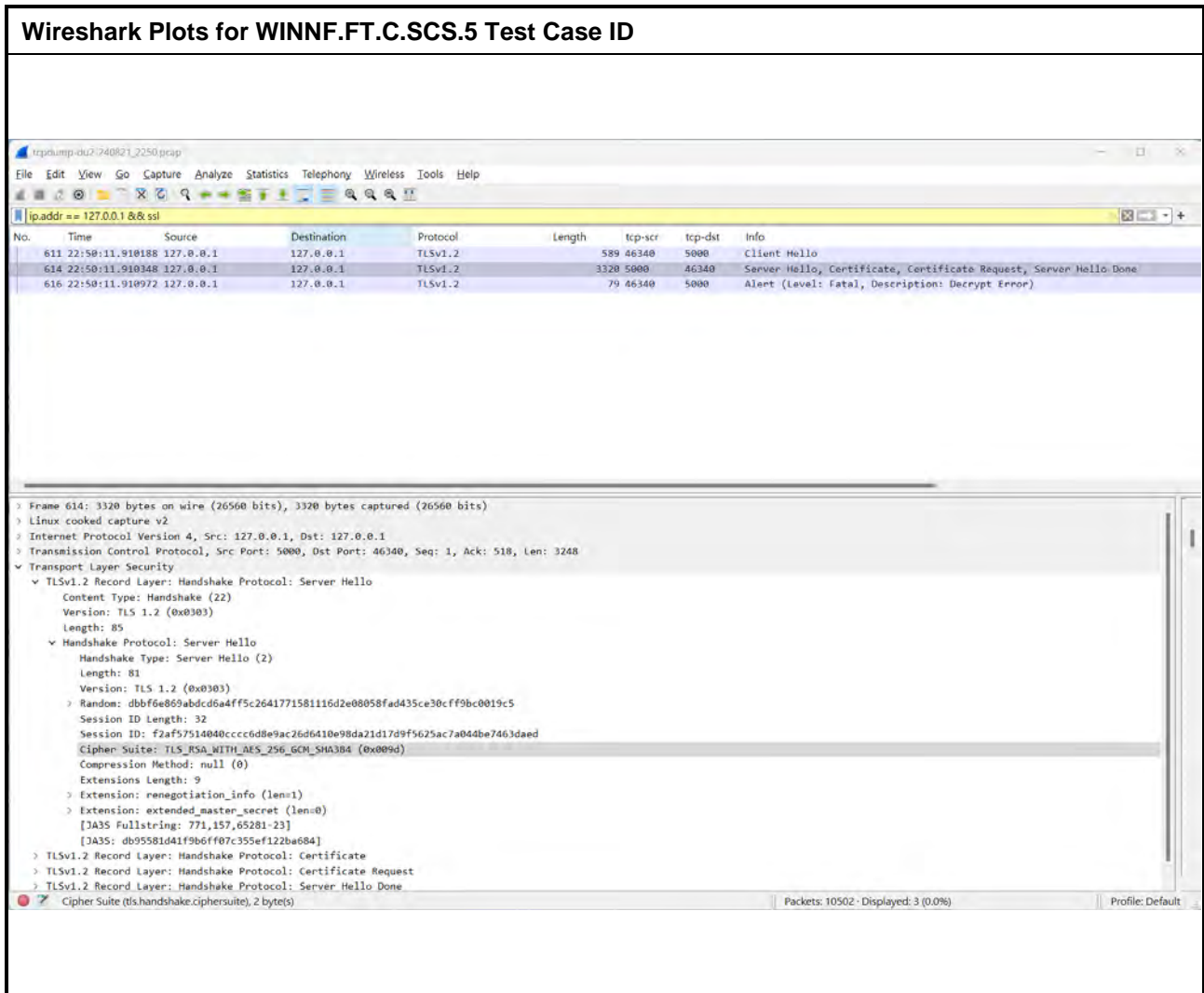
The packet details pane for frame 588 shows the following structure:

- Internet Protocol Version 4, Src: 127.0.0.1, Dst: 127.0.0.1
- Transmission Control Protocol, Src Port: 5000, Dst Port: 56102, Seq: 1, Ack: 518, Len: 3244
- Transport Layer Security
 - TLSv1.2 Record Layer: Handshake Protocol: Server Hello
 - Content Type: Handshake (22)
 - Version: TLS 1.2 (0x0303)
 - Length: 85
 - Handshake Protocol: Server Hello
 - Handshake Type: Server Hello (2)
 - Length: 81
 - Version: TLS 1.2 (0x0303)
 - Random: 9c969b3acafaa82abc31dd84b3e20302afe0f9cc2f19ca351d619f1401315cd
 - Session ID Length: 32
 - Session ID: aaa9e23e0b8a446a2328afe06c4f3d087b47bae86cf6295d927e40f7f924bebc
 - Cipher Suite: TLS_RSA_WITH_AES_256_GCM_SHA384 (0x009d)
 - Compression Method: null (0)
 - Extensions Length: 9
 - Extension: renegotiation_info (len=1)
 - Extension: extended_master_secret (len=0)
 - [JA3S Fullstring: 771,157,65281-23]
 - [JA3S: db95581d41f9b6ff07c355ef122ba684]
 - TLSv1.2 Record Layer: Handshake Protocol: Certificate
 - TLSv1.2 Record Layer: Handshake Protocol: Certificate Request
 - TLSv1.2 Record Layer: Handshake Protocol: Server Hello Done

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

Packets: 6863 - Displayed: 3 (0.0%) Profile: Default

Wireshark Plots for WINNF.FT.C.SCS.5 Test Case ID



The image shows a Wireshark capture of network traffic. The top pane displays a list of packets. Packet 614 is selected, showing a TLSv1.2 handshake. The bottom pane provides a detailed view of this packet's structure.

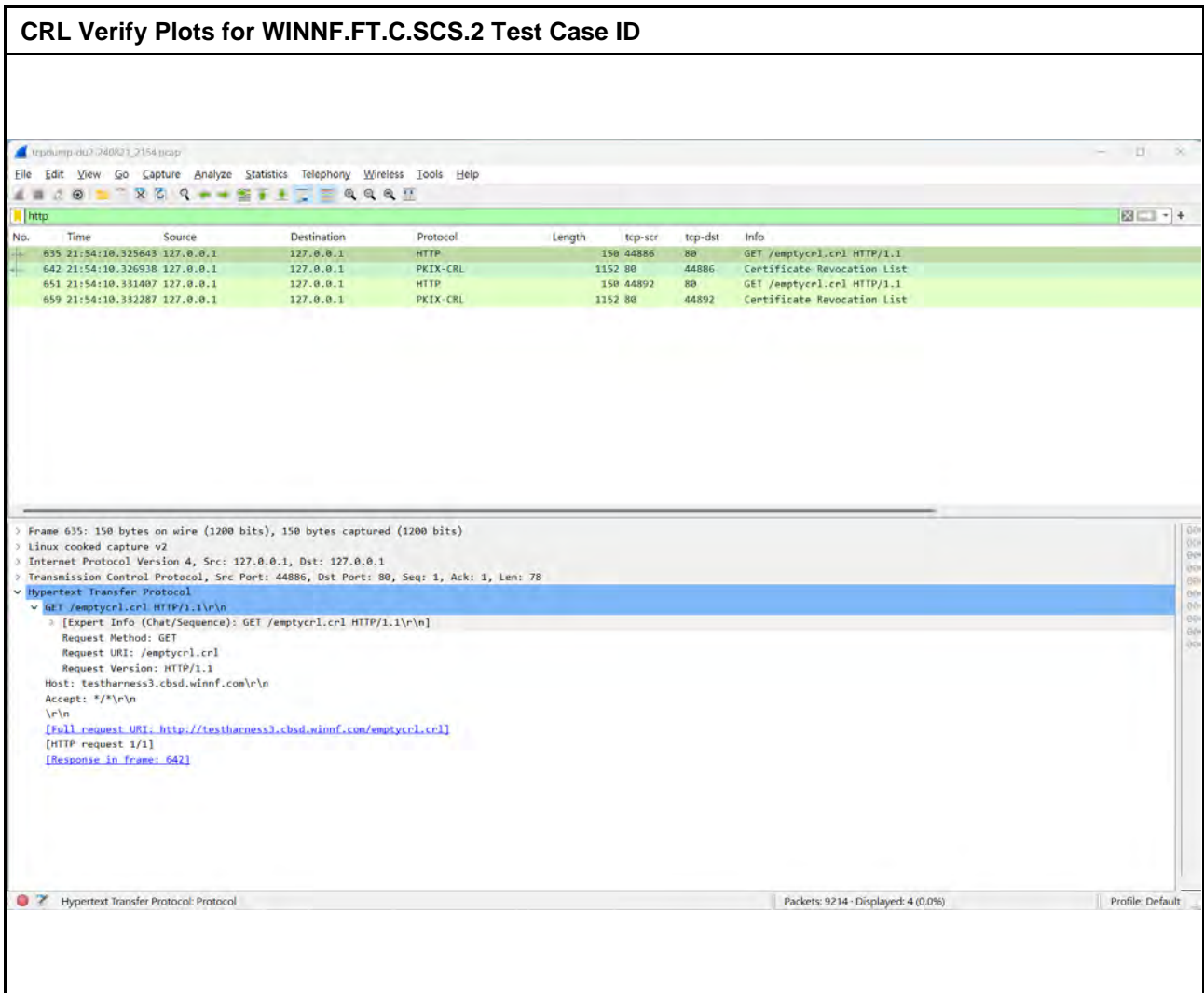
No.	Time	Source	Destination	Protocol	Length	tcp-src	tcp-dst	Info
611	22:50:11.918188	127.0.0.1	127.0.0.1	TLSv1.2	589	46340	5000	Client Hello
614	22:50:11.918348	127.0.0.1	127.0.0.1	TLSv1.2	3328	5000	46340	Server Hello, Certificate, Certificate Request, Server Hello Done
616	22:50:11.918972	127.0.0.1	127.0.0.1	TLSv1.2	79	46340	5000	Alert (Level: Fatal, Description: Decrypt Error)

Frame 614: 3328 bytes on wire (26560 bits), 3328 bytes captured (26560 bits)

- Linux cooked capture v2
- Internet Protocol Version 4, Src: 127.0.0.1, Dst: 127.0.0.1
- Transmission Control Protocol, Src Port: 5000, Dst Port: 46340, Seq: 1, Ack: 518, Len: 3248
- Transport Layer Security
 - TLSv1.2 Record Layer: Handshake Protocol: Server Hello
 - Content Type: Handshake (22)
 - Version: TLS 1.2 (0x0303)
 - Length: 85
 - Handshake Protocol: Server Hello
 - Handshake Type: Server Hello (2)
 - Length: 81
 - Version: TLS 1.2 (0x0303)
 - Random: dbbf6e869abcd6a4ff5c2641771581116d2e08058fad435ce30cff9bc0019c5
 - Session ID Length: 32
 - Session ID: f2af57514040cccc6d8e9ac26d6410e98da21d1709f5625ac7a044be7463daed
 - Cipher Suite: TLS_RSA_WITH_AES_256_GCM_SHA384 (0x009d)
 - Compression Method: null (0)
 - Extensions Length: 9
 - Extension: renegotiation_info (len=1)
 - Extension: extended_master_secret (len=0)
 - [JA3S Fullstring: 771,157,65281-23]
 - [JA3S: db95581d41f9b6ff07c355ef122ba684]
 - TLSv1.2 Record Layer: Handshake Protocol: Certificate
 - TLSv1.2 Record Layer: Handshake Protocol: Certificate Request
 - TLSv1.2 Record Layer: Handshake Protocol: Server Hello Done

Cipher Suite (tls.handshake.ciphersuite), 2 byte(s) | Packets: 10502 · Displayed: 3 (0.0%) | Profile: Default

CRL Verify Plots for WINNF.FT.C.SCS.2 Test Case ID



The image shows a Wireshark network traffic capture window. The top pane displays a list of captured packets. The bottom pane shows the details of a selected packet (No. 635), which is an HTTP GET request for /emptycrl.crl.

No.	Time	Source	Destination	Protocol	Length	tcp-scr	tcp-dst	Info
635	21:54:10.325643	127.0.0.1	127.0.0.1	HTTP	150	44886	80	GET /emptycrl.crl HTTP/1.1
642	21:54:10.326938	127.0.0.1	127.0.0.1	PKIX-CRL	1152	80	44886	Certificate Revocation List
651	21:54:10.331407	127.0.0.1	127.0.0.1	HTTP	150	44892	80	GET /emptycrl.crl HTTP/1.1
659	21:54:10.332287	127.0.0.1	127.0.0.1	PKIX-CRL	1152	80	44892	Certificate Revocation List

```

> Frame 635: 150 bytes on wire (1200 bits), 150 bytes captured (1200 bits)
> Linux cooked capture v2
> Internet Protocol Version 4, Src: 127.0.0.1, Dst: 127.0.0.1
> Transmission Control Protocol, Src Port: 44886, Dst Port: 80, Seq: 1, Ack: 1, Len: 78
  Hypertext Transfer Protocol
    GET /emptycrl.crl HTTP/1.1\r\n
      [Expert Info (Chat/Sequence): GET /emptycrl.crl HTTP/1.1\r\n]
      Request Method: GET
      Request URI: /emptycrl.crl
      Request Version: HTTP/1.1
      Host: testharness3.cbsd.winnf.com\r\n
      Accept: */*\r\n
      \r\n
      [Full request URI: http://testharness3.cbsd.winnf.com/emptycrl.crl]
      [HTTP request 1/1]
      [Response in frame: 642]
  
```