

WINNF-TS-0122 TEST REPORT

FCC ID : 2BAMZGRBBU001O05001

Equipment : REIGN CORE

Brand Name : G REIGNS

Model Name : Cupid001O05001

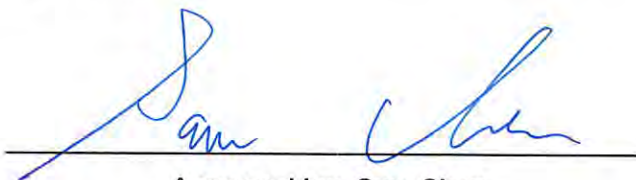
Applicant : REIGN Technology Corporation
12F, No.88, Section 3, Zhongxing Road, Xindian
District, New Taipei City, Taiwan

Manufacturer : REIGN Technology Corporation
12F, No.88, Section 3, Zhongxing Road, Xindian
District, New Taipei City, Taiwan

Standard : WINNF-TS-0122 Version V1.0.2

The product was received on Mar. 12, 2024, and testing was started from Mar. 12, 2024 and completed on Mar. 18, 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.



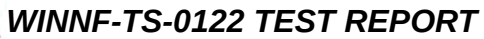
Approved by: Sam Chen

Sporton International Inc. Hsinchu Laboratory
No.8, Ln. 724, Bo'ai St., Zhubei City, Hsinchu County 302010, Taiwan (R.O.C.)



Table of Contents

1	General Description	8
1.1	Product Feature of Equipment Under Test	8
1.2	Accessories.....	8
1.3	Support Equipment	8
1.4	Testing Location.....	9
2	Measurement Environment	10
2.1	Conditional Test Case.....	10
2.2	Test Configuration	11
3	Protocol Test Results	12
3.1	WINNF.FT.C.REG.5 - Single-Step registration for CBSD with CPI signed data.....	12
3.2	WINNF.FT.C.REG.8 - Missing Required parameters (responseCode 102).....	13
3.3	WINNF.FT.C.REG.10 - Pending registration (responseCode 200).....	14
3.4	WINNF.FT.C.REG.12 - Invalid parameter (responseCode 103)	15
3.5	WINNF.FT.C.REG.14 - Blacklisted CBSD (responseCode 101)	16
3.6	WINNF.FT.C.REG.16 - Unsupported SAS protocol version (responseCode 100)	17
3.7	WINNF.FT.C.REG.18 - Group Error (responseCode 201).....	18
3.8	WINNF.FT.C.GRA.1 - Unsuccessful Grant responseCode=400 (INTERFERENCE)	19
3.9	WINNF.FT.C.GRA.2 - Unsuccessful Grant responseCode=401 (GRANT_CONFLICT).....	20
3.10	WINNF.FT.C.HBT.1 - Heartbeat Success Case (first Heartbeat Response)	21
3.11	WINNF.FT.C.HBT.3 - Heartbeat responseCode=105 (DEREGISTER)	23
3.12	WINNF.FT.C.HBT.4 - Heartbeat responseCode=500 (TERMINATED_GRANT)	24
3.13	WINNF.FT.C.HBT.5 - Heartbeat responseCode=501 (SUSPENDED_GRANT) in First Heartbeat Response.	25
3.14	WINNF.FT.C.HBT.6 - Heartbeat responseCode=501 (SUSPENDED_GRANT) in Subsequent Heartbeat Response	26
3.15	WINNF.FT.C.HBT.7 - Heartbeat responseCode=502 (UNSYNC_OP_PARAM)	27
3.16	WINNF.FT.C.HBT.9 - Heartbeat Response Absent (First Heartbeat).....	28
3.17	WINNF.FT.C.HBT.10 - Heartbeat Response Absent (Subsequent Heartbeat)	29
3.18	WINNF.FT.C.HBT.11 - Successful Grant Renewal in Heartbeat Test Case	30
3.19	WINNF.FT.C.MES.1 - Registration Response contains measReportConfig	32
3.20	WINNF.FT.C.RLQ.1 - Successful Relinquishment.....	33
3.21	WINNF.FT.C.RLQ.3 - Unsuccessful Relinquishment, responseCode=102	34
3.22	WINNF.FT.C.RLQ.5 - Unsuccessful Relinquishment, responseCode=103	35
3.23	WINNF.FT.C.DRG.1 - Successful Deregistration	36
3.24	WINNF.FT.C.DRG.3 - Deregistration responseCode=102	37
3.25	WINNF.FT.C.DRG.5 - Deregistration responseCode=103	38
3.26	WINNF.FT.C.SCS.1 - Successful TLS connection between UUT and SAS Test Harness.....	39
3.27	WINNF.FT.C.SCS.2 - TLS failure due to revoked certificate	40
3.28	WINNF.FT.C.SCS.3 - TLS failure due to expired server certificate	41
3.29	WINNF.FT.C.SCS.4 - TLS failure when SAS Test Harness certificate is issued by an unknown CA	42
3.30	WINNF.FT.C.SCS.5 - TLS failure when certificate at the SAS Test Harness is corrupted	43
3.31	WINNF.PT.C.HBT.1 - UUT RF Transmit Power Measurement	44
4	Test Equipment and Calibration Data	47
5	Measurement Uncertainty	48
Appendix A. RF Measurement Plots		
Appendix B. Wireshark Plots		
Appendix C. CRL Verify Plots		
Appendix D. Test Photos		
Photographs of EUT v01		



History of this test report

[illegible]

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	-
-	6.1.4.1.7	X	X	C6	WINNF.FT.C.REG.7	Registration due to change of an installation parameter	N/A	-
3.2	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	-
3.3	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	-
3.4	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	-
3.5	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	-
3.6	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	-
3.7	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	-



3.8	6.3.4.2.1	X	X	M	WINNF.FT.C.GRA.1	Unsuccessful Grant responseCode=400 (INTERFERENCE)	PASS	-
3.9	6.3.4.2.2	X	X	M	WINNF.FT.C.GRA.2	Unsuccessful Grant responseCode=401 (GRANT_CONFLICT)	PASS	-
3.10	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	-
3.11	6.4.4.2.1	X	X	M	WINNF.FT.C.HBT.3	Heartbeat responseCode=105 (DEREGISTER)	PASS	-
3.12	6.4.4.2.2	X	-	M	WINNF.FT.C.HBT.4	Heartbeat responseCode=500 (TERMINATED_GRANT)	PASS	-
3.13	6.4.4.2.3	X	X	M	WINNF.FT.C.HBT.5	Heartbeat responseCode=501 (SUSPENDED_GRANT) in First Heartbeat Response	PASS	-
3.14	6.4.4.2.4	X	X	M	WINNF.FT.C.HBT.6	Heartbeat responseCode=501 (SUSPENDED_GRANT) in Subsequent Heartbeat Response	PASS	-
3.15	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 (TEMINATED_GRANT)	N/A	-
3.16	6.4.4.3.1	X	X	M	WINNF.FT.C.HBT.9	Heartbeat Response Absent (First Heartbeat)	PASS	-
3.17	6.4.4.3.2	X	X	M	WINNF.FT.C.HBT.10	Heartbeat Response Absent (Subsequent Heartbeat)	PASS	-
3.18	6.4.4.4.1	X	X	O	WINNF.FT.C.HBT.11	SuccessfulGrantRenewalin HeartbeatTestCase	PASS	-
3.19	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	-
-	6.5.4.2.3	X	X	C5	WINNF.FT.C.MES.3	Grant Response contains measReportConfig	N/A	-
-	6.5.4.2.4	X	-	C5	WINNF.FT.C.MES.4	Heartbeat Response contains measReportConfig	N/A	-
-	6.5.4.2.5	-	X	C5	WINNF.FT.D.MES.5	Domain Proxy Heartbeat Response contains measReportConfig	N/A	-
3.20	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	-
3.21	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	-
3.22	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	-
3.23	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	-
3.24	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	-
3.25	6.7.4.3.1	X	X	O	WINNF.FT.C.DRG.5	Deregistration responseCode=103	PASS	-
3.26	6.8.4.1.1	X	X	M	WINNF.FT.C.SCS.1	Successful TLS connection between UUT and SAS Test Harness	PASS	-
3.27	6.8.4.2.1	X	X	M	WINNF.FT.C.SCS.2	TLS failure due to revoked certificate	PASS	-
3.28	6.8.4.2.2	X	X	M	WINNF.FT.C.SCS.3	TLS failure due to expired server certificate	PASS	-
3.29	6.8.4.2.3	X	X	M	WINNF.FT.C.SCS.4	TLS failure when SAS Test Harness certificate is issued by unknown CA	PASS	-
3.30	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	-
3.31	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 and C4.



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/manufacture 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:

1. 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.
2. The test configuration, test mode and test software were written in this test report are declared by the manufacturer.

Reviewed by: Sam Chen

Report Producer: Sophia Shiung



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
Category of EUT	☐ Category A ☒ Category B
Professional Installation	☒ Yes ☐ No
EUT in Test ID	☐ EUT with Domain Proxy ☒ EUT without Domain Proxy
CBSD Firmware Version	1.0
CBSD Software Version	2.0
CBSD Hardware Version	1.0

Note: The above information was declared by manufacturer.

1.2 Accessories

Accessories
Waterproof connector to EUT*1
Waterproof connector to adapter*1
Wall bracket*1

1.3 Support Equipment

Support Equipment				
No.	Equipment	Brand Name	Model Name	FCC ID
A	Notebook (SAS)	Lenovo	L440	N/A
B	Notebook	MSI	MS16JB	N/A
C	UE	Upurple	Naomi Color White	N/A
D	Notebook	MSI	MS16JB	N/A
E	AC Adapter	MOSO	LSV-320B048	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	Jeff Wu	22.2~22.8 / 65~69	Mar. 12, 2024~ Mar. 18, 2024

2 Measurement Environment

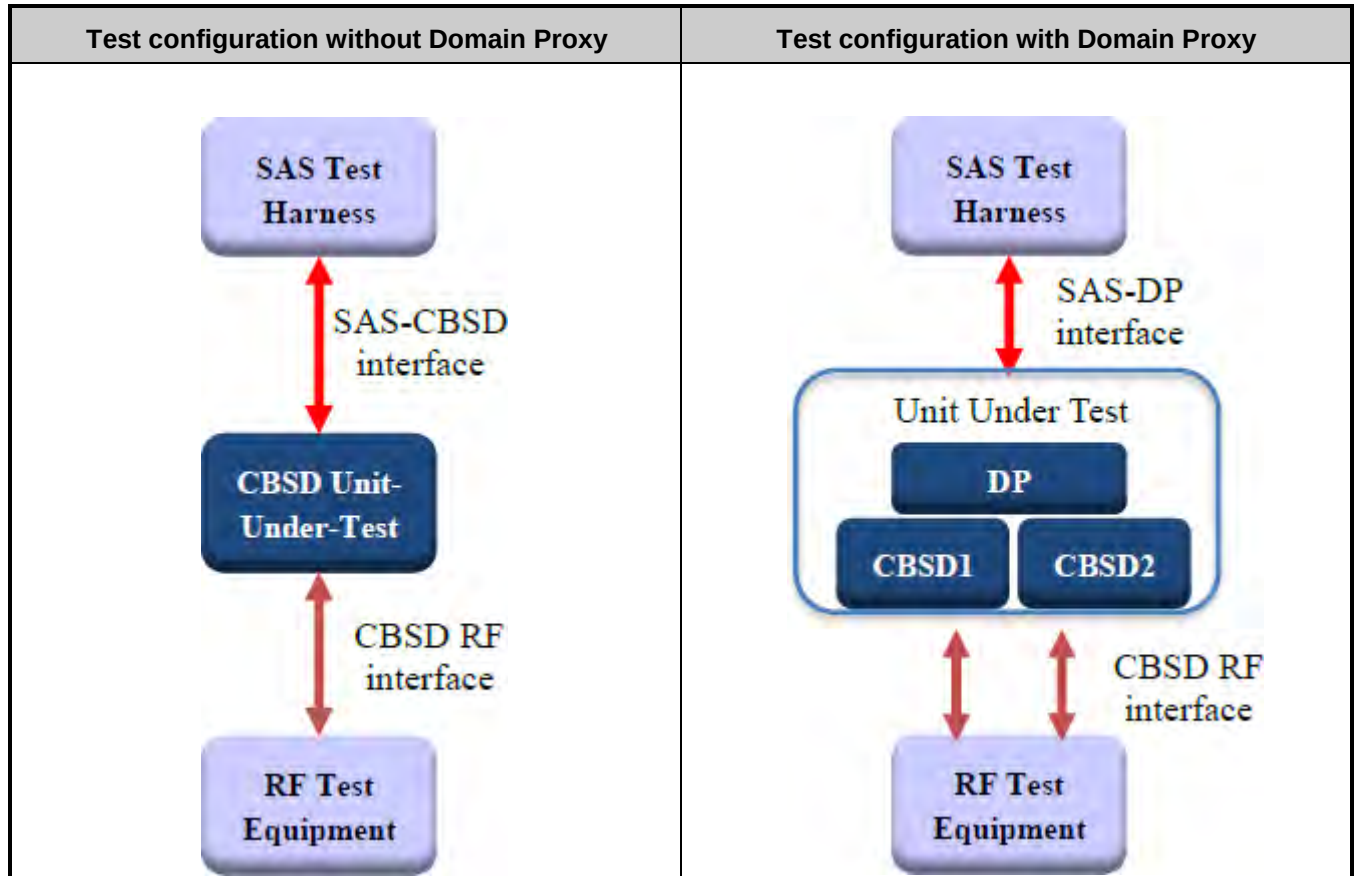
Measurement Environment Information	
Test Harness version	1.0.0.3
Operating System	Microsoft Windows 10
TLS version	1.2
Python	2.7.13

2.1 Conditional Test Case

☐	C1	Mandatory for UUT which supports multi-step registration message
☐	C2	Mandatory for UUT which supports single-step registration with no CPI-signed data in the registration message. By definition, this is a subset of Category A devices which determine all registration information, including location, without CPI intervention.
☒	C3	Mandatory for UUT which supports single-step registration containing CPI-signed data in the registration message.
☒	C4	Mandatory for UUT which supports RECEIVED_POWER_WITHOUT_GRANT measurement report type.
☐	C5	Mandatory for UUT which supports RECEIVED_POWER_WITH_GRANT measurement report type.
☐	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: • 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: • The required <code>userId</code>, <code>fcId</code> and <code>cbsdSerialNumber</code> and REG- Conditional <code>cbsdCategory</code>, <code>airInterface</code>, <code>measCapability</code> and <code>cpiSignatureData</code> 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 as follows: – <code>cbsdId = C</code> – <code>measReportConfig</code> shall not be included. – <code>responseCode = 0</code>	--	--
4	After completion of step 3, SAS Test Harness does not provide any positive response (<code>responseCode=0</code>) to further request messages from the UUT.	--	--
5	Monitor the RF output of the UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify: • UUT shall not transmit RF	PASS	--

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

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: • UUT has successfully completed SAS Discovery and Authentication with SAS Test Harness • UUT is in the Unregistered state	--	--
2	CBSD sends a Registration request to SAS Test Harness.	--	--
3	SAS Test Harness rejects the request by sending a CBSD Registration Response as follows: – 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: • UUT shall not transmit RF	PASS	--

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

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: • UUT has successfully completed SAS Discovery and Authentication with SAS Test Harness • UUT is in the Unregistered state	--	--
2	CBSD sends a Registration request to SAS Test Harness.	--	--
3	SAS Test Harness rejects the request by sending a CBSD Registration Response as follows: – 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: • UUT shall not transmit RF	PASS	--

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

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: • UUT has successfully completed SAS Discovery and Authentication with SAS Test Harness • UUT is in the Unregistered state	--	--
2	CBSD sends a Registration request to SAS Test Harness.	--	--
3	SAS Test Harness rejects the request by sending a CBSD Registration Response as follows: – 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: • UUT shall not transmit RF	PASS	--

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

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: • UUT has successfully completed SAS Discovery and Authentication with SAS Test Harness • UUT is in the Unregistered state	--	--
2	CBSD sends a Registration request to SAS Test Harness.	--	--
3	SAS Test Harness rejects the request by sending a CBSD Registration Response as follows: – 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: • UUT shall not transmit RF	PASS	--

3.6 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: • 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: – 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: • UUT shall not transmit RF	PASS	--

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

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: • UUT has successfully completed SAS Discovery and Authentication with SAS Test Harness • UUT is in the Unregistered state	--	--
2	CBSD sends a Registration request to SAS Test Harness.	--	--
3	SAS Test Harness rejects the request by sending a CBSD Registration Response as follows: – 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: • UUT shall not transmit RF	PASS	--



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

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: • UUT has registered successfully with SAS Test Harness, with <i>cbsdId</i> = C	--	--
2	UUT sends valid Grant Request.	--	--
3	SAS Test Harness sends a Grant Response message, including • <i>cbsdId</i>=C • <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: • UUT shall not transmit RF	PASS	--



3.9 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: • UUT has registered successfully with SAS Test Harness, with <i>cbsdId</i> = C	--	--
2	UUT sends valid Grant Request.	--	--
3	SAS Test Harness sends a Grant Response message, including • <i>cbsdId</i>=C • <i>responseCode</i> =R	--	--
4	After completion of step 3, SAS Test Harness does not provide any positive response (<i>responseCode</i> =401) to further request messages from the UUT.	--	--
5	Monitor the RF output of the UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify: • UUT shall not transmit RF	PASS	--

3.10 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: • UUT has registered successfully with SAS Test Harness, with <i>cbsdId</i> = C	--	--
2	UUT sends a message: • If message is type Spectrum Inquiry Request, go to step 3, or • If message is type Grant Request, go to step 5	--	--
3	UUT sends Spectrum Inquiry Request. Validate: • <i>cbsdId</i> = C • 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: • <i>cbsdId</i> = C • <i>availableChannel</i> is an array of availableChannel objects • <i>responseCode</i> = 0	--	--
5	UUT sends Grant Request message. Validate: • <i>cbsdId</i> = C • <i>maxEIRP</i> is at or below the limit appropriate for CBSD category as defined by Part 96 • <i>operationFrequencyRange</i>, F, sent by UUT is a valid range within the CBRS band	PASS	--
6	SAS Test Harness sends a Grant Response message, including the parameters: • <i>cbsdId</i> = C • <i>grantId</i> = G = a valid grant ID • <i>grantExpireTime</i> = UTC time greater than duration of the test • <i>responseCode</i> = 0	--	--
7	UUT sends a first Heartbeat Request message. VerifyHeartbeatRequest message is formatted correctly, including: • <i>cbsdId</i> = C • <i>grantId</i> = G • <i>operationState</i> = "GRANTED"	PASS	--
8	SAS Test Harness sends a Heartbeat Response message, with the following parameters: • <i>cbsdId</i> = C • <i>grantId</i> = G • <i>transmitExpireTime</i> = current UTC time + 200 seconds • <i>responseCode</i> = 0	--	--

9	For further Heartbeat Request messages sent from UUT after completion of step 8, validate message is sent within latest specified heartbeatInterval, and: • <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: • <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: • 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	--

3.11 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: ○ 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: • <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: • <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: • UUT shall stop transmission within (T + 60 seconds) of completion of step 3	PASS	--

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

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: • UUT has registered successfully with SAS Test Harness • UUT has a valid single grant as follows: ○ valid <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: • <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: • <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: • UUT shall stop transmission within (T + 60 seconds) of completion of step 3	PASS	--

3.13 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: • UUT has registered successfully with SAS Test Harness • UUT has a valid single grant as follows: ○ 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: • <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: • <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: A. UUT sends a Heartbeat Request message. Ensure message is sent within latest specified heartbeatInterval, and is correctly formatted with parameters: • <i>cbsdId</i> = C • <i>grantId</i> = G • <i>operationState</i> = "GRANTED" B. UUT sends a Relinquishment request message. Ensure message is correctly formatted with parameters: • <i>cbsdId</i> = C • <i>grantId</i> = G Monitor the RF output of the UUT. Verify: • UUT does not transmit at any time	PASS	--

3.14 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: • UUT has registered successfully with SAS Test Harness • UUT has a valid single grant as follows: ○ 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 heartbeatInterval, and is formatted correctly, including: • <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: • <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: A. UUT sends a Heartbeat Request message. Ensure message is sent within latest specified heartbeatInterval, and is correctly formatted with parameters: • <i>cbsdId</i> = C • <i>grantId</i> = G • <i>operationState</i> = "GRANTED" B. UUT sends a Relinquishment Request message. Ensure message is correctly formatted with parameters: • <i>cbsdId</i> = C • <i>grantId</i> = G Monitor the RF output of the UUT. Verify: • UUT shall stop transmission within (T + 60 seconds) of completion of step 3	PASS	--

3.15 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: • UUT has registered successfully with SAS Test Harness • UUT has a valid single grant as follows: ○ 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: • <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: • <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: • UUT sends a Grant Relinquishment Request message. Verify message is correctly formatted with parameters: ○ <i>cbsdId</i> = C ○ <i>grantId</i> = G Monitor the RF output of the UUT. Verify: • UUT shall stop transmission within (T+60) seconds of completion of step 3.	PASS	--

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

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: • UUT has registered successfully with SAS Test Harness • UUT has a valid single grant as follows: ○ valid <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: • <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: • At any time during the test, UUT shall not transmit on RF interface	PASS	--

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

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: • UUT has registered successfully with SAS Test Harness • UUT has a valid single grant as follows: ○ valid <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: • <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: • <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: • UUT shall stop all transmission on RF interface within (<i>transmitExpireTime</i> + 60 seconds), using the <i>transmitExpireTime</i> sent in Step 3.	PASS	--

3.18 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: • UUT has registered successfully with SAS Test Harness • UUT has a valid single grant as follows: ○ 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: ○ <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: • <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: • <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: • <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: • <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: • <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 <i>Tgrant_expire</i> + 60 seconds and ensure UUT continues to transmit throughout the time period.	PASS	--

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

#	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	--	--
2	UUT sends a Registration Request message. Validate the Registration Request message is formatted correctly, including: • <i>userId</i> is present and correct • <i>fccId</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: • <i>cbsdId</i> = C = valid cbsdId for this UUT • <i>measReportConfig</i> = "RECEIVED_POWER_WITHOUT_GRANT" • <i>responseCode</i> = 0	--	--
4	UUT sends a message: • 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: • <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: • <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: • <i>cbsdId</i> = C • <i>measReport</i> is present, and is a properly formatted <i>rcvdPowerMeasReport</i>.	PASS	--

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

#	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 has successfully registered with SAS Test Harness, with <i>cbsdId</i>=C • UUT has received a valid grant with <i>grantId</i>= G • 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: • <i>cbsdId</i> = C • <i>grantId</i> = G	PASS	--
3	SAS Test Harness shall approve the request with a Relinquishment Response message with parameters: – <i>cbsdId</i> = C – <i>grantId</i> = G – <i>responseCode</i> = 0	--	--
4	After completion of step 3, SAS Test Harness will not provide any additional 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: • UUT shall stop RF transmission at any time between triggering the relinquishment and UUT sending the relinquishment request	PASS	--



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

#	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 has successfully registered with SAS Test Harness, with <i>cbsdId</i>=C • UUT has received a valid grant with <i>grantId</i> = G • 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: • <i>cbsdId</i> = C • <i>grantId</i> = G	--	--
3	SAS Test Harness shall send a Relinquishment Response message with parameters: • <i>cbsdId</i> = C • No <i>grantId</i> • <i>responseCode</i> = R	--	--
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.	--	--
5	Monitor the RF output of the UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify: • UUT stopped RF transmission at any time between triggering the relinquishment and UUT sending the relinquishment request	PASS	--

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

#	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 has successfully registered with SAS Test Harness, with <i>cbsdId</i>=C • UUT has received a valid grant with <i>grantId</i> = G • 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: • <i>cbsdId</i> = C • <i>grantId</i> = G	--	--
3	SAS Test Harness shall send a Relinquishment Response message with parameters: • <i>cbsdId</i> = C • No <i>grantId</i> • <i>responseCode</i> = R	--	--
4	After completion of step 3, SAS Test Harness will 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: • UUT stopped RF transmission at any time between triggering the relinquishment and UUT sending the relinquishment request	PASS	--

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

#	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 has successfully registered with SAS Test Harness, with <i>cbsdId</i>=C • UUT has received a valid grant with <i>grantId</i>= G • 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</i> =0	--	--
3	UUT sends Deregistration Request to SAS Test Harness with <i>cbsdId</i> =C.	PASS	--
4	SAS Test Harness shall approve the request with a Deregistration Response message with parameters: • <i>cbsdId</i> = C • <i>responseCode</i> = 0	--	--
5	After completion of step 3, SAS Test Harness will not provide any additional positive response (<i>responseCode</i> =0) 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: • 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	--

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

#	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 has successfully registered with SAS Test Harness, with <i>cbsdId</i>=C • UUT has received a valid grant with <i>grantId</i>= G • 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</i> =0	--	--
3	UUT sends Deregistration Request to SAS Test Harness with <i>cbsdId</i> =C	--	--
4	The SAS Test Harness sends the Deregistration Response Message to UUT with: • No <i>cbsdId</i> • <i>responseCode</i> = 102	--	--
5	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.	--	--
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: • 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	--

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

#	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 has successfully registered with SAS Test Harness, with <i>cbsdId</i>=C • UUT has received a valid grant with <i>grantId</i>= G • 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</i> =0	--	--
3	UUT sends Deregistration Request to SAS Test Harness with <i>cbsdId</i> =C	--	--
4	The SAS Test Harness sends the Deregistration Response Message to UUT with: • No <i>cbsdId</i> • <i>responseCode</i> = 103	--	--
5	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.	--	--
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: • 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	--

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

#	Test Execution Steps	Results	
1	- UUT shall start CBSD-SAS communication with the security procedure - The UUT shall establish a TLS handshake with the SAS Test Harness using configured certificate. - Configure the SAS Test Harness to accept the security procedure and establish the connection	PASS	--
2	- Make sure that Mutual authentication happens between UUT and the SAS Test Harness. - Make sure that UUT uses TLS v1.2 - Makesurethatciphersuitesfromoneofthefollowing is selected, - TLS_RSA_WITH_AES_128_GCM_SHA256 - TLS_RSA_WITH_AES_256_GCM_SHA384 - TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256 - TLS_ECDHE_ECDSA_WITH_AES_256_GCM_SHA384 - TLS ECDHE RSA WITH AES 128 GCM SHA256	PASS	--
3	A successful registration is accomplished using one of the test cases described in section 6.1.4.1, depending on CBSD capability. UUT sends a registration request to the SAS Test Harness and the SAS Test Harness sends a Registration Response with <i>responseCode</i> = 0 and <i>cbsdId</i>.	PASS	--
4	Monitor the RF output of the UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify: UUT shall not transmit RF	PASS	--

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

#	Test Execution Steps	Results	
1	UUT shall start CBSD-SAS communication with the security procedures	PASS	--
2	- Make sure that UUT uses TLSv1.2 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: UUT shall not transmit RF	PASS	--

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

#	Test Execution Steps	Results	
1	• UUT shall start CBSD-SAS communication with the security procedures	PASS	--
2	• Make sure that UUT uses TLSv1.2 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: • UUT shall not transmit RF	PASS	--



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

#	Test Execution Steps	Results	
1	• UUT shall start CBSD-SAS communication with the security procedures	PASS	--
2	• Make sure that UUT uses TLS v1.2 for security establishment. • Make sure UUT selects the correct cipher suite. • UUT shall use CRL or OCSP to verify the validity of the server certificate • Make sure that Mutual authentication does not happen between UUT and the SAS Test Harness.	PASS	--
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: • UUT shall not transmit RF	PASS	--

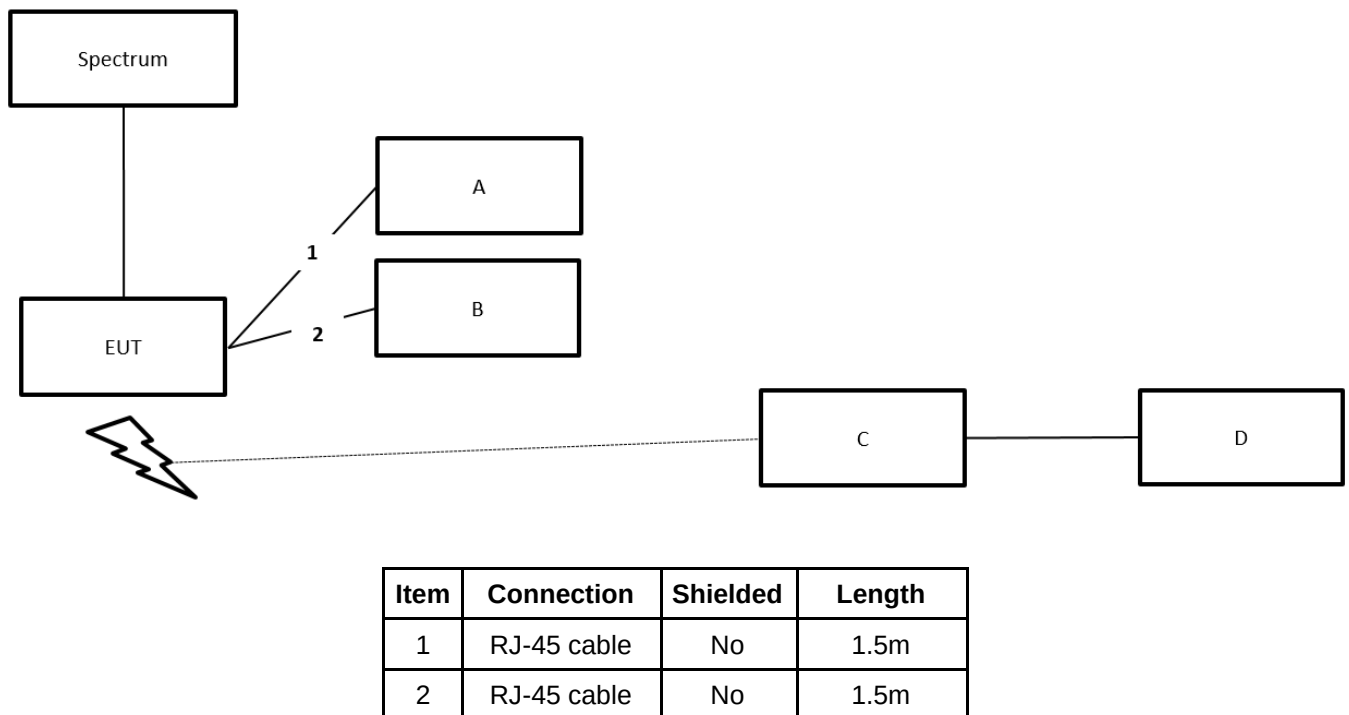


3.30 WINNF.FT.C.SCS.5 - TLS failure when certificate at the SAS Test Harness is corrupted

#	Test Execution Steps	Results	
1	• UUT shall start CBSD-SAS communication with the security procedures	PASS	--
2	• Make sure that UUT uses TLS v1.2 for security establishment. • Make sure UUT selects the correct cipher suite. • UUT shall use CRL or OCSP to verify the validity of the server certificate. • Make sure that Mutual authentication does not happen between UUT and the SAS Test Harness.	PASS	--
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: • UUT shall not transmit RF	PASS	--

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

Items	Parameters
Maximum rated power (EIRP, dBm/MHz)	36dBm/MHz
Transmit dynamic range (EIRP, dBm/MHz)	36, 34, 31, 29, 26dBm/MHz
Occupied bandwidth (OBW)	40MHz
maxEirp values	26dBm/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	3630MHz
Frequency Span	80MHz
RBW / VBW	1MHz / 3MHz
Channel Power Meas Bandwidth	10MHz
Sweep Time	20ms

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: • UUT has successfully completed SAS Discovery and Authentication with the SAS Test Harness • UUT has registered with the SAS, with 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 <i>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.</i>	--	--
2	UUT and SAS Test Harness perform a series of Heartbeat Request/Response cycles, which continues until the other test steps are complete. Messaging for each cycle is as follows: • UUT sends Heartbeat Request, including: - o cbsdId = C - o grantId = G • SAS Test Harness responds with Heartbeat Response, including: - o cbsdId = C - o grantId = G - o transmitExpireTime = currentUTCtime + 200seconds - o responseCode = 0	--	--



3	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. <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>	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			
3630	40	17.49	10.97	10.57	11.31	10.36	34.33	36	PASS
3630	40	17.49	6.066	5.522	6.203	6.005	29.47	31	PASS
3630	40	17.49	1.435	0.3816	1.04	1.184	24.54	26	PASS



4 Test Equipment and Calibration Data

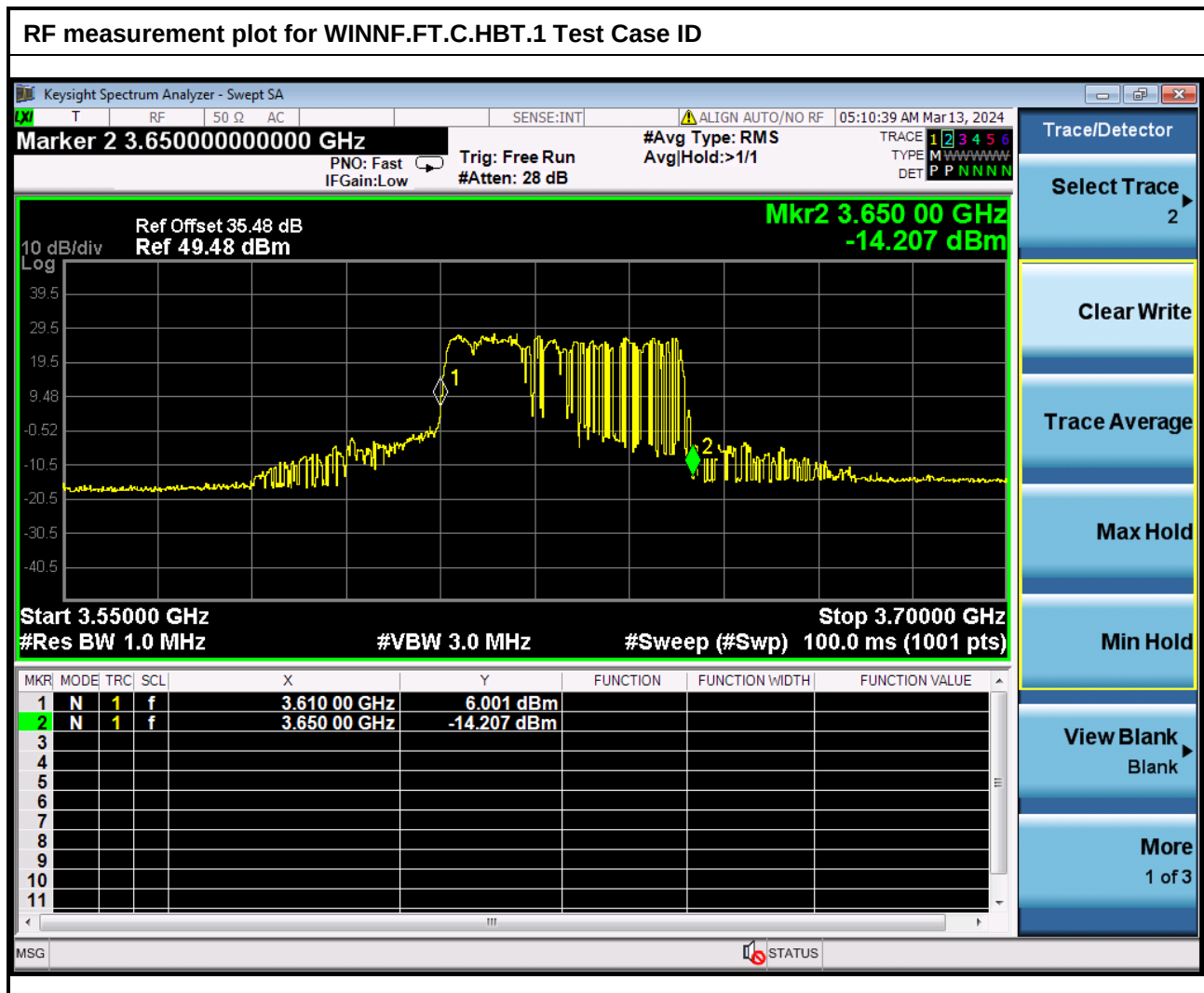
Instrument	Brand	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
Spectrum analyzer	R&S	FSV40	101028	9kHz~40GHz	Dec. 22, 2023	Dec. 21, 2024	Conducted (TH03-CB)
RF Cable	Woken	RG402	High Cable-11	30MHz ~18 GHz	Oct. 02, 2023	Oct. 01, 2024	Conducted (TH03-CB)
RF Cable	Woken	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	3 Way	TH03-DV02	1 ~ 6GHz	Oct. 03, 2023	Oct. 02, 2024	Conducted (TH03-CB)

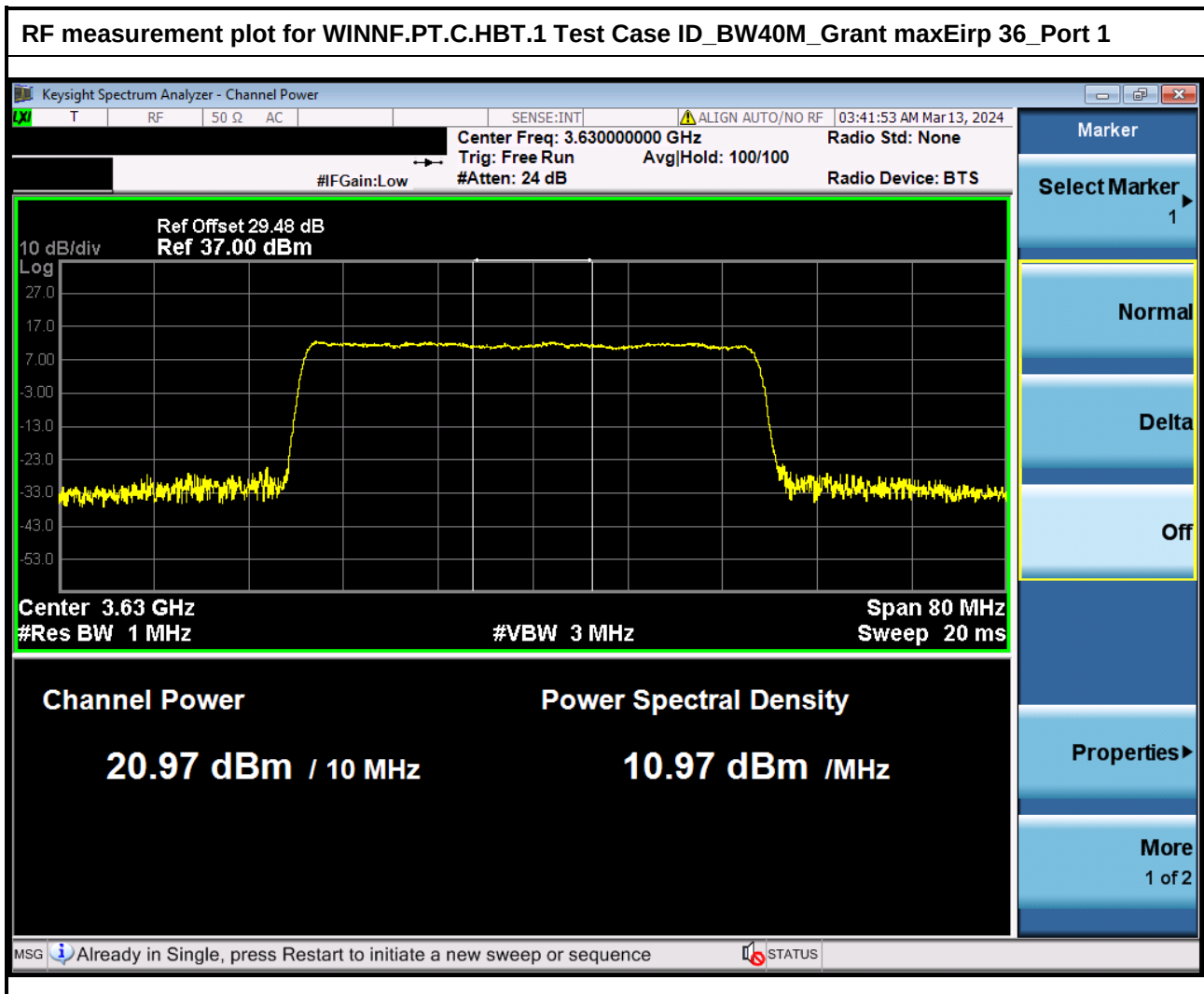
Note: Calibration Interval of instruments listed above is one year.

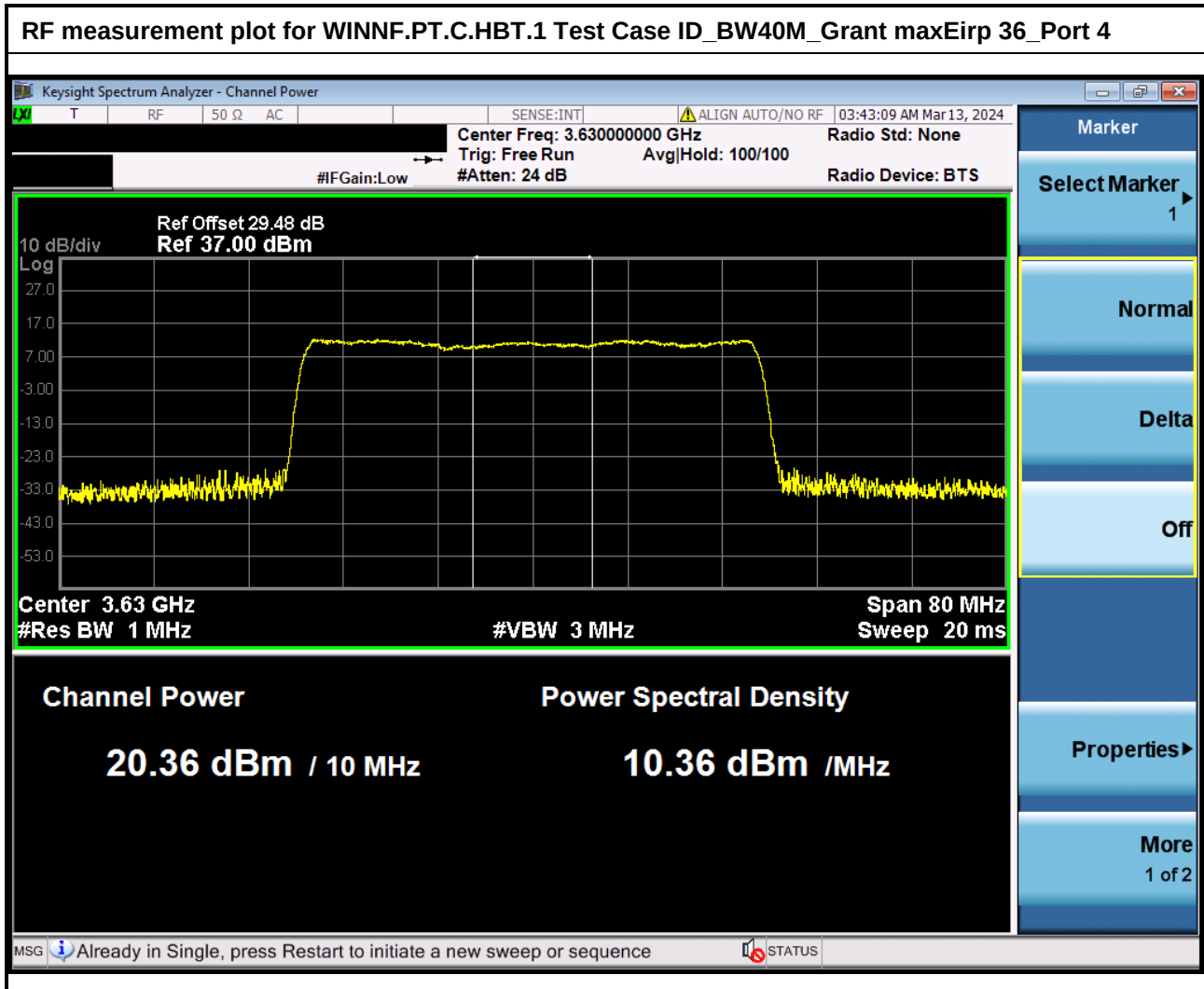


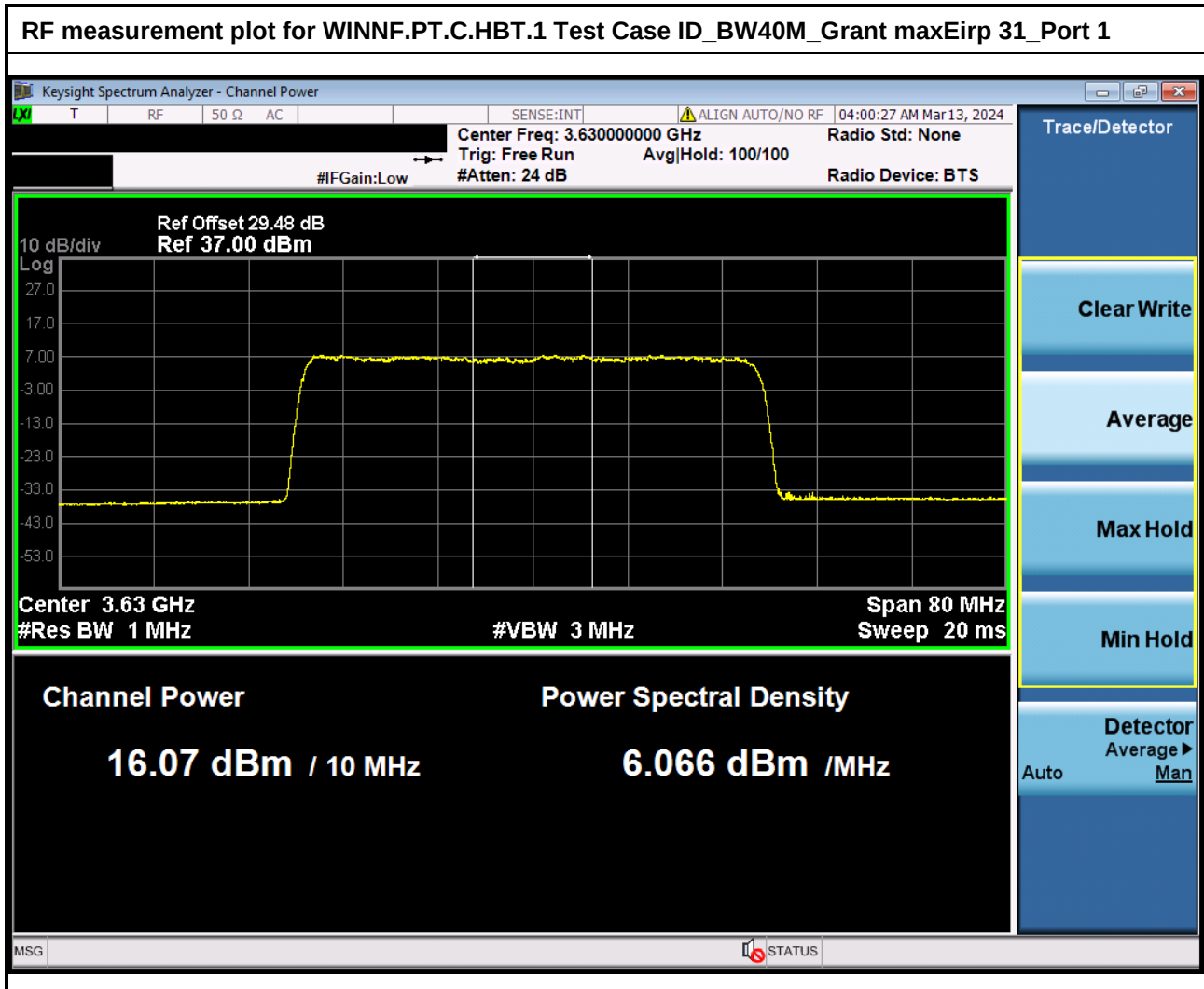
5 Measurement Uncertainty

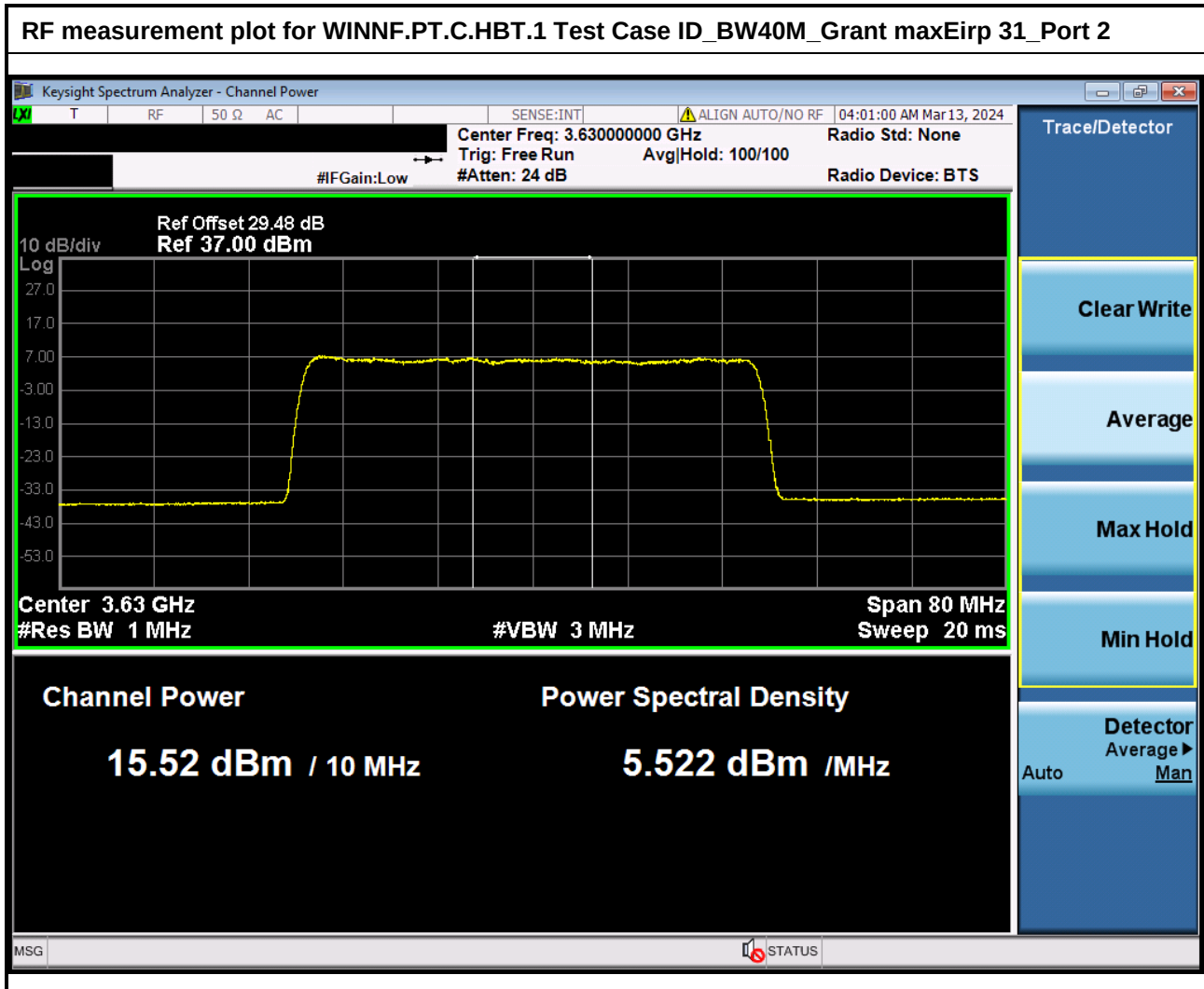
Test Items	Uncertainty	Remark
Conducted Emission	3.1 dB	Confidence levels of 95%

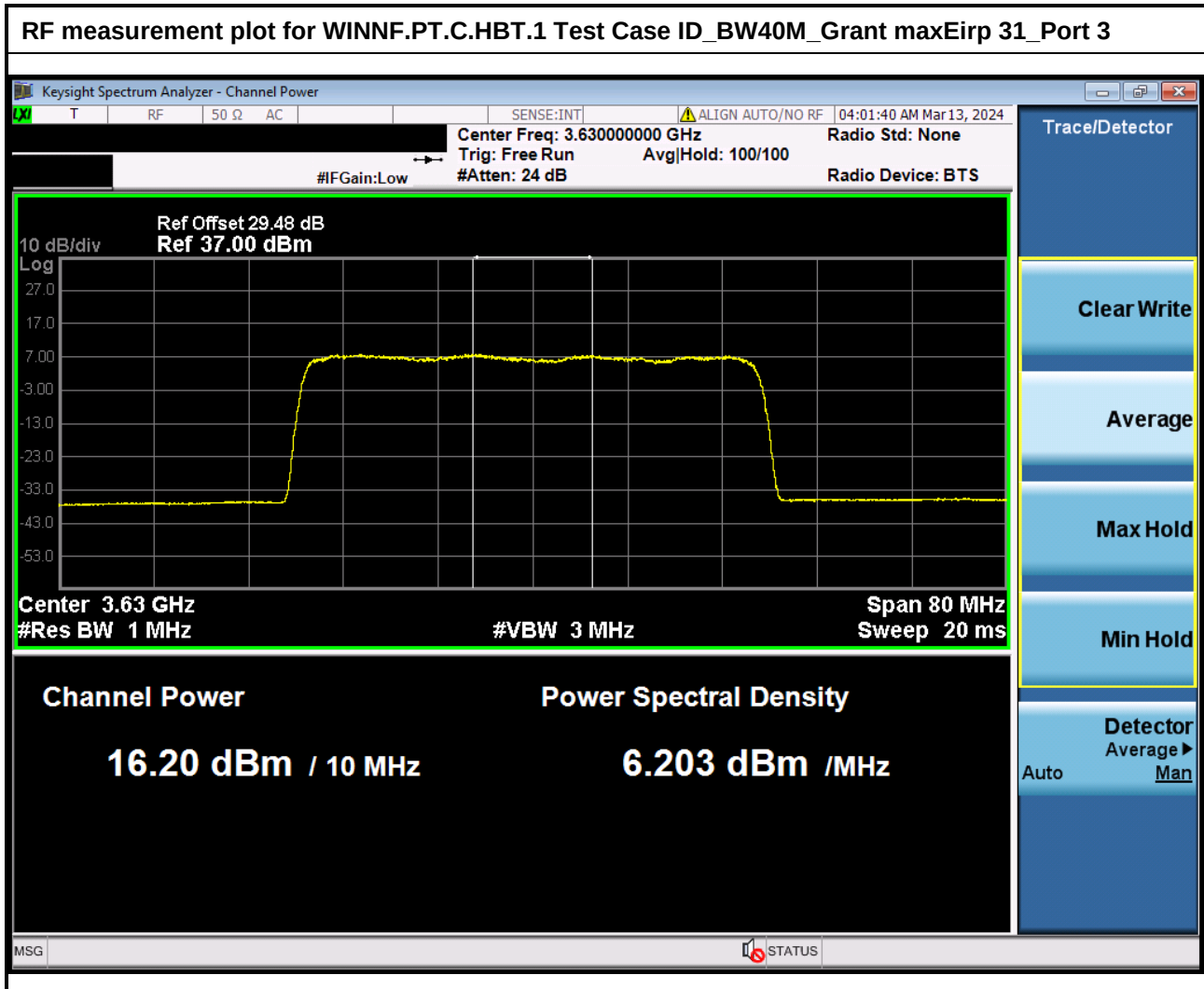


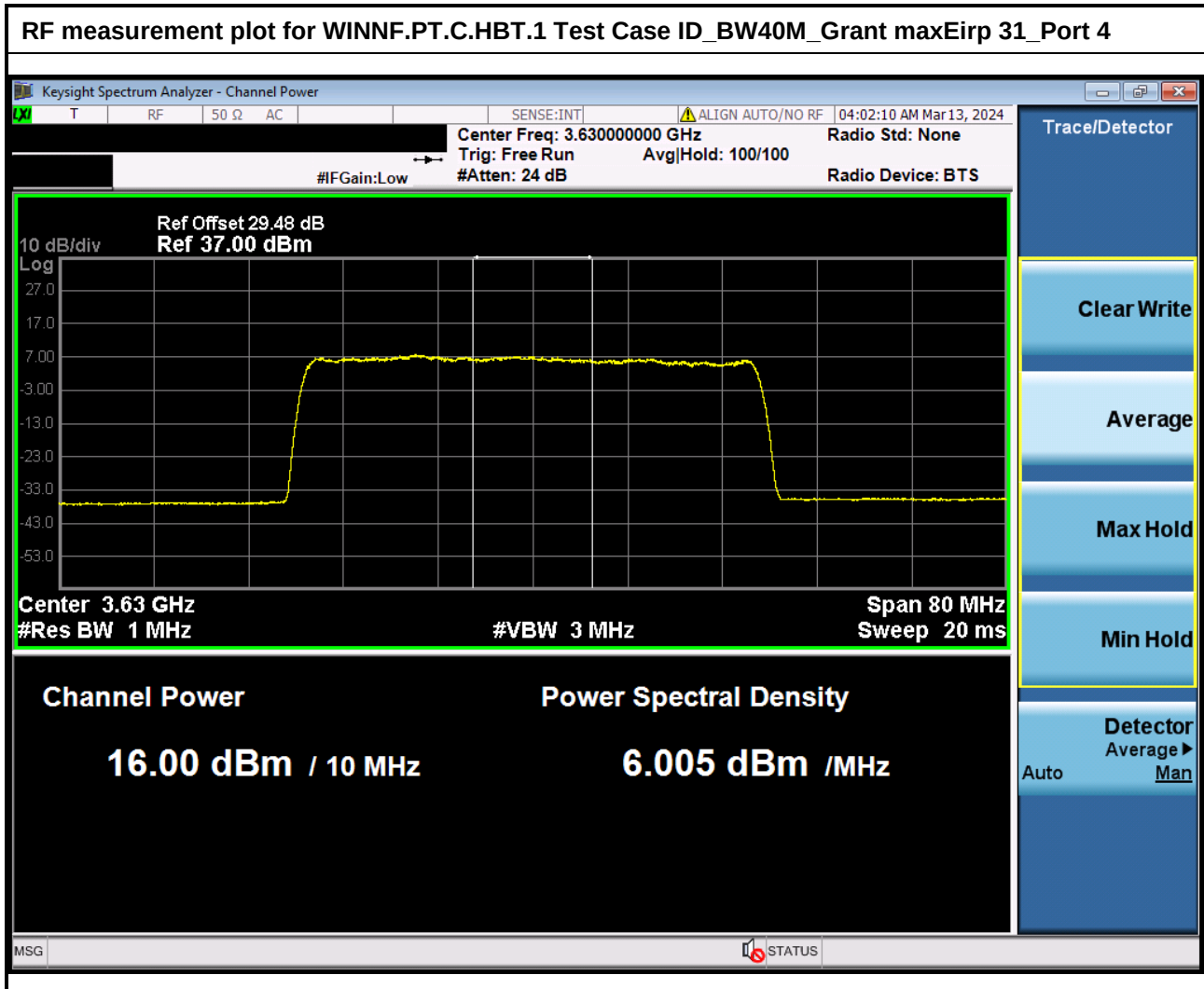




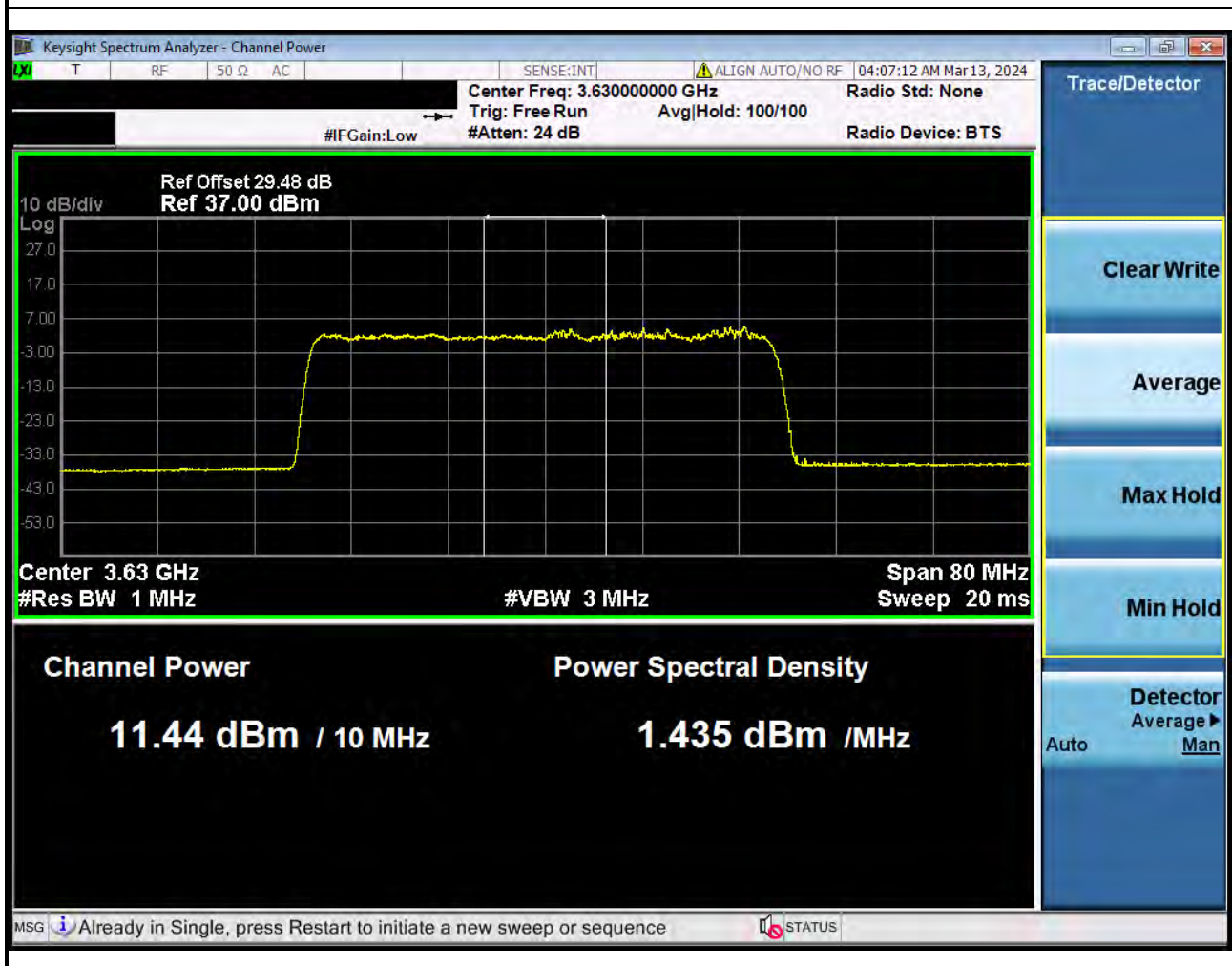


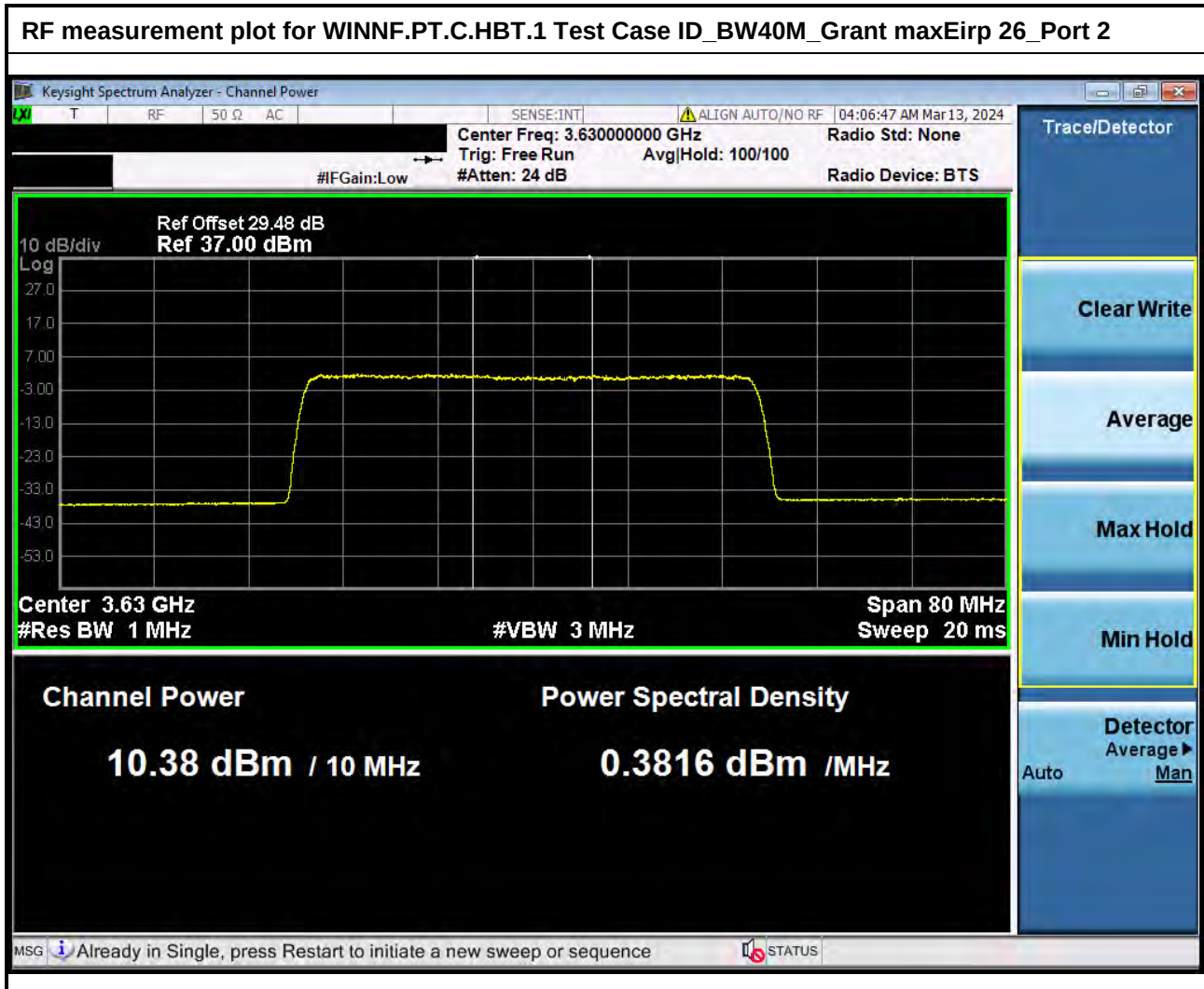


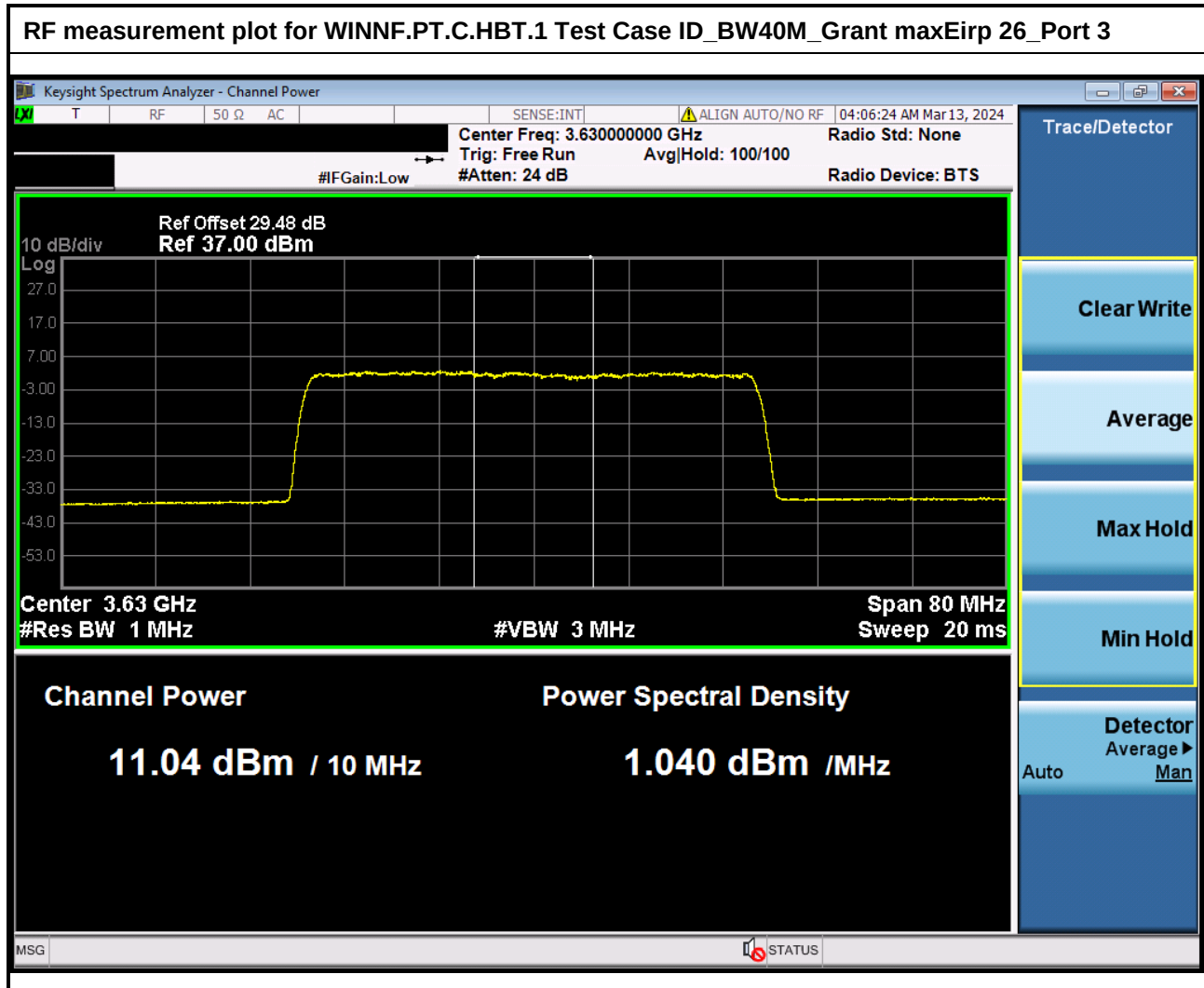


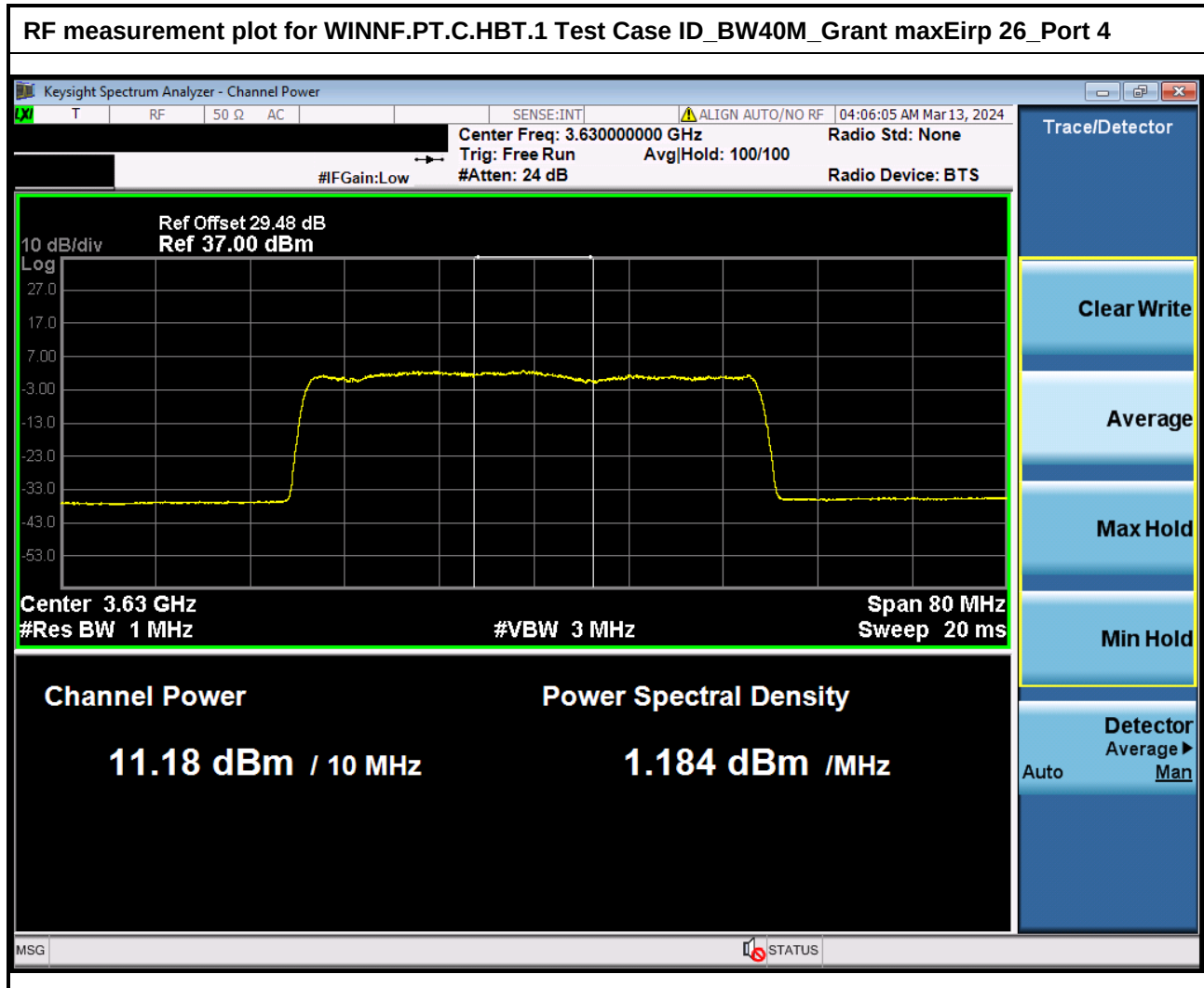


RF measurement plot for WINNF.PT.C.HBT.1 Test Case ID_BW40M_Grant maxEirp 26_Port 1

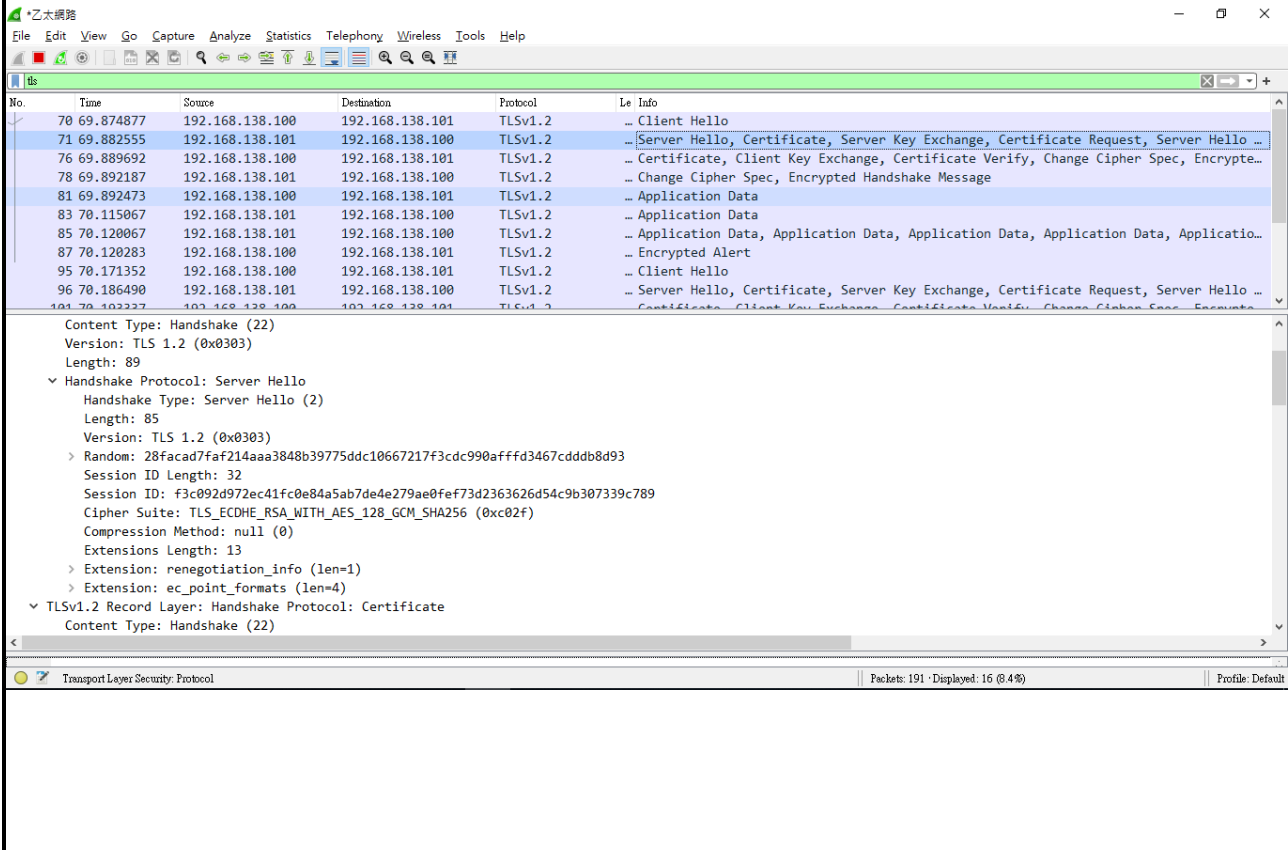








Wireshark Plots for WINNF.FT.C.SCS.1 Test Case ID

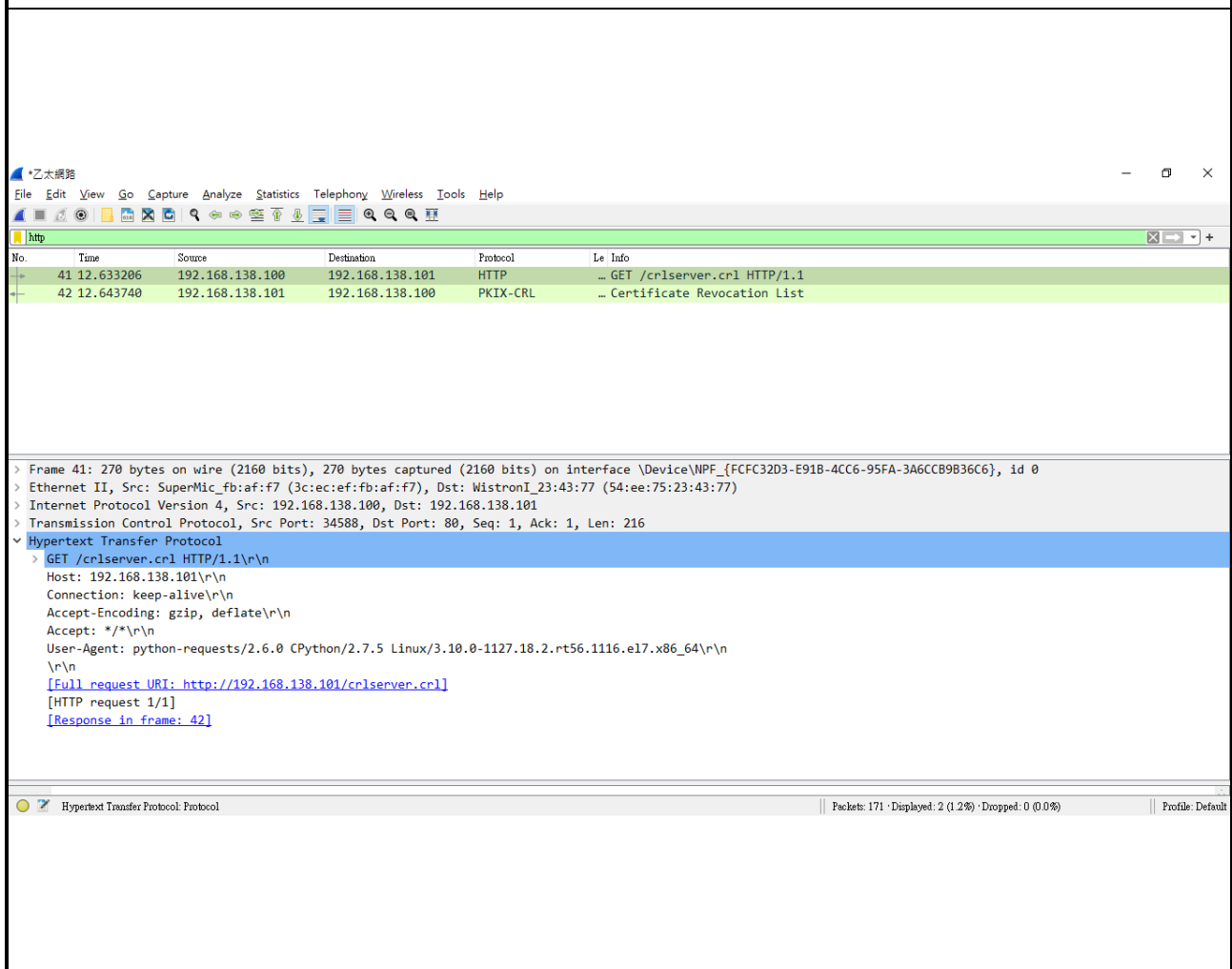


Content Type: Handshake (22)
Version: TLS 1.2 (0x0303)
Length: 89

- Handshake Protocol: Server Hello
 - Handshake Type: Server Hello (2)
 - Length: 85
 - Version: TLS 1.2 (0x0303)
 - Random: 28facad7faf214aaa3848b39775ddc10667217f3cdc990afffd3467cdddb8d93
 - Session ID Length: 32
 - Session ID: f3c092d972ec41fc0e84a5ab7de4e279ae0fef73d2363626d54c9b307339c789
 - Cipher Suite: TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256 (0xc02f)
 - Compression Method: null (0)
 - Extensions Length: 13
 - Extension: renegotiation_info (len=1)
 - Extension: ec_point_formats (len=4)
- TLSv1.2 Record Layer: Handshake Protocol: Certificate
 - Content Type: Handshake (22)

Transport Layer Security Protocol | Packets: 191 · Displayed: 16 (8.4%) | Profile: Default

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



The image shows a Wireshark capture of network traffic. The top pane displays a list of packets. The bottom pane shows the details of the selected packet (Frame 41).

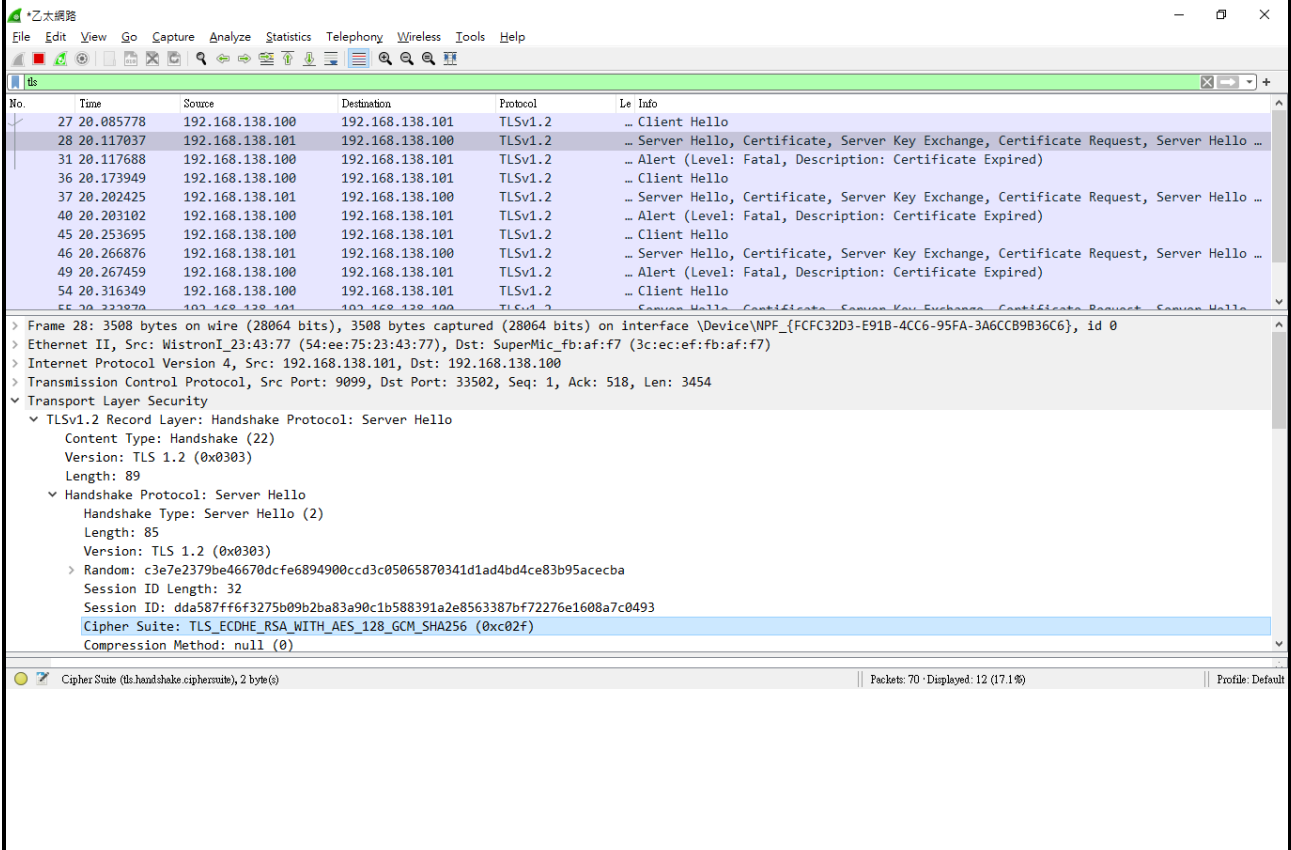
No.	Time	Source	Destination	Protocol	Length	Info
41	12.633206	192.168.138.100	192.168.138.101	HTTP	270	GET /cr1server.cr1 HTTP/1.1
42	12.643740	192.168.138.101	192.168.138.100	PKIX-CRL	...	Certificate Revocation List

Frame 41: 270 bytes on wire (2160 bits), 270 bytes captured (2160 bits) on interface \Device\NPF_{FCFC32D3-E91B-4CC6-95FA-3A6CCB9B36C6}, id 0

- Ethernet II, Src: SuperMic_fb:af:f7 (3c:ec:ef:fb:af:f7), Dst: WistronI_23:43:77 (54:ee:75:23:43:77)
- Internet Protocol Version 4, Src: 192.168.138.100, Dst: 192.168.138.101
- Transmission Control Protocol, Src Port: 34588, Dst Port: 80, Seq: 1, Ack: 1, Len: 216
- Hypertext Transfer Protocol**
 - GET /cr1server.cr1 HTTP/1.1\r\n
 - Host: 192.168.138.101\r\n
 - Connection: keep-alive\r\n
 - Accept-Encoding: gzip, deflate\r\n
 - Accept: */*\r\n
 - User-Agent: python-requests/2.6.0 CPython/2.7.5 Linux/3.10.0-1127.18.2.rt56.1116.el7.x86_64\r\n
 - \r\n
 - [Full request URI: <http://192.168.138.101/cr1server.cr1>]
 - [HTTP request 1/1]
 - [Response in frame: 42]

Summary: Packets: 171 · Displayed: 2 (1.2%) · Dropped: 0 (0.0%) Profile: Default

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



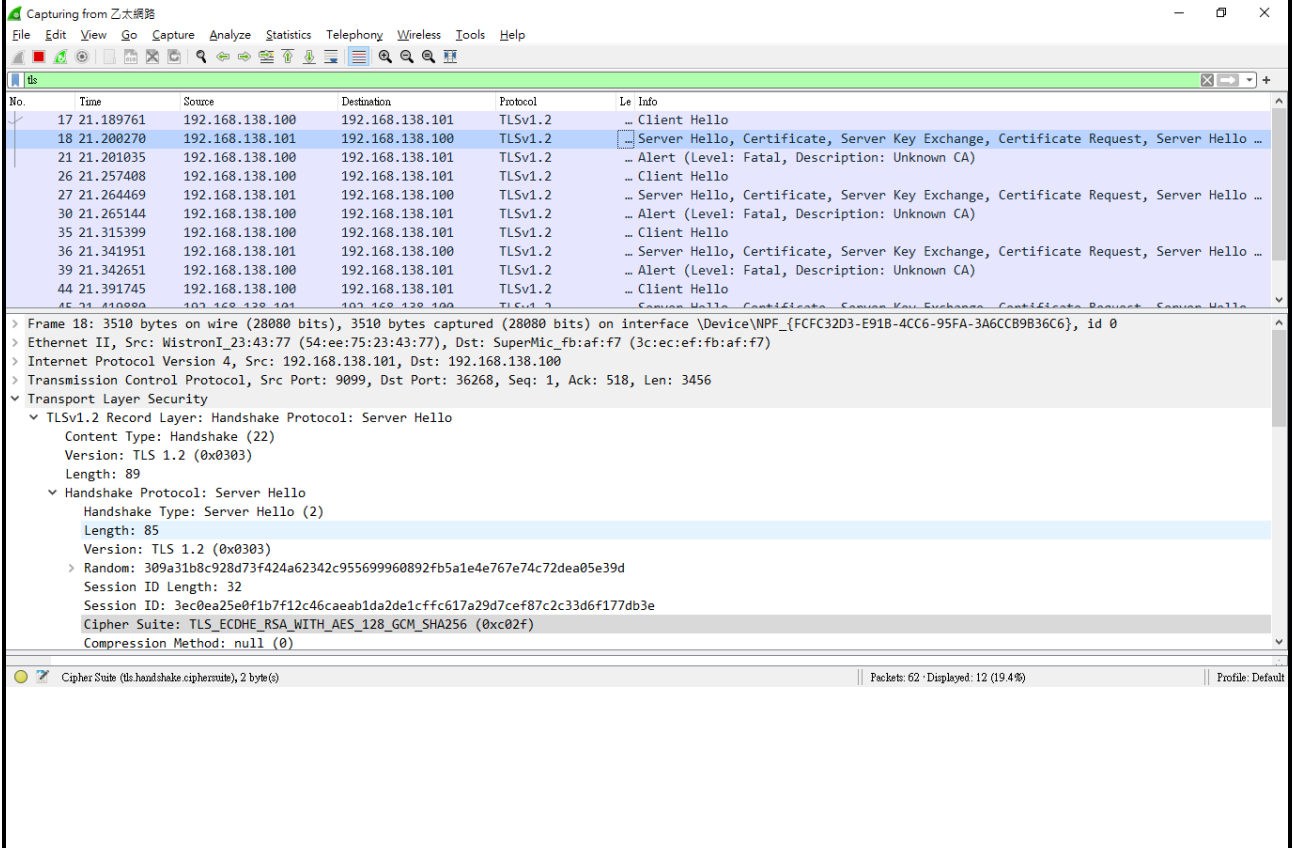
The screenshot displays a Wireshark capture of a TLS handshake. The packet list pane shows several packets, with packet 28 selected, which is a TLSv1.2 Server Hello. The packet details pane provides a hierarchical view of the selected packet's structure, including the TLS Record Layer, Handshake Protocol, and specific handshake messages like Server Hello and Random. The packet bytes pane shows the raw data of the selected packet.

No.	Time	Source	Destination	Protocol	Length	Info
27	20.085778	192.168.138.100	192.168.138.101	TLSv1.2	...	Client Hello
28	20.117037	192.168.138.101	192.168.138.100	TLSv1.2	...	Server Hello, Certificate, Server Key Exchange, Certificate Request, Server Hello ...
31	20.117688	192.168.138.100	192.168.138.101	TLSv1.2	...	Alert (Level: Fatal, Description: Certificate Expired)
36	20.173949	192.168.138.100	192.168.138.101	TLSv1.2	...	Client Hello
37	20.202425	192.168.138.101	192.168.138.100	TLSv1.2	...	Server Hello, Certificate, Server Key Exchange, Certificate Request, Server Hello ...
40	20.203102	192.168.138.100	192.168.138.101	TLSv1.2	...	Alert (Level: Fatal, Description: Certificate Expired)
45	20.253695	192.168.138.100	192.168.138.101	TLSv1.2	...	Client Hello
46	20.266876	192.168.138.101	192.168.138.100	TLSv1.2	...	Server Hello, Certificate, Server Key Exchange, Certificate Request, Server Hello ...
49	20.267459	192.168.138.100	192.168.138.101	TLSv1.2	...	Alert (Level: Fatal, Description: Certificate Expired)
54	20.316349	192.168.138.100	192.168.138.101	TLSv1.2	...	Client Hello

Frame 28: 3508 bytes on wire (28064 bits), 3508 bytes captured (28064 bits) on interface \Device\NPF_{FCFC32D3-E91B-4CC6-95FA-3A6CCB9B36C6}, id 0
 Ethernet II, Src: WistronI_23:43:77 (54:ee:75:23:43:77), Dst: SuperMic_fb:af:f7 (3c:ec:ef:fb:af:f7)
 Internet Protocol Version 4, Src: 192.168.138.101, Dst: 192.168.138.100
 Transmission Control Protocol, Src Port: 9099, Dst Port: 33502, Seq: 1, Ack: 518, Len: 3454
 Transport Layer Security
 TLSv1.2 Record Layer: Handshake Protocol: Server Hello
 Content Type: Handshake (22)
 Version: TLS 1.2 (0x0303)
 Length: 89
 Handshake Protocol: Server Hello
 Handshake Type: Server Hello (2)
 Length: 85
 Version: TLS 1.2 (0x0303)
 Random: c3e7e2379be46670dcfe6894900ccd3c05065870341d1ad4bd4ce83b95acebca
 Session ID Length: 32
 Session ID: dda587ff6f3275b09b2ba83a90c1b588391a2e8563387bf72276e1608a7c0493
 Cipher Suite: TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256 (0xc02f)
 Compression Method: null (0)

Cipher Suite (tls.handshake.ciphersuite), 2 byte(s) | Packets: 70 · Displayed: 12 (17.1%) | Profile: Default

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



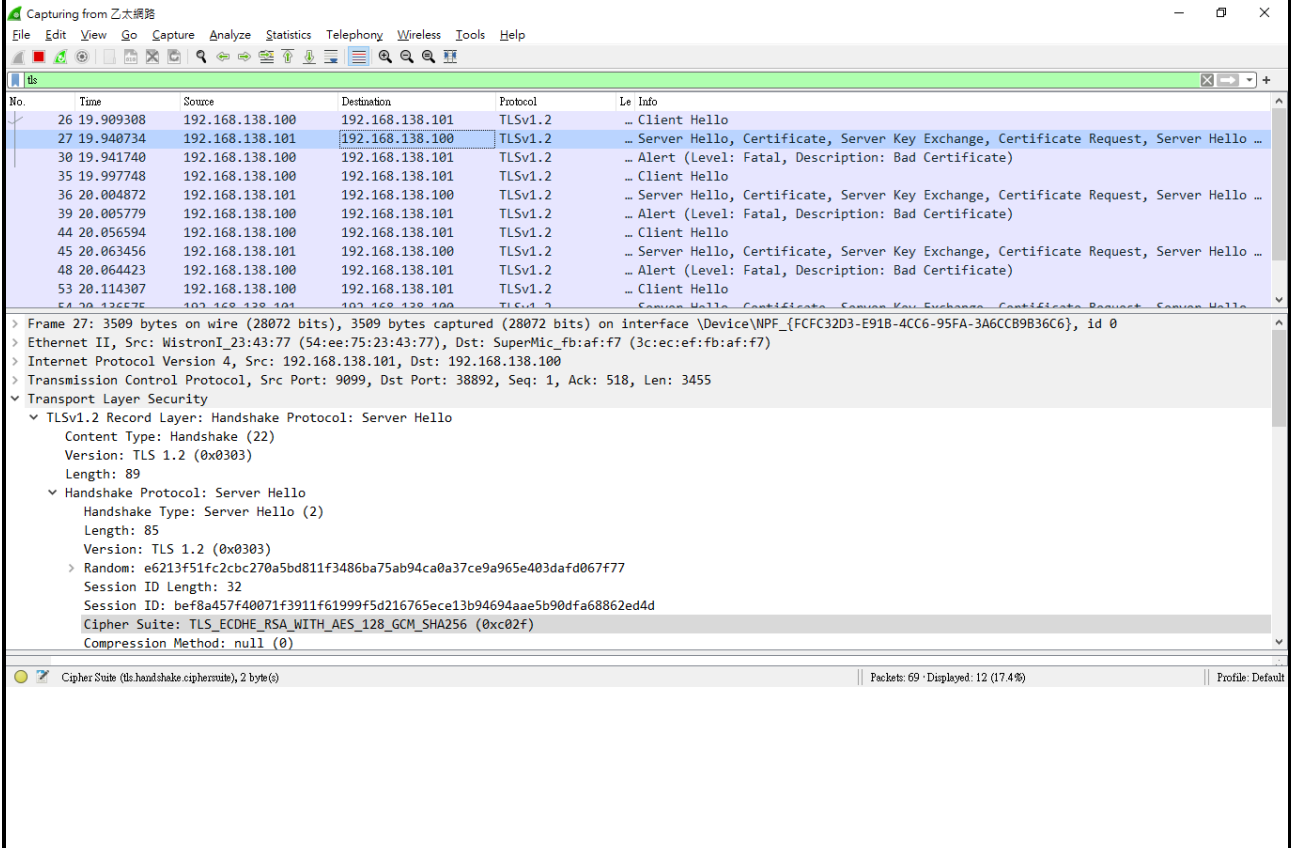
The screenshot displays the Wireshark interface with a packet capture from the '乙太網路' (Ethernet) interface. The packet list shows several TLSv1.2 handshake messages between 192.168.138.100 and 192.168.138.101. Packet 18 is selected, showing details for a Server Hello message. The details pane includes fields for Content Type, Version, Length, Handshake Type, Random, Session ID, Session ID Length, Session ID, Cipher Suite, and Compression Method.

No.	Time	Source	Destination	Protocol	Info
17	21.189761	192.168.138.100	192.168.138.101	TLSv1.2	... Client Hello
18	21.200270	192.168.138.101	192.168.138.100	TLSv1.2	... Server Hello, Certificate, Server Key Exchange, Certificate Request, Server Hello ...
21	21.201035	192.168.138.100	192.168.138.101	TLSv1.2	... Alert (Level: Fatal, Description: Unknown CA)
26	21.257408	192.168.138.100	192.168.138.101	TLSv1.2	... Client Hello
27	21.264469	192.168.138.101	192.168.138.100	TLSv1.2	... Server Hello, Certificate, Server Key Exchange, Certificate Request, Server Hello ...
30	21.265144	192.168.138.100	192.168.138.101	TLSv1.2	... Alert (Level: Fatal, Description: Unknown CA)
35	21.315399	192.168.138.100	192.168.138.101	TLSv1.2	... Client Hello
36	21.341951	192.168.138.101	192.168.138.100	TLSv1.2	... Server Hello, Certificate, Server Key Exchange, Certificate Request, Server Hello ...
39	21.342651	192.168.138.100	192.168.138.101	TLSv1.2	... Alert (Level: Fatal, Description: Unknown CA)
44	21.391745	192.168.138.100	192.168.138.101	TLSv1.2	... Client Hello

Frame 18: 3510 bytes on wire (28080 bits), 3510 bytes captured (28080 bits) on interface \Device\NPF_{FCFC32D3-E91B-4CC6-95FA-3A6CCB9B36C6}, id 0
 > Ethernet II, Src: MistrionI_23:43:77 (54:ee:75:23:43:77), Dst: SuperMic_fb:af:f7 (3c:ec:ef:fb:af:f7)
 > Internet Protocol Version 4, Src: 192.168.138.101, Dst: 192.168.138.100
 > Transmission Control Protocol, Src Port: 9099, Dst Port: 36268, Seq: 1, Ack: 518, Len: 3456
 > Transport Layer Security
 > TLSv1.2 Record Layer: Handshake Protocol: Server Hello
 Content Type: Handshake (22)
 Version: TLS 1.2 (0x0303)
 Length: 89
 > Handshake Protocol: Server Hello
 Handshake Type: Server Hello (2)
 Length: 85
 Version: TLS 1.2 (0x0303)
 > Random: 309a31b8c928d73f424a62342c955699960892fb5a1e4e767e74c72dea05e39d
 Session ID Length: 32
 Session ID: 3ec0ea25e0f1b7f12c46caeab1da2de1cfff617a29d7cef87c2c33d6f177db3e
 Cipher Suite: TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256 (0xc02f)
 Compression Method: null (0)

Cipher Suite (tls handshake.ciphersuite), 2 byte(s) | Packets: 62 · Displayed: 12 (19.4%) | Profile: Default

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



Capturing from 乙太網路

File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help

No.	Time	Source	Destination	Protocol	Length	Info
26	19.909308	192.168.138.100	192.168.138.101	TLSv1.2	...	Client Hello
27	19.940734	192.168.138.101	192.168.138.100	TLSv1.2	...	Server Hello, Certificate, Server Key Exchange, Certificate Request, Server Hello ...
30	19.941740	192.168.138.100	192.168.138.101	TLSv1.2	...	Alert (Level: Fatal, Description: Bad Certificate)
35	19.997748	192.168.138.100	192.168.138.101	TLSv1.2	...	Client Hello
36	20.004872	192.168.138.101	192.168.138.100	TLSv1.2	...	Server Hello, Certificate, Server Key Exchange, Certificate Request, Server Hello ...
39	20.005779	192.168.138.100	192.168.138.101	TLSv1.2	...	Alert (Level: Fatal, Description: Bad Certificate)
44	20.056594	192.168.138.100	192.168.138.101	TLSv1.2	...	Client Hello
45	20.063456	192.168.138.101	192.168.138.100	TLSv1.2	...	Server Hello, Certificate, Server Key Exchange, Certificate Request, Server Hello ...
48	20.064423	192.168.138.100	192.168.138.101	TLSv1.2	...	Alert (Level: Fatal, Description: Bad Certificate)
53	20.114307	192.168.138.100	192.168.138.101	TLSv1.2	...	Client Hello

> Frame 27: 3509 bytes on wire (28072 bits), 3509 bytes captured (28072 bits) on interface \Device\NPF_{FCFC32D3-E91B-4CC6-95FA-3A6CCB9B36C6}, id 0

> Ethernet II, Src: MistrionI_23:43:77 (54:ee:75:23:43:77), Dst: SuperMic_fb:af:f7 (3c:ec:ef:fb:af:f7)

> Internet Protocol Version 4, Src: 192.168.138.101, Dst: 192.168.138.100

> Transmission Control Protocol, Src Port: 9099, Dst Port: 38892, Seq: 1, Ack: 518, Len: 3455

▼ Transport Layer Security

▼ TLSv1.2 Record Layer: Handshake Protocol: Server Hello

Content Type: Handshake (22)

Version: TLS 1.2 (0x0303)

Length: 89

▼ Handshake Protocol: Server Hello

Handshake Type: Server Hello (2)

Length: 85

Version: TLS 1.2 (0x0303)

> Random: e6213f51fc2cbc270a5bd811f3486ba75ab94ca0a37ce9a965e403dafd067f77

Session ID Length: 32

Session ID: bef8a457f40071f3911f61999f5d216765ece13b94694aae5b90dfa68862ed4d

Cipher Suite: TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256 (0xc02f)

Compression Method: null (0)

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

Packets: 69 · Displayed: 12 (17.4%)

Profile: Default

