

Test Report

As per

FCC Part 96 SAS requirements (CBRS Test Plan)

On the
PF54A0-mb480-05 Radio Unit
for wireless base station

FCC ID(s): 2BHMSA1452201

Issued by:
TÜV SÜD Canada Inc.
1280 Teron Rd,
Ottawa, ON K2K 2C1
Canada

Scott Drysdale.
Test Personnel



Steve McFarlane
Report Reviewer



**Add value.
Inspire trust.**

Testing produced
for

NEC Corporation

See Appendix A for
full client & EUT
details.



Testing Laboratory
Certificate #2955.19

Client	NEC Corporation	
Product	PF54A0-mb480-05 Radio Unit	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	

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Client	NEC Corporation	
Product	PF54A0-mb480-05 Radio Unit	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	

Report Scope

This report addresses the EMC verification testing and test results of the **PF54A0-mb480-05 Radio Unit** herein referred to as EUT (Equipment Under Test). The EUT was tested for compliance against the following standards:

FCC Part 96 SAS requirements (CBRS Test Plan)

Test procedures, results, justifications, and engineering considerations, if any, follow later in this report.

For a more detailed list of the standards and the revision used, see the "Applicable Standards, Specifications and Methods" section of this report.

This report does not imply product endorsement by any government, accreditation agency, or TÜV SÜD Canada Inc.

Opinions or interpretations expressed in this report, if any, are outside the scope of TÜV SÜD Canada Inc accreditations. Any opinions expressed do not necessarily reflect the opinions of TÜV SÜD Canada Inc, unless otherwise stated.

Client	NEC Corporation	
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Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	

Summary

The results contained in this report relate only to the item(s) tested.

Equipment Under Test (EUT)	PF54A0-mb480-05 Radio Unit
EUT passed all tests performed	Yes
Tests conducted by	Scott Drysdale

For testing dates, see 'Testing Environmental Conditions and Dates'.

Client	NEC Corporation	
Product	PF54A0-mb480-05 Radio Unit	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	

Test Results Summary

Section as per Working Document WINNF-TS-0122

Section	CBSD	DP	Test Case ID	Test Case Title	RF Measurement Requirement	Pass / Fail
6.1.4.1.1	X	--	WINNF.FT.C.REG.1	Multi-Step registration	Monitor for 60 seconds after REG message sent. No transmission during test.	N/A
6.1.4.1.2	--	X	WINNF.FT.D.REG.2	Domain Proxy Multi-Step registration	Monitor for 60 seconds after REG message sent. No transmission during test.	P
6.1.4.1.3	X	--	WINNF.FT.C.REG.3	Single-Step registration for Category A CBSD	Monitor for 60 seconds after REG message sent. No transmission during test.	N/A
6.1.4.1.4	--	X	WINNF.FT.D.REG.4	Domain Proxy Single-Step registration for Cat A CBSD (Note: Mandatory only if without CPI)	Monitor for 60 seconds after REG message sent. No transmission during test.	N/A
6.1.4.1.5	X	--	WINNF.FT.C.REG.5	Single-Step registration for CBSD with CPI signed data	Monitor for 60 seconds after REG message sent. No transmission during test.	N/A
6.1.4.1.6	--	X	WINNF.FT.D.REG.6	Domain Proxy Single-Step registration for CBSD with CPI signed data	Monitor for 60 seconds after REG message sent. No transmission during test.	P
6.1.4.1.7	X	X	WINNF.FT.C.REG.7	Registration due to change of an installation parameter	Test waits until transmission starts, then trigger an installationParam change. Record time at which transmission stops. Time must be within 60 seconds of the installationParam change taking effect.	N/A
6.1.4.2.1	X	--	WINNF.FT.C.REG.8	Missing Required parameters (responseCode 102)	Monitor for 60 seconds after REG message sent. No transmission during test.	N/A
6.1.4.2.2	--	X	WINNF.FT.D.REG.9	Domain Proxy Missing Required parameters (responseCode 102)	Monitor for 60 seconds after REG message sent. No transmission during test.	P
6.1.4.2.3	X	--	WINNF.FT.C.REG.10	Pending registration (responseCode 200)	Monitor for 60 seconds after REG message sent. No transmission during test.	N/A
6.1.4.2.4	--	X	WINNF.FT.D.REG.11	Domain Proxy Pending registration (responseCode 200)	Monitor for 60 seconds after REG message sent. No transmission during test.	P

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6.1.4.2.5	X	--	WINNF.FT.C.REG.12	Invalid parameter (responseCode 103)	Monitor for 60 seconds after REG message sent. No transmission during test.	N/A
6.1.4.2.6	--	X	WINNF.FT.D.REG.13	Domain Proxy Invalid parameters (responseCode 103)	Monitor for 60 seconds after REG message sent. No transmission during test.	P
6.1.4.2.7	X	--	WINNF.FT.C.REG.14	Blacklisted CBSD (responseCode 101)	Monitor for 60 seconds after REG message sent. No transmission during test.	N/A
6.1.4.2.8	--	X	WINNF.FT.D.REG.15	Domain Proxy Blacklisted CBSD (responseCode 101)	Monitor for 60 seconds after REG message sent. No transmission during test.	P
6.1.4.2.9	X	--	WINNF.FT.C.REG.16	Unsupported SAS protocol version (responseCode 100)	Monitor for 60 seconds after REG message sent. No transmission during test.	N/A
6.1.4.2.10	--	X	WINNF.FT.D.REG.17	Domain Proxy Unsupported SAS protocol version responseCode 100)	Monitor for 60 seconds after REG message sent. No transmission during test.	P
6.1.4.2.11	X	--	WINNF.FT.C.REG.18	Group Error (responseCode 201)	Monitor for 60 seconds after REG message sent. No transmission during test.	N/A
6.1.4.2.12	--	X	WINNF.FT.D.REG.19	Domain Proxy Group Error (responseCode 201)	Monitor for 60 seconds after REG message sent. No transmission during test.	P
6.1.4.3.1	X	X	WINNF.FT.C.REG.20	Category A CBSD location update		N/A
6.3.4.2.1	X	X	WINNF.FT.C.GRA.1 (TYPO FIXED D TO C)	Unsuccessful Grant responseCode=400 (INTERFERENCE)	Monitor for 60 seconds after REG message sent. No transmission during test.	P
6.3.4.2.2	X	X	WINNF.FT.C.GRA.2	Unsuccessful Grant responseCode=401 (GRANT_CONFLICT)	Monitor for 60 seconds after REG message sent. No transmission during test.	P
6.4.4.1.1	X	--	WINNF.FT.C.HBT.1	Heartbeat Success Case (first Heartbeat Response)	Monitor RF from start of test. Ensure that: - Transmission does not start until time of first heartbeat response or after. - After transmission starts, measure that transmission is within the granted channel (frequencyLow, frequencyHigh)	N/A
6.4.4.1.2	--	X	WINNF.FT.D.HBT.2	Domain Proxy Heartbeat Success Case (first Heartbeat Response)	Monitor RF from start of test. Ensure that: Transmission does not	P

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					- start until time of first heartbeat response or after. - After transmission starts, measure that transmission is within the granted channel (frequencyLow, frequencyHigh)	
6.4.4.2.1	X	X	WINNF.FT.C.HBT.3	Heartbeat responseCode=105 (DEREGISTER)	Monitor RF transmission. Ensure that: CBSD stops transmission within 60 seconds of the heartbeatResponse which contains responseCode = 105	P
6.4.4.2.2	X	--	WINNF.FT.C.HBT.4	Heartbeat responseCode=500 (TERMINATED_GRANT)		N/A
6.4.4.2.3	X	X	WINNF.FT.C.HBT.5	Heartbeat responseCode=501 (SUSPENDED_GRANT) in First Heartbeat Response	Monitor RF transmission from start of test. Ensure there is no transmission during the test	p
6.4.4.2.4	X	X	WINNF.FT.C.HBT.6	Heartbeat responseCode=501 (SUSPENDED_GRANT) in Subsequent Heartbeat Response	Monitor RF transmission. Ensure: CBSD stops transmission within 60 seconds of heartbeatResponse which contains responseCode=501	p
6.4.4.2.5	X	X	WINNF.FT.C.HBT.7	Heartbeat responseCode=502 (UNSYNC_OP_PARAM)	Monitor RF transmission. Ensure: CBSD stops transmission within 60 seconds of heartbeatResponse which contains responseCode=502	p
6.4.4.2.6	--	X	WINNF.FT.D.HBT.8	Domain Proxy Heartbeat responseCode=500 (TERMINATED_GRANT)	Monitor RF transmission. CBSDs will have different behavior: CBSD1: will continue to transmit to end of test (this is not a pass/fail criteria, but check)	P

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					CBSD2: must stop transmission within 60 seconds of being sent heartbeatResponse with responseCode = 500	
6.4.4.3.1	X	X	WINNF.FT.C.HBT.9	Heartbeat Response Absent (First Heartbeat)	Monitor RF from start of test to 60 seconds after last heartbeatResponse message was sent. CBSD should not transmit at any time during test	P
6.4.4.3.2	X	X	WINNF.FT.C.HBT.10	Heartbeat Response Absent (Subsequent Heartbeat)	Monitor RF transmission. Verify: CBSD must stop transmission within transmitExpireTime+60 seconds, where transmitExpireTime is from last successful heartbeatResponse message	P
6.5.4.2.1	X	--	WINNF.FT.C.MES.1	Registration Response contains measReportConfig	No RF monitoring	N/A
6.5.4.2.2	--	X	WINNF.FT.D.MES.2	Domain Proxy Registration Response contains measReportConfig	No RF monitoring	N/A
6.5.4.2.3	X	X	WINNF.FT.C.MES.3	Grant Response contains measReportConfig	No RF monitoring	P
6.5.4.2.4	X	--	WINNF.FT.C.MES.4	Heartbeat Response contains measReportConfig	No RF monitoring	N/A
6.5.4.2.5	--	X	WINNF.FT.D.MES.5	Domain Proxy Heartbeat Response contains measReportConfig	No RF monitoring	P
6.6.4.1.1	X	--	WINNF.FT.C.RLQ.1	Successful Relinquishment	Monitor RF transmission. Ensure: CBSD stops transmission at any time prior to sending the relinquishmentRequest message.	N/A
6.6.4.1.2	--	X	WINNF.FT.D.RLQ.2	Domain Proxy Successful Relinquishment	Monitor RF transmission. Ensure: CBSD stops transmission at any time prior to sending the relinquishmentRequest message.	P
6.7.4.1.1	X	--	WINNF.FT.C.DRG.1	Successful Deregistration	Monitor RF transmission. Ensure: CBSD stops transmission at any time prior to sending the relinquishmentRequest message.	N/A

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					quest message or deregistration Request message (whichever is sent first)	
6.7.4.1.2	--	X	WINNF.FT.D.DRG.2	Domain Proxy Successful Deregistration	Monitor RF transmission. Ensure: • CBSD stops transmission at any time prior to sending the relinquishmentRequest message or deregistrationRequest message (whichever is sent first)	P
6.8.4.1.1	X	X	WINNF.FT.C.SCS.1	Successful TLS connection between UUT and SAS Test Harness	No RF transmission during test Check the tcpdump for the TLS information	P
6.8.4.2.1	X	X	WINNF.FT.C.SCS.2	TLS failure due to revoked certificate	No RF transmission during test Check the tcpdump for the TLS information	P
6.8.4.2.2	X	X	WINNF.FT.C.SCS.3	TLS failure due to expired server certificate	No RF transmission during test Check the tcpdump for the TLS information	P
6.8.4.2.3	X	X	WINNF.FT.C.SCS.4	TLS failure when SAS Test Harness certificate is issue by unknown CA	No RF transmission during test Check the tcpdump for the TLS information	P
6.8.4.2.4	X	X	WINNF.FT.C.SCS.5	TLS failure when certificate at the SAS Test Harness is corrupted	No RF transmission during test Check the tcpdump for the TLS information	P
7.1.4.1.1	X	X	WINNF.PT.C.HBT	UUT RF Transmit Power Measurement	Power Spectral Density test case. Assume we use 1 carrier bandwidth (say, 5 or 10 MHz), one frequency (say middle channel in band) for test. Measure at max transmit power, and reduce in steps of 3 dB to minimum declared transmit power.	P

If the product as tested complies with the specification, the EUT is deemed to comply with the standard and is deemed a 'PASS' or 'P' grade. If not 'FAIL' grade is issued. Where 'N/A' is stated this means the test case is not applicable, and see Notes, Justifications or Deviations Section for details.

Client	NEC Corporation	
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Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	

Notes, Justifications, or Deviations

The following notes, justifications for tests not performed or deviations from the above listed specifications apply:

A later revision of the standard may have been substituted in place of the previous dated referenced revision. The year of the specification used is listed under applicable standards. Using the later revision accomplishes the goal of ensuring compliance to the intent of the previous specification, while allowing the laboratory to incorporate the extensions and clarifications made available by a later revision.

Test results were obtained using the PF54A0-mb480-05 Radio Unit model.

For the N/A test cases, the following justifications apply:

- a. EUT is a CBSD with Domain Proxy
- b. EUT supports the following Conditional functionality from WINNF-TS-0122-V1.0.2, Table 6-2:
 - i. C1 – Multi-step registration (WINNF.FT.D.REG.2)
 - ii. C3 – Single step registration containing CPI-signed data in the registration message (WINNF.FT.D.REG.6)
 - iii. C5 – RECEIVED_POWER_WITH_GRANT measurement report (WINNF.FT.D.MES.3, WINNF.FT.D.MES.5)
- c. Optional test cases were not performed

The device does not use single-step registration (as defined in condition C2 in WINNF-TS-0122-V1.0.0, Table 6-2), therefore test cases 6.1.4.1.4, and 6.1.4.3.1 are not applicable as per WINNF-TS-0122-V1.0.0, Table 6-3 and therefore not required or performed.

Note, where graph sweeps are incomplete, this was used to set the time stamp of when the events occurred. This can be accomplished by determining the time at which the graph was captured and subtracting the remaining time. For example if there was a 30 second sweep, and 9 out of 10 is complete, that means the end occurred at the 27 second mark. If the time on the graph was 12:03:35, this means the graph started at 12:03:08. This allows us to co-ordinate graph with timing provided in the logs.

Logs are kept on file.

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Applicable Standards, Specifications and Methods

ANSI C63.26:2015 American National Standard for Compliance Testing of Transmitters
Used in Licensed Radio Services

CFR47 FCC Part 96 Code of Federal Regulations – Citizens Broadband Radio Service

WINNF-TS-0122 Conformance and Performance Test Technical Specification;
Version V1.0.2 CBSD/DP as Unit Under Test (UUT)
25 November 2020 Working Document

ISO/IEC 17025:2017 General requirements for the competence of testing and calibration
laboratories

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Document Revision Status

TR-7169014294-CBRS-000: Dec 9, 2024 - First release.

TR-7169014294-CBRS-001: Dec 13, 2024 - minor revisions as per customer request, kept on file.

TR-7169014294-CBRS-002: Dec 16, 2024 - minor revisions as per customer request, kept on file.

Client	NEC Corporation	
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Definitions and Acronyms

The following definitions and acronyms are applicable in this report.
See also ANSI C63.14.

AE – Auxiliary Equipment. A digital accessory that feeds data into or receives data from another device (host) that in turn, controls its operation.

EMI – Electro-Magnetic Immunity. The ability to maintain a specified performance when the equipment is subjected to disturbance (unwanted) signals of specified levels.

EUT – Equipment Under Test. A device or system being evaluated for compliance that is representative of a product to be marketed.

NCR – No Calibration Required

RF – Radio Frequency

Client	NEC Corporation	
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Testing Facility

Testing for EMC on the EUT was carried out at TÜV SÜD Ottawa located at 1280 Teron Road, Ottawa, Ontario, Canada.

Calibrations and Accreditations

TÜV SÜD Canada Inc is accredited to ISO/IEC 17025 by A2LA with Testing Certificate #2955.19. The laboratory's current scope of accreditation listing can be found as listed on the A2LA website. All measuring equipment is calibrated on an annual or bi-annual basis as listed for each respective test.

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Testing Environmental Conditions and Dates

Following environmental conditions were recorded in the facility during time(s) of testing and kept on file.

Date	Test	Initials	Temperature (°C)	Humidity (%)	Pressure (kPa)
Oct 28 2024 –Dec 6, 2024	All	SD	18-23	35-65	96-106

Client	NEC Corporation	
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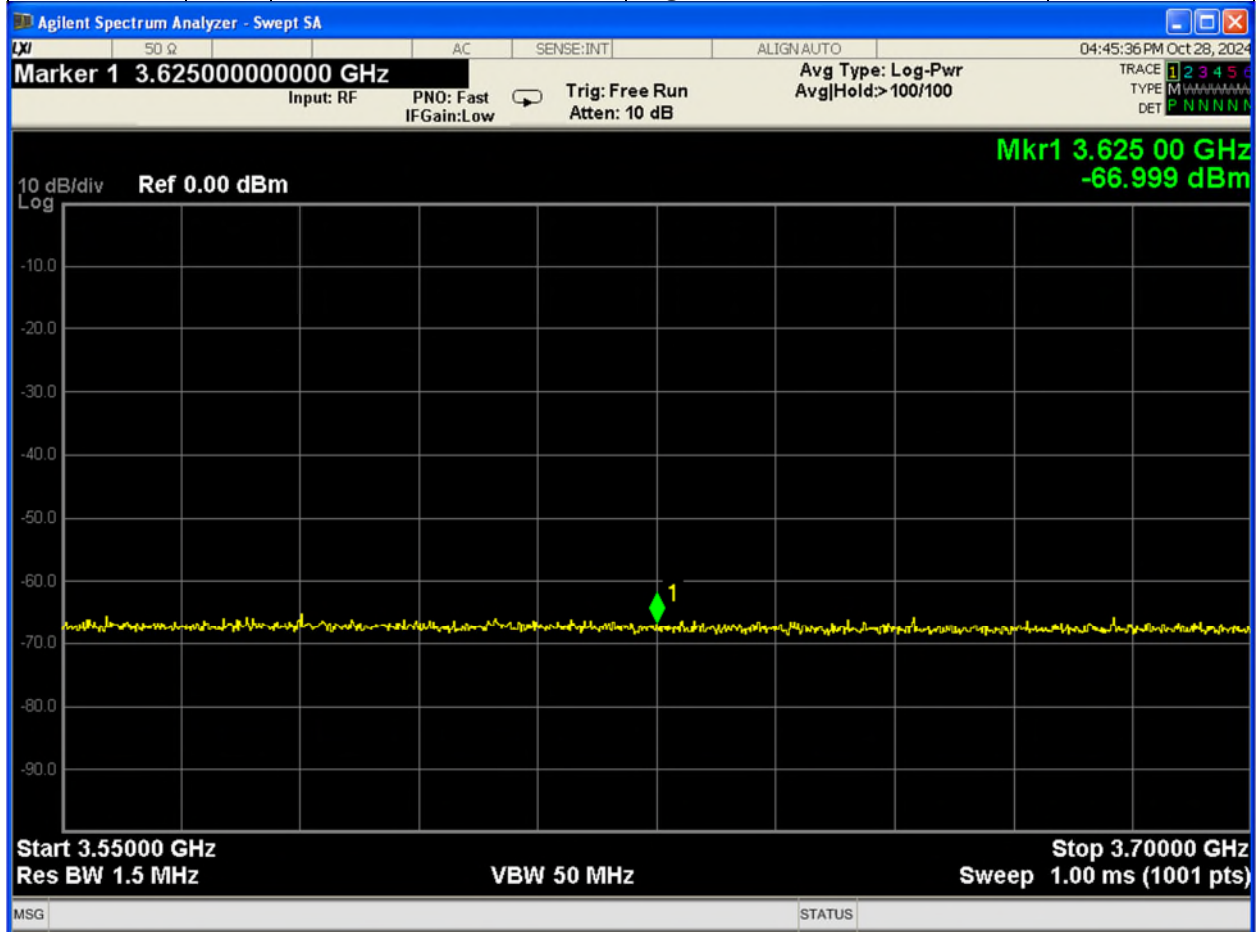
Detailed Test Results Section

Client	NEC Corporation	
Product	PF54A0-mb480-05 Radio Unit	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	

Registration

Authorization transmit after it receives authorization from a SAS.

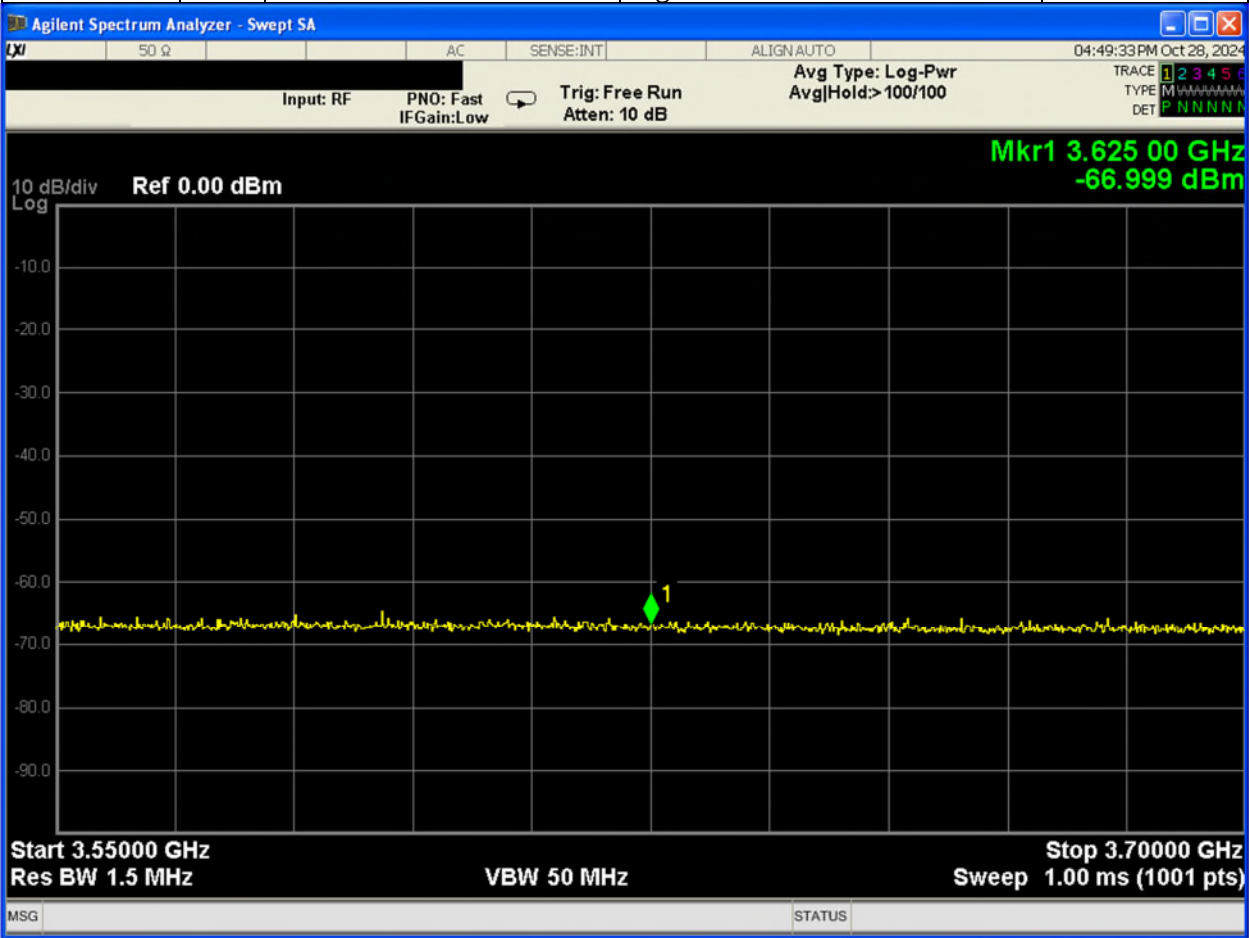
Section	DP	Test Case ID	Test Case Title	Pass / Fail
6.1.4.1.2	X	WINNF.FT.D.REG.2	Domain Proxy Multi-Step registration	P



Registration was received. EUT did not transmit.

Client	NEC Corporation	
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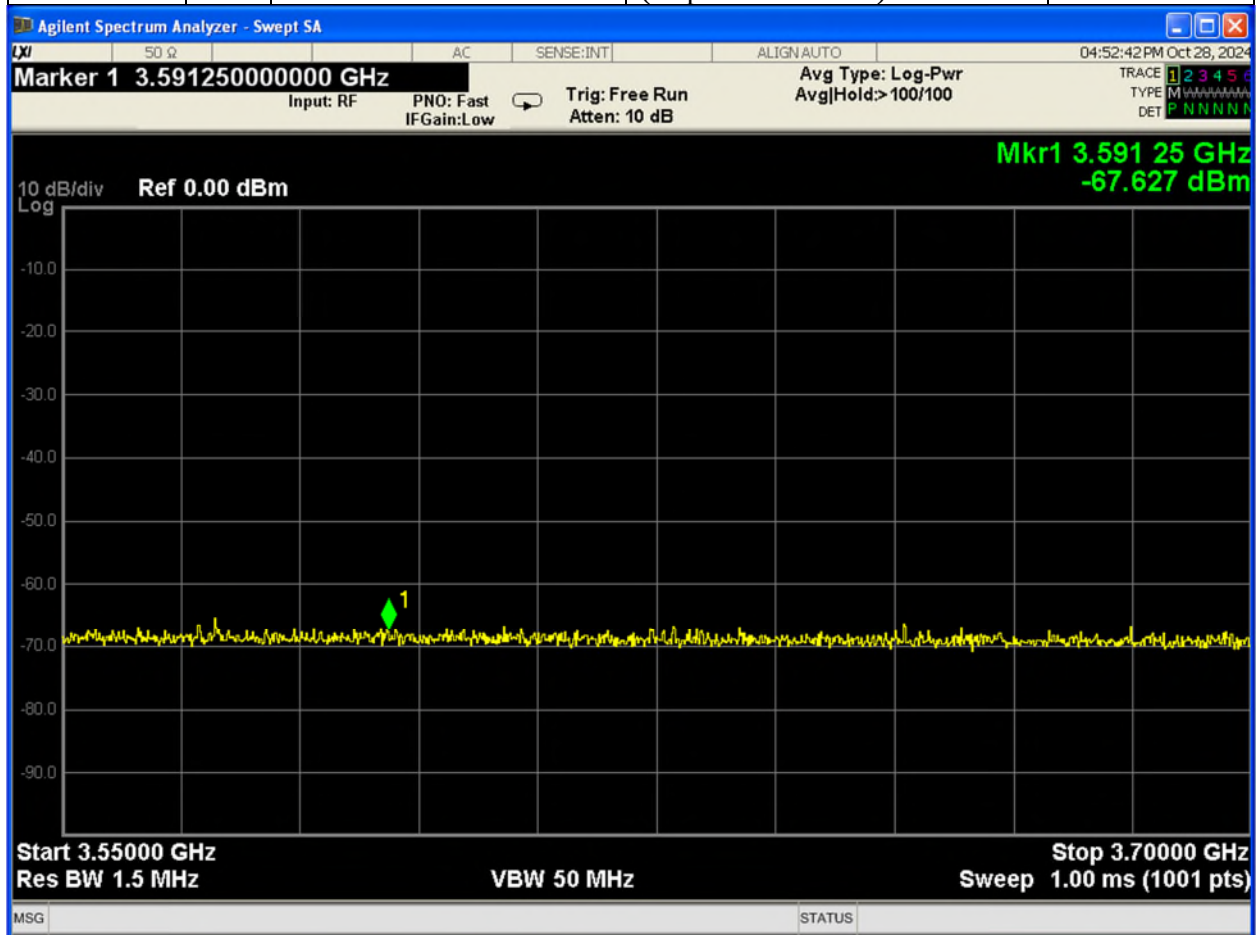
6.1.4.1.6	X	WINNF.FT.D.REG.6	Domain Proxy Single-Step registration for CBSD with CPI signed data	P
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Registration was received with CPI signed data. EUT did not transmit.

Client	NEC Corporation	
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Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	

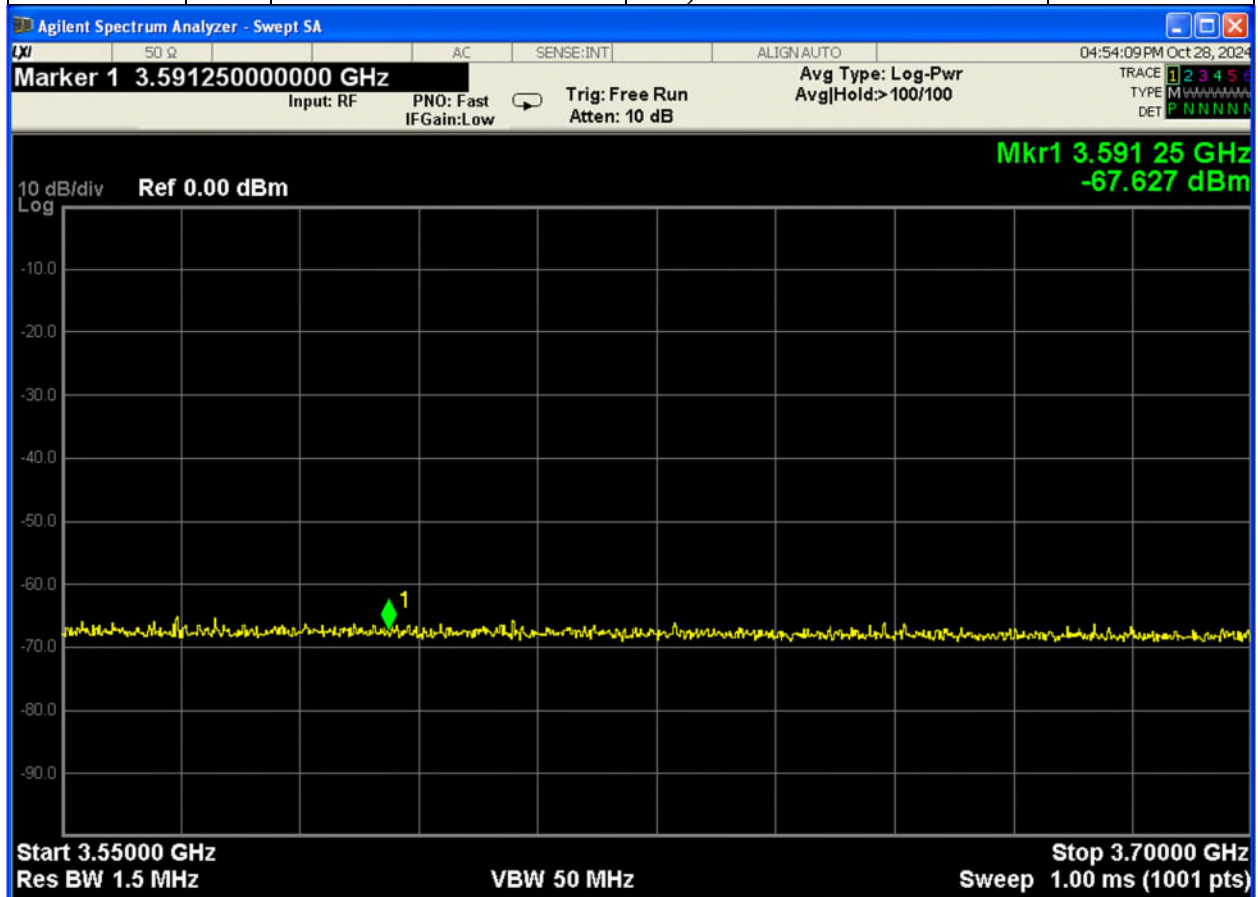
6.1.4.2.2	X	WINNF.FT.D.REG.9	Domain Proxy Missing Required parameters (responseCode 102)	P
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Domain Proxy Missing Required parameters (responseCode 102) was verified by logs. The EUT did not transmit.

Client	NEC Corporation	
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Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	

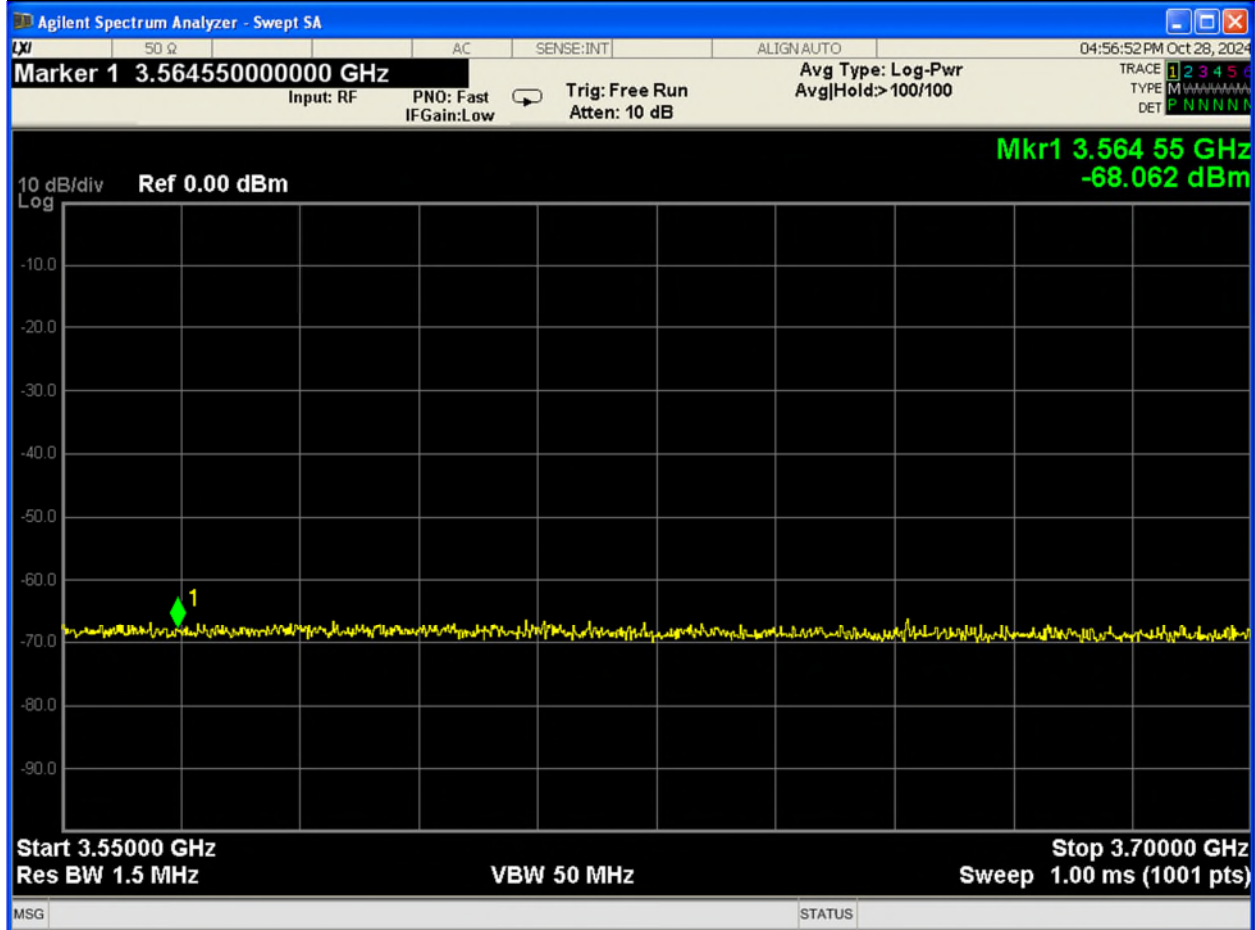
6.1.4.2.4	X	WINNF.FT.D.REG.11	Domain Proxy Pending registration (responseCode 200)	P
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Domain Proxy Pending registration (responseCode 200) was verified by logs. The EUT did not transmit

Client	NEC Corporation	
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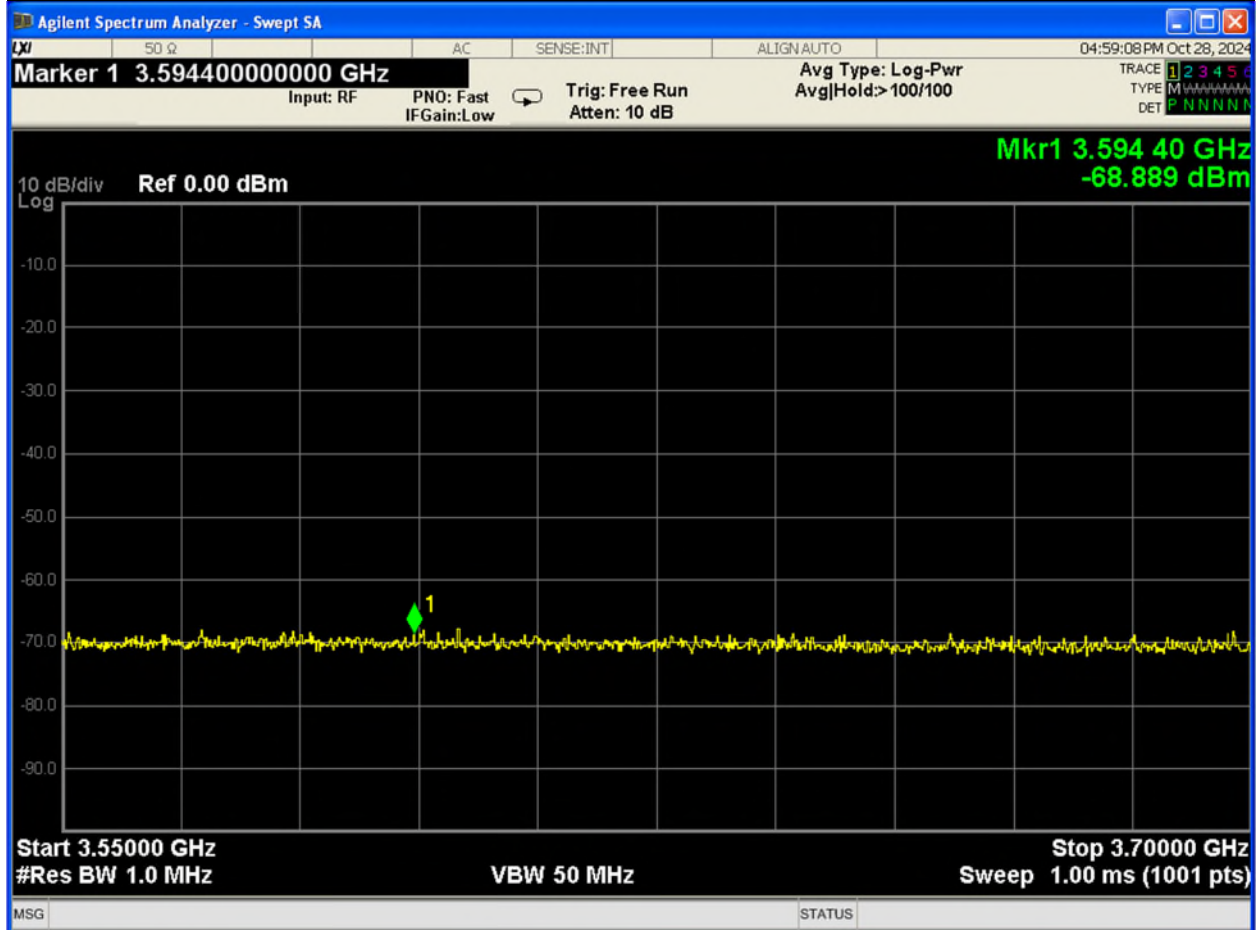
6.1.4.2.6	X	WINNF.FT.D.REG.13	Domain Proxy Invalid parameters (responseCode 103)	P
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Domain Proxy Invalid parameters (responseCode 103) was verified via logs. The EUT did not transmit.

Client	NEC Corporation	
Product	PF54A0-mb480-05 Radio Unit	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	

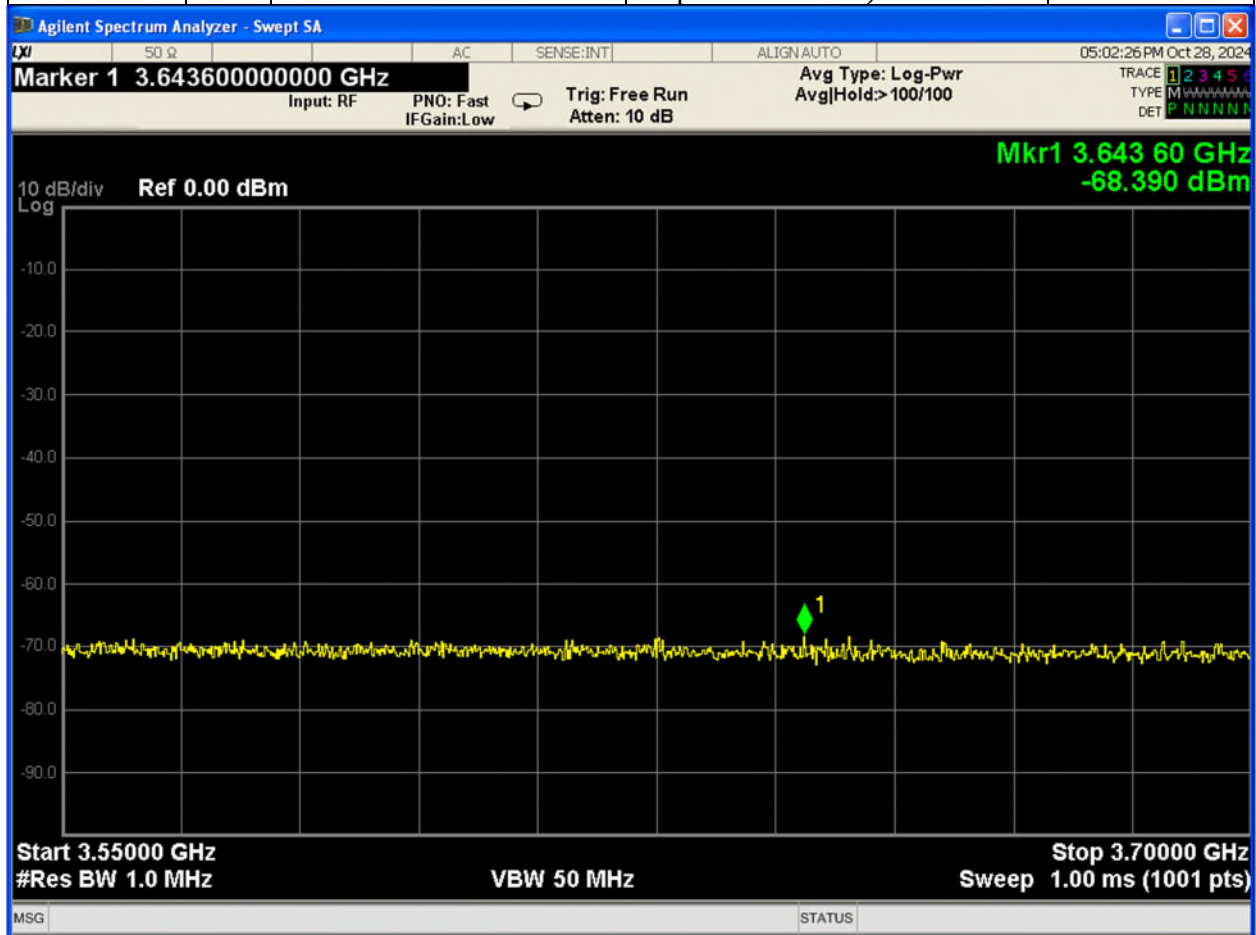
6.1.4.2.8	X	WINNF.FT.D.REG.15	Domain Proxy Blacklisted CBSD (responseCode 101)	P
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Domain Proxy Blacklisted CBSD (responseCode 101) was verified via logs. The EUT did not transmit.

Client	NEC Corporation	
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6.1.4.2.10	X	WINNF.FT.D.REG.17	Domain Proxy Unsupported SAS protocol version responseCode 100)	P
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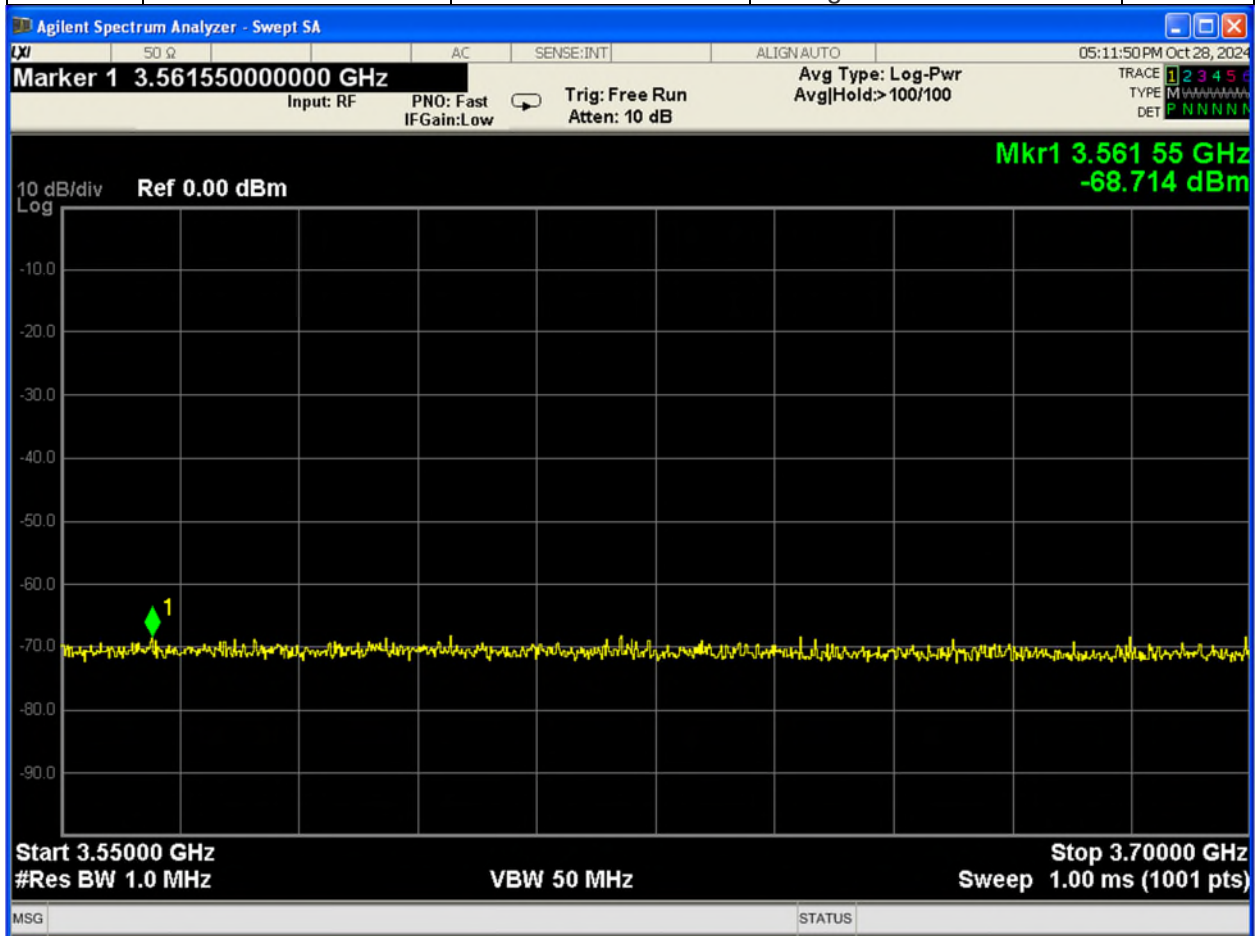
Domain Proxy Unsupported SAS protocol version (responseCode 100) was verified via logs. The EUT did not transmit.

Client	NEC Corporation	
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Grant

Check the device registration and authorization with the SAS,
Confirm that the device changes its operating power and/or channel in response to a command from the SAS and Confirm that the device correctly configures based on the different license classes.

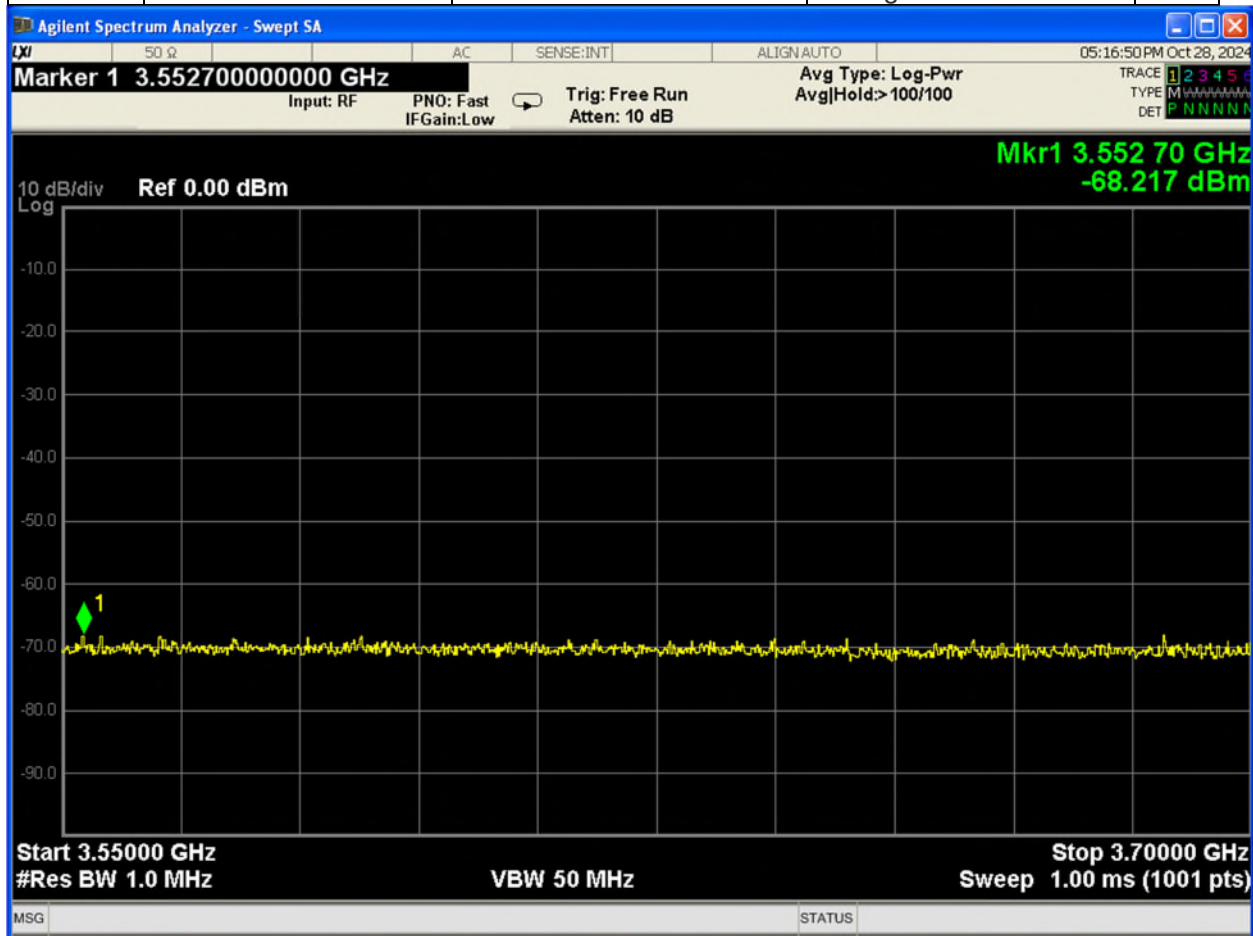
6.3.4.2.1	WINNF.FT.C.GRA.1	Unsuccessful Grant responseCode=400 (INTERFERENCE)	Monitor for 60 seconds after REG message sent. No transmission during test.	P
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Unsuccessful Grant responseCode=400 (INTERFERENCE) was verified via logs. The EUT was monitored for greater than 60 seconds after REG message sent. No transmissions during test occurred.

Client	NEC Corporation	
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6.3.4.2.2	WINNF.FT.C.GRA.2	Unsuccessful Grant responseCode=401 (GRANT_CONFLICT)	Monitor for 60 seconds after REG message sent. No transmission during test.	P
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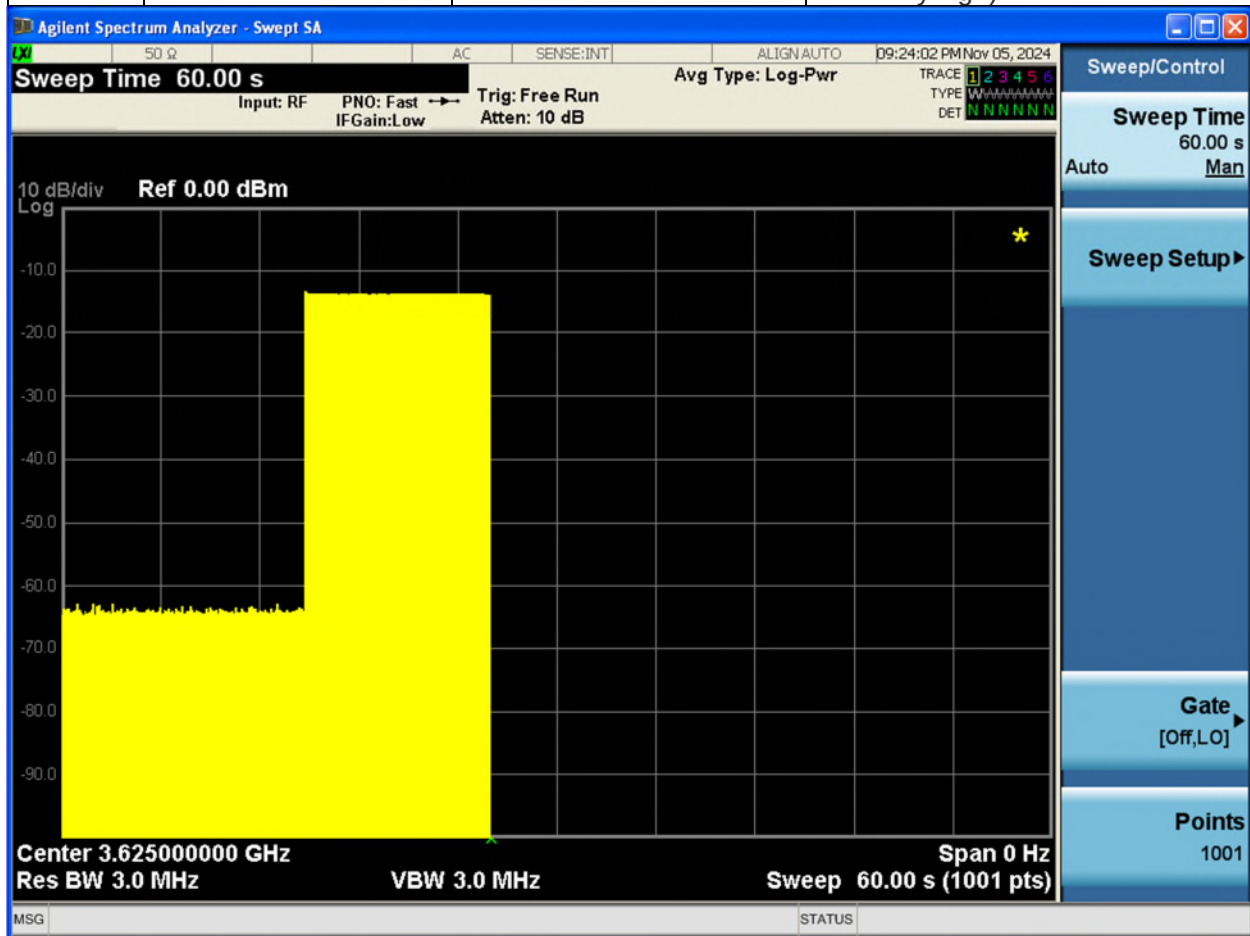


Unsuccessful Grant responseCode=401 (GRANT_CONFLICT) was verified via logs. The EUT was monitored for 60 seconds after REG message sent. No transmissions were sent during test.

Client	NEC Corporation	
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Heartbeat

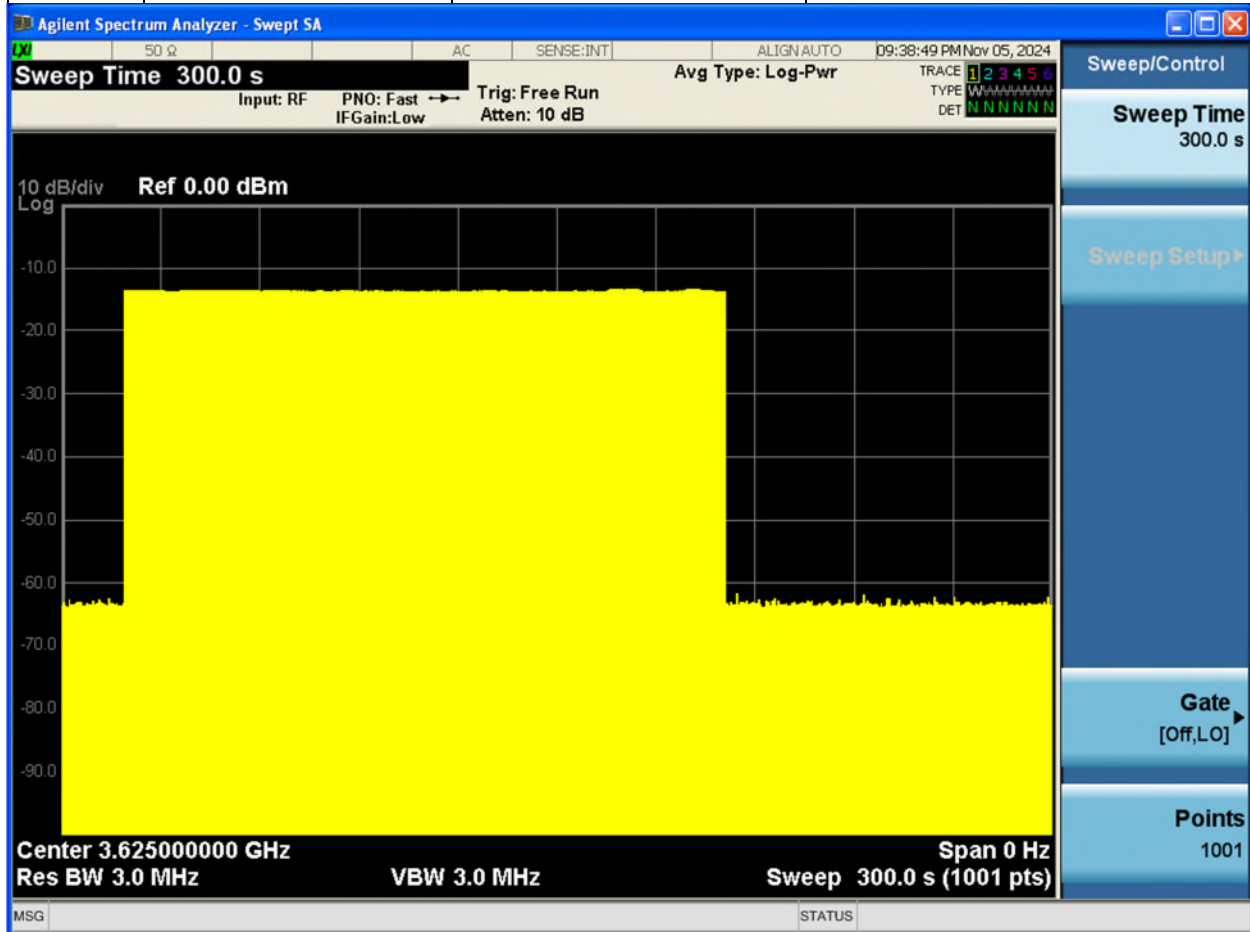
6.4.4.1.2	WINNF.FT.D.HBT.2	Domain Proxy Heartbeat Success Case (first Heartbeat Response)	Monitor RF from start of test. Ensure that: - Transmission does not start until time of first heartbeat response or after. - After transmission starts, measure that transmission is within the granted channel (frequencyLow, frequencyHigh)	P
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Test Harness logs and timing on graph was verified, the EUT passed the requirement.

Client	NEC Corporation	
Product	PF54A0-mb480-05 Radio Unit	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	

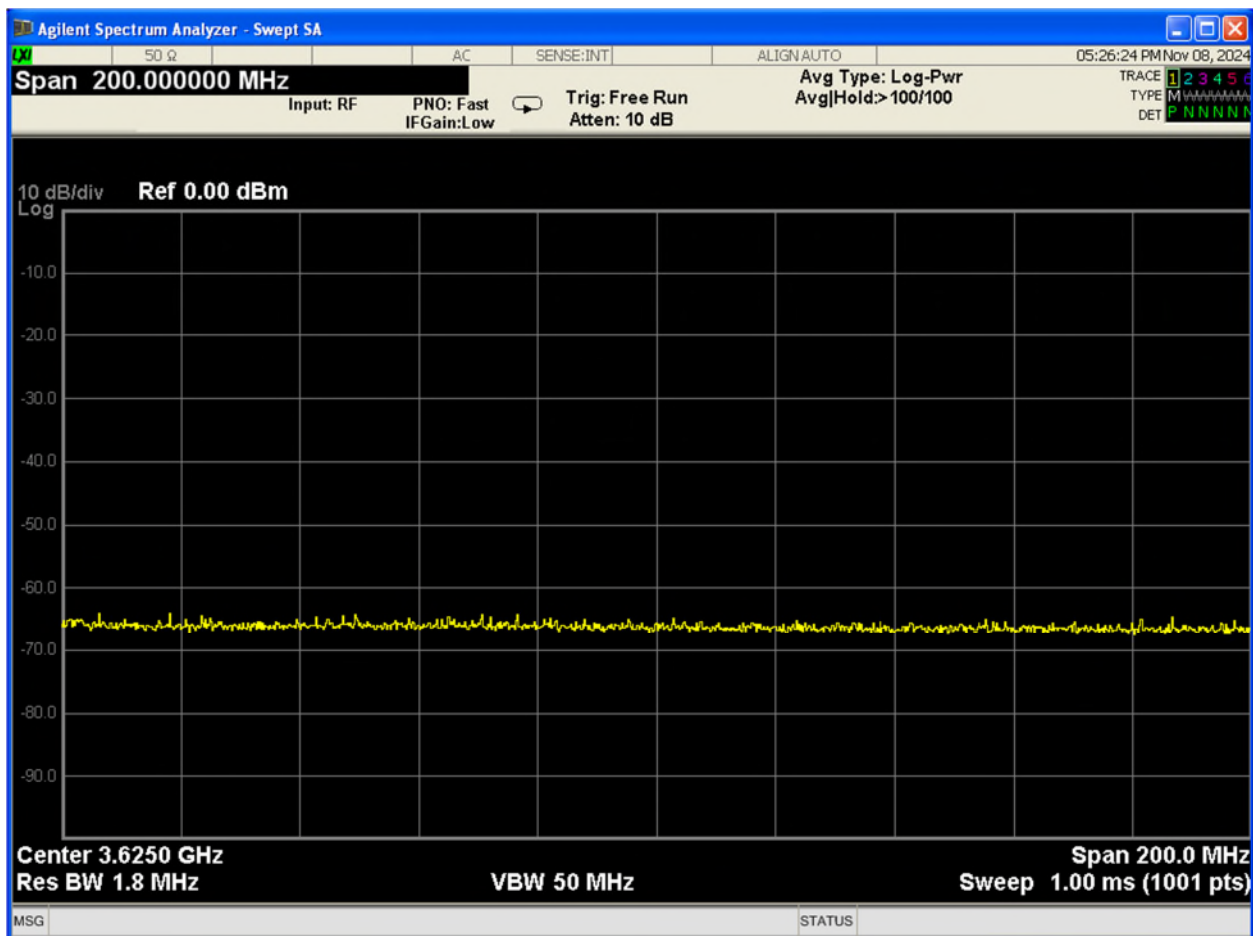
6.4.4.2.1	WINNF.FT.C.HBT.3	Heartbeat responseCode=105 (DEREGISTER)	Monitor RF transmission. Ensure that: CBSD stops transmission within 60 seconds of the heartbeatResponse which contains responseCode = 105	P
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Test Harness logs and timing on graph was verified, the EUT passed the requirement.

Client	NEC Corporation	
Product	PF54A0-mb480-05 Radio Unit	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	

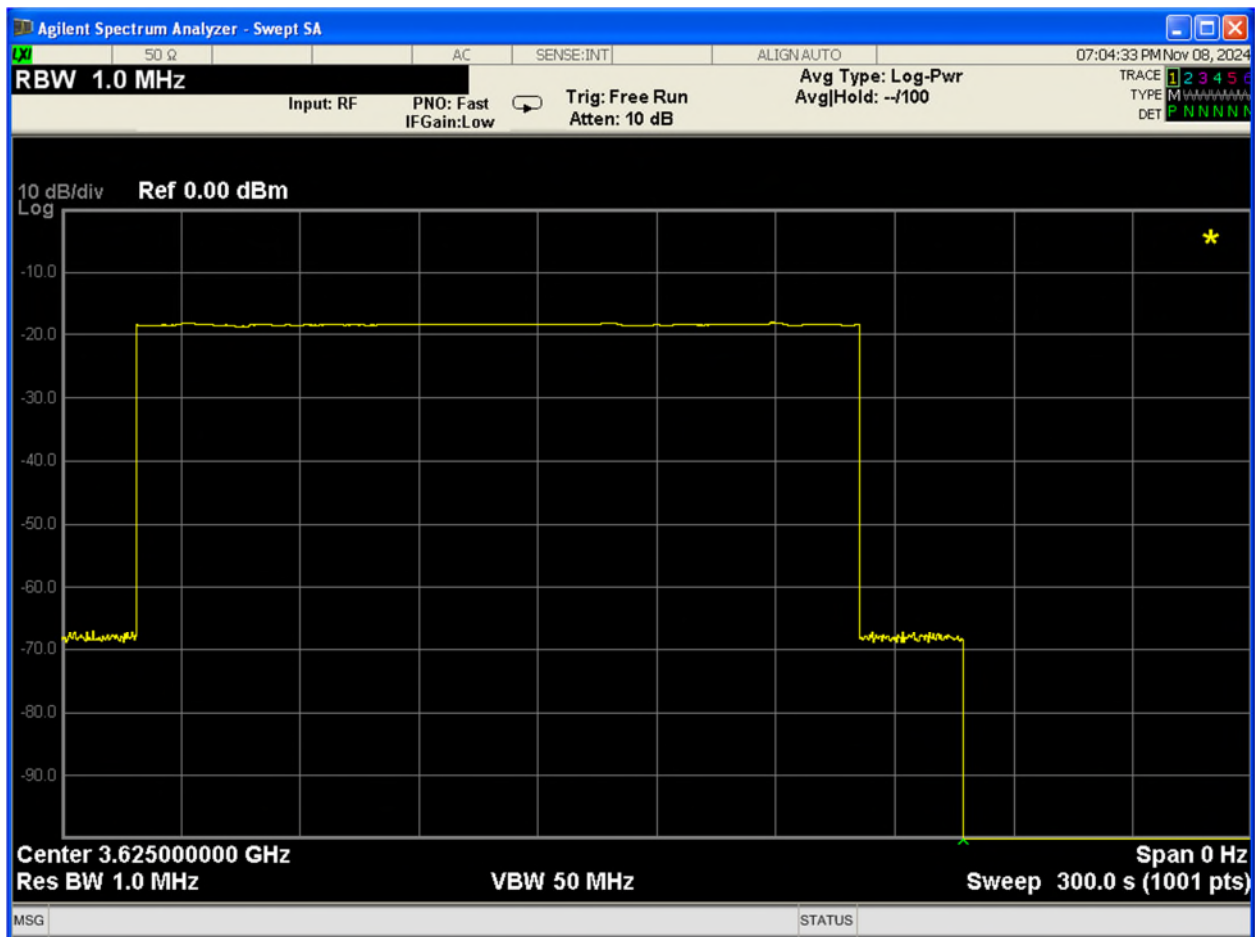
6.4.4.2.3	WINNF.FT.C.HBT.5	Heartbeat responseCode=501 (SUSPENDED_GRANT) in First Heartbeat Response	Monitor RF transmission from start of test. Ensure there is no transmission during the test	p
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Heartbeat responseCode=501 (SUSPENDED_GRANT) in First Heartbeat Response was verified via logs. RF transmissions were monitored from start of test and there was no transmission during the test

Client	NEC Corporation	
Product	PF54A0-mb480-05 Radio Unit	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	

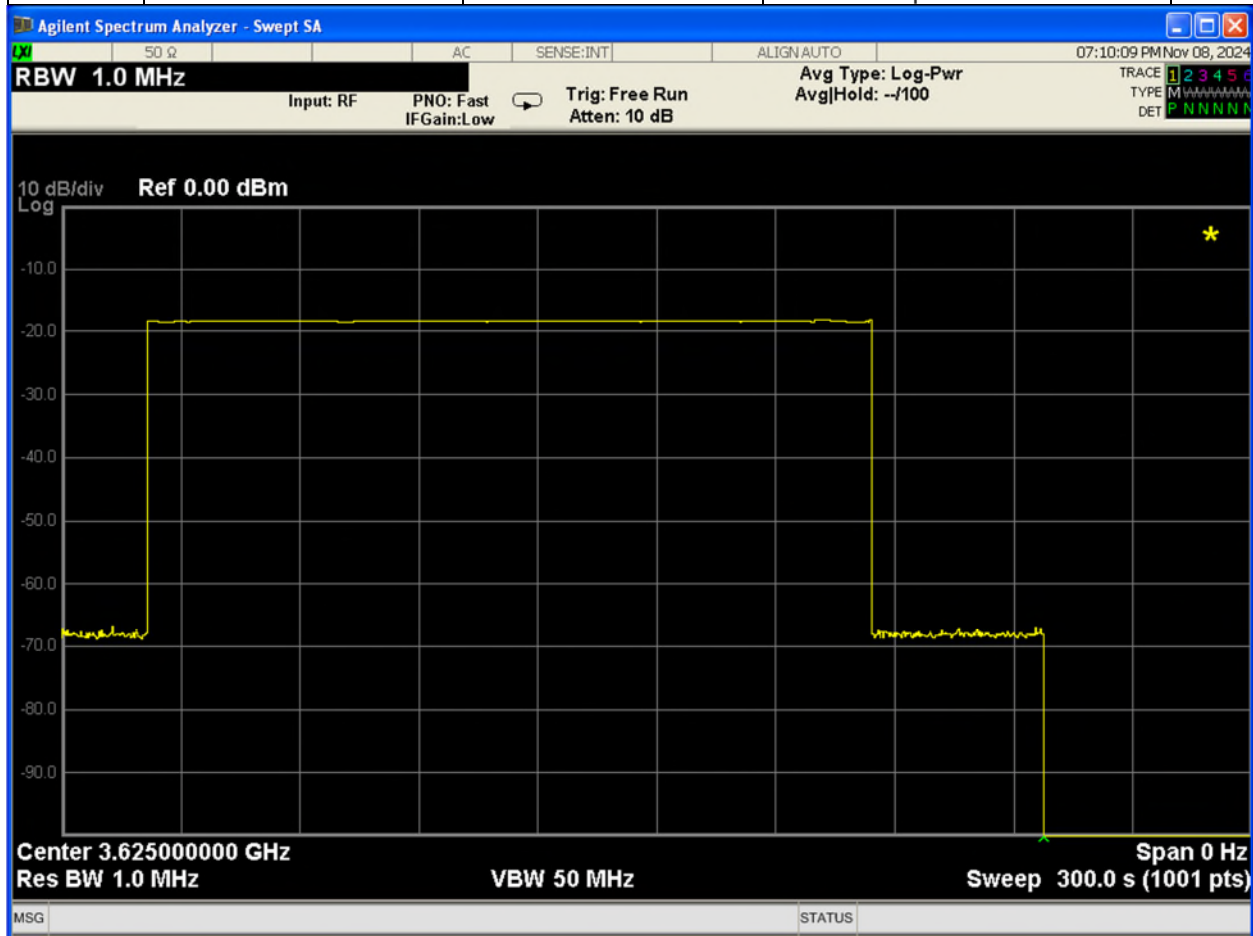
6.4.4.2.4	WINNF.FT.C.HBT.6	Heartbeat responseCode=501 (SUSPENDED_GRANT) in Subsequent Heartbeat Response	Monitor RF transmission. Ensure: CBSD stops transmission within 60 seconds of heartbeatResponse which contains responseCode=501	p
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Test Harness logs and timing on graph was verified, the EUT passed the requirement.

Client	NEC Corporation	
Product	PF54A0-mb480-05 Radio Unit	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	

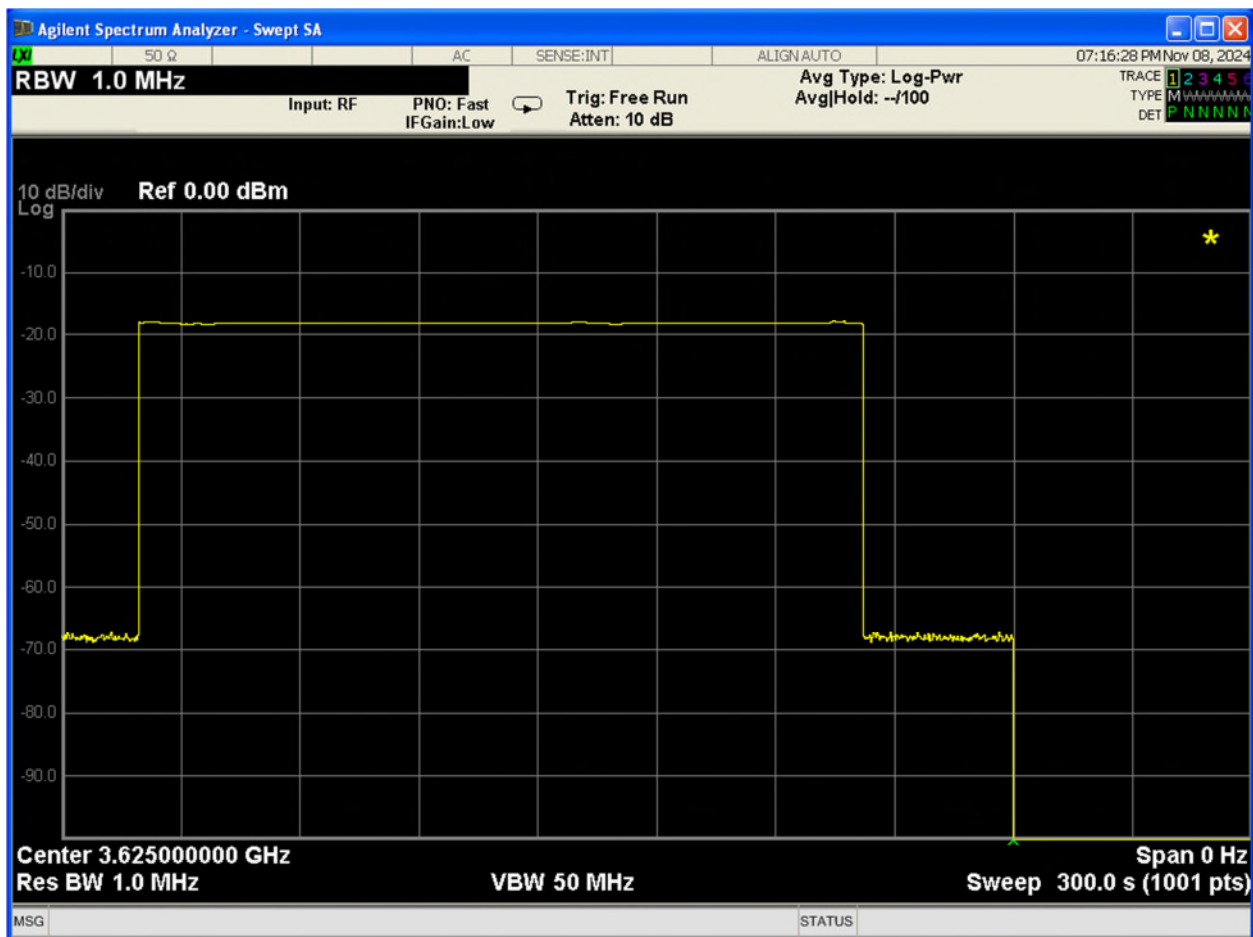
6.4.4.2.5	WINNF.FT.C.HBT.7	Heartbeat responseCode=502 (UNSYNC_OP_PAR AM)	Monitor RF transmission. Ensure: • CBSD stops transmission within 60 seconds of heartbeatResponse which contains responseCode=502	p
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Test Harness logs and timing on graph was verified, the EUT passed the requirement.

Client	NEC Corporation	
Product	PF54A0-mb480-05 Radio Unit	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	

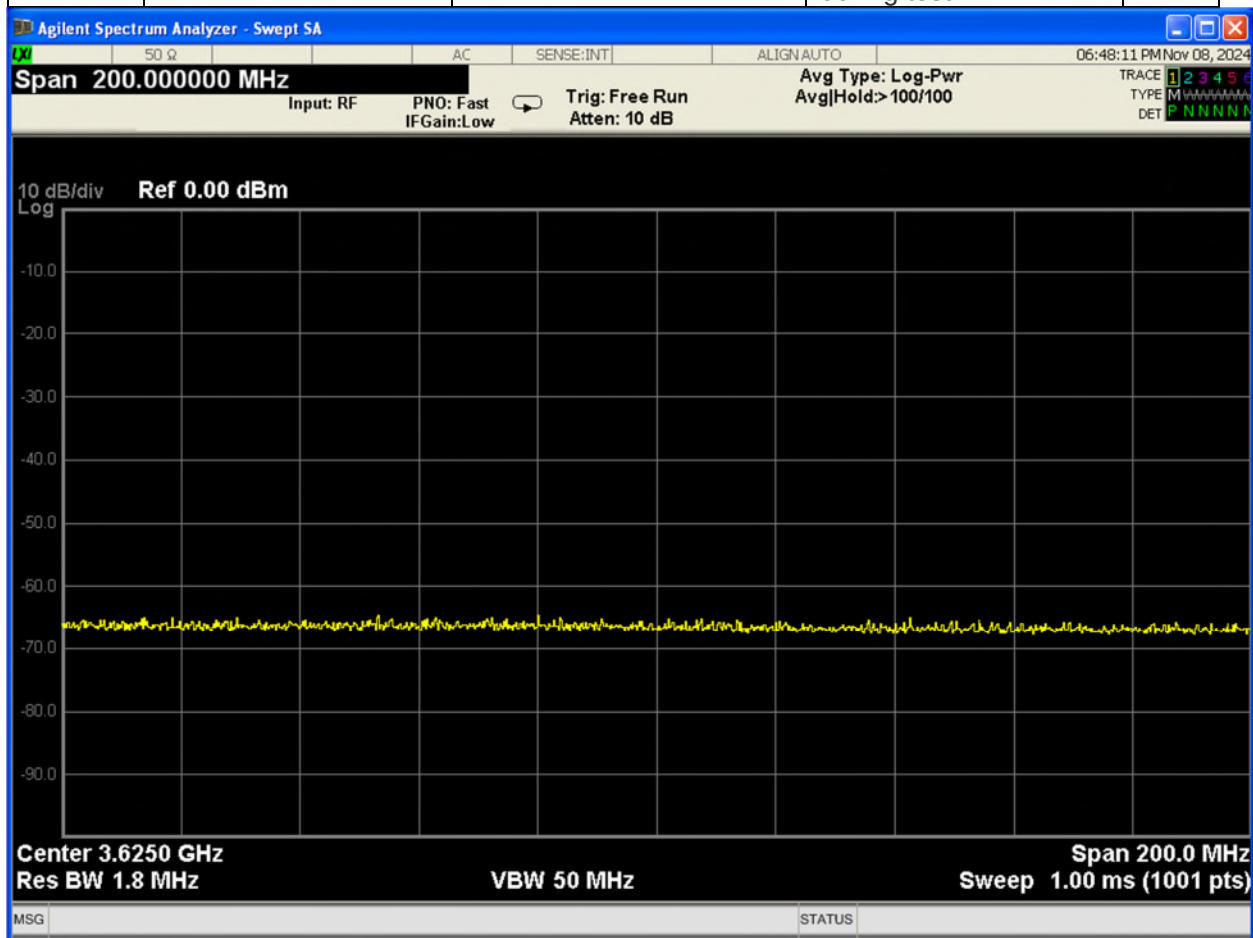
6.4.4.2.6	--	X	WINNF.FT.D.H BT.8	Domain Proxy Heartbeat responseCode=500 (TEMINATED_GR ANT)	Monitor RF transmission. CBSDs will have different behavior: • CBSD1: will continue to transmit to end of test (this is not a pass/fail criteria, but check) • CBSD2: must stop transmission within 60 seconds of being sent heartbeatResponse with responseCode = 500	P
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Graph showing CBSD 2. Test Harness logs and timing on graph was verified, the EUT passed the requirement.

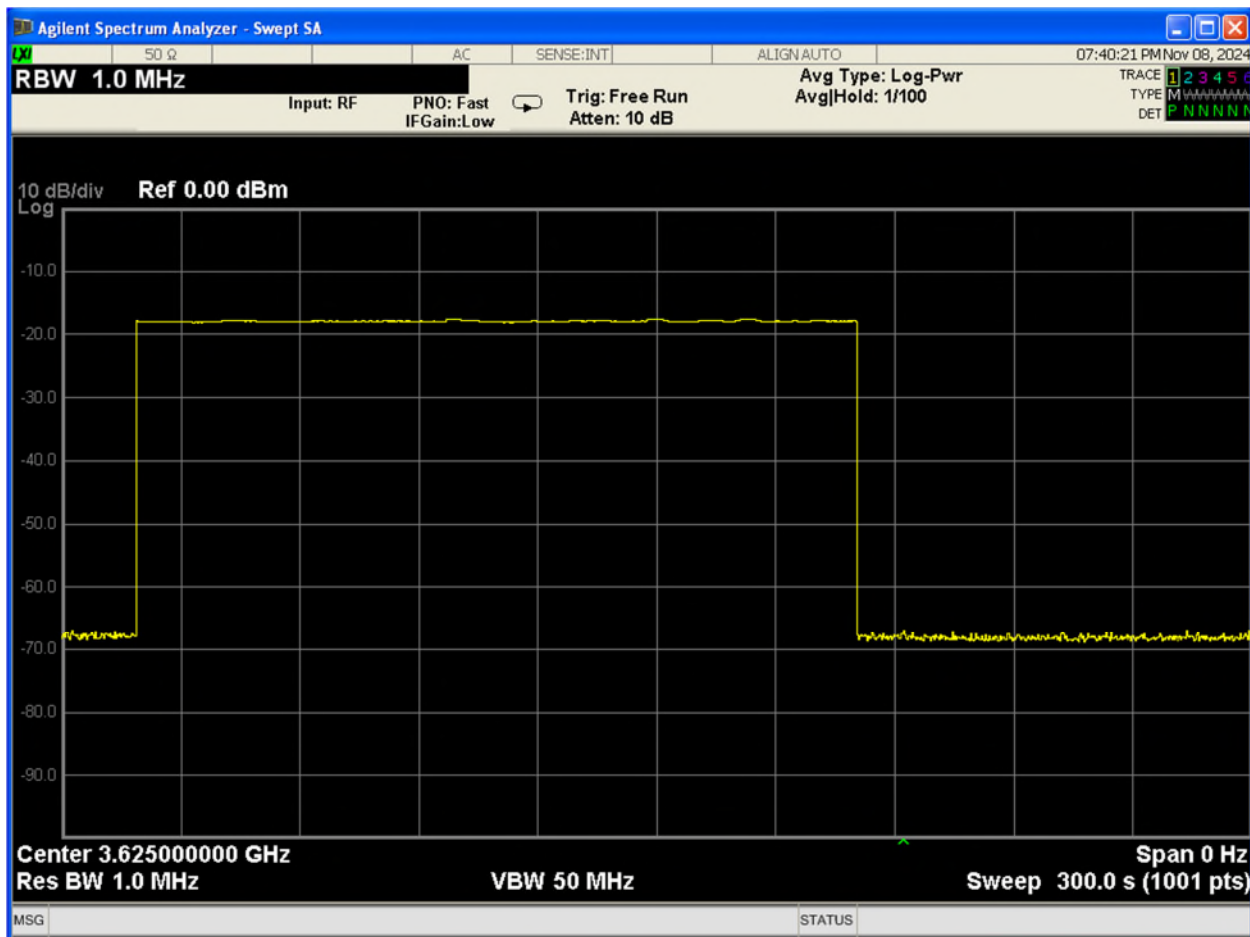
Client	NEC Corporation	
Product	PF54A0-mb480-05 Radio Unit	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	

6.4.4.3. 1	WINNF.FT.C.HBT.9	Heartbeat Response Absent (First Heartbeat)	Monitor RF from start of test to 60 seconds after last heartbeatResponse message was sent. CBSD should not transmit at any time during test	P
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Client	NEC Corporation	
Product	PF54A0-mb480-05 Radio Unit	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	

6.4.4.3.2	WINNF.FT.C.HBT.10	Heartbeat Response Absent (Subsequent Heartbeat)	Monitor RF transmission. Verify: CBSD must stop transmission within transmitExpireTime +60 seconds, where transmitExpireTime is from last successful heartbeatResponse message	P
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Test Harness logs and timing on graph was verified, the EUT passed the requirement.

Client	NEC Corporation	
Product	PF54A0-mb480-05 Radio Unit	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	

Measurement

6.5.4.2.3	WINNF.FT.C.MES.3	Grant Response contains measReportConfig	No RF monitoring	P
-----------	------------------	--	------------------	---

Pass. “measreportconfig” in logs. All other requirements verified.

Client	NEC Corporation	
Product	PF54A0-mb480-05 Radio Unit	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	

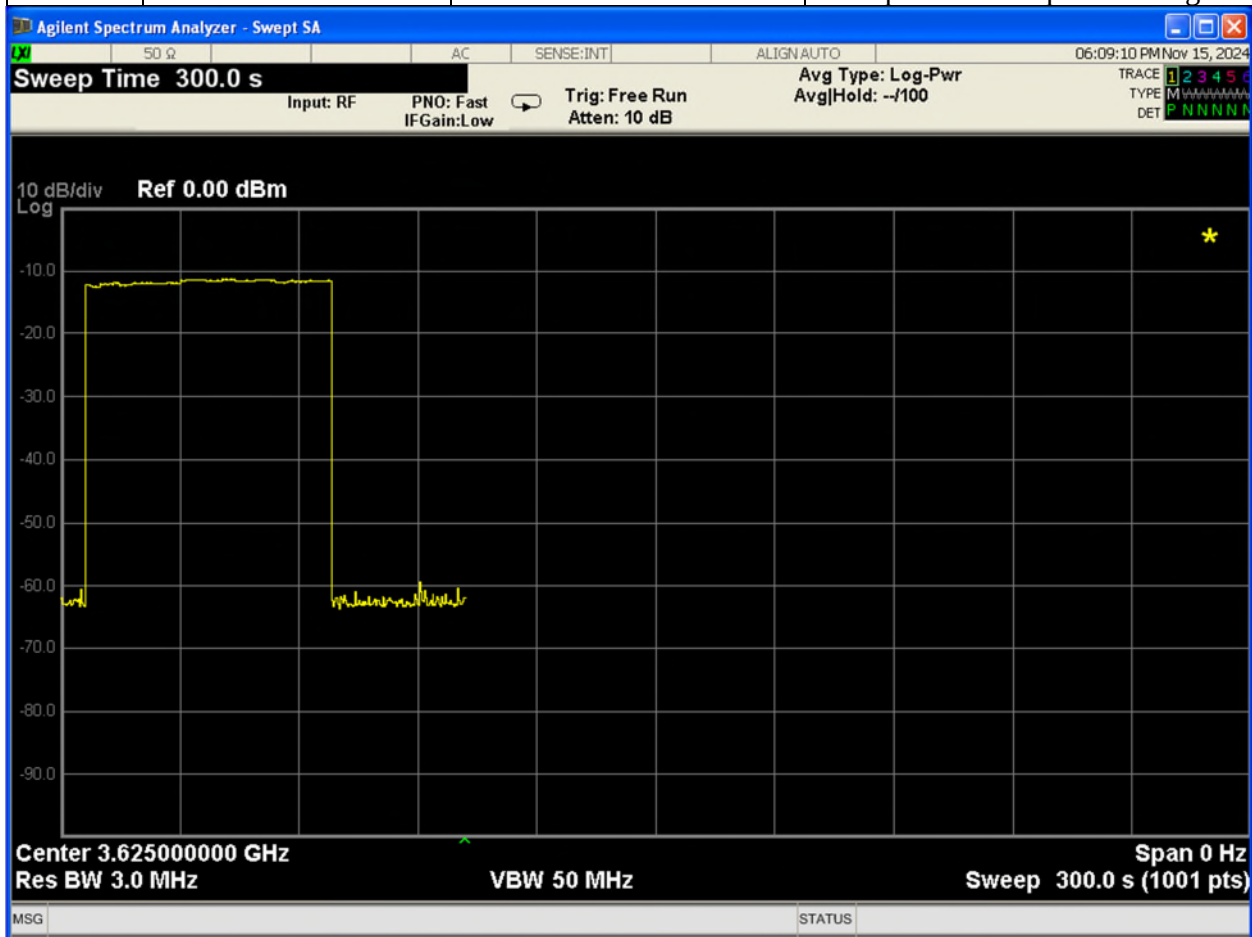
6.5.4.2.5	WINNF.FT.D.MES.5	Domain Proxy Heartbeat Response contains measReportConfig	No RF monitoring	P
-----------	------------------	---	------------------	---

Pass. “measreportconfig” in logs. All other requirements verified.

Client	NEC Corporation	
Product	PF54A0-mb480-05 Radio Unit	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	

Relinquishment

6.6.4.1.2	WINNF.FT.D.RLQ.2	Domain Proxy Successful Relinquishment	Monitor RF transmission. Ensure: • CBSD stops transmission at any time prior to sending the relinquishmentRequest message.	P
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Test Harness logs and timing on graph was verified, the EUT passed the requirement.

Shutdown time taken from Domain Proxy logs, and shutdown confirmed by RF monitoring.

Client	NEC Corporation	
Product	PF54A0-mb480-05 Radio Unit	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	

Deregistration

6.7.4.1.2	WINNF.FT.D.DRG.2	Domain Proxy Successful Deregistration	Monitor RF transmission. Ensure: • CBSD stops transmission at any time prior to sending the relinquishmentRequest message or deregistrationRequest message (whichever is sent first)	P
-----------	------------------	--	--	---

Test Harness logs and timing on graph was verified, the EUT passed the requirement.

Shutdown time taken from Domain Proxy logs, and shutdown confirmed by RF monitoring.

Client	NEC Corporation	
Product	PF54A0-mb480-05 Radio Unit	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	

Power level

7.1.4.1.1	X	X	WINNF.PT.C.H BT	UUT RF Transmit Power Measurement	Power Spectral Density test case. Measure at max transmit power	P
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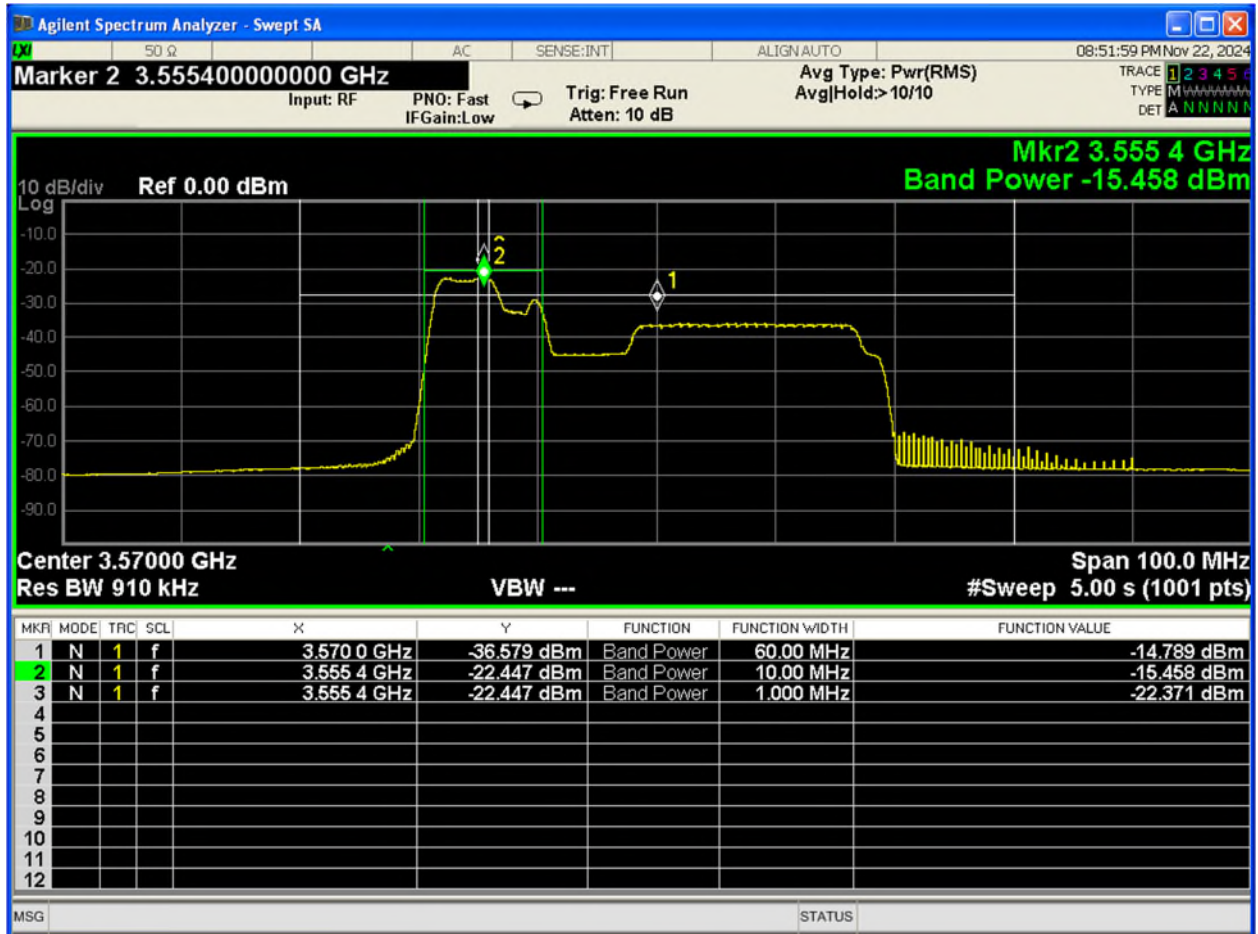
Test Table

	Raw	Raw	External	Raw				EIRP 10 MHz	EIRP 1MHz	1MHz EIRP limit (target) dBm	margin
Freq	10 MHz	1MHz	Losses (dB)	dBm/MHz	antenna gain dBi	ports	port gain (dB)	dBm	dBm/MHz		dB
3570	-15.4	-22.4	25.1	2.7	10.8	2	3	23.5	16.5	24	7.5
3625	-15.2	-22.2	25.1	2.9	10.8	2	3	23.7	16.7	24	7.3
3680	-15.2	-22.3	25.1	2.8	10.8	2	3	23.7	16.6	24	7.4

Note: testing was performed using max hold of average as worst case.

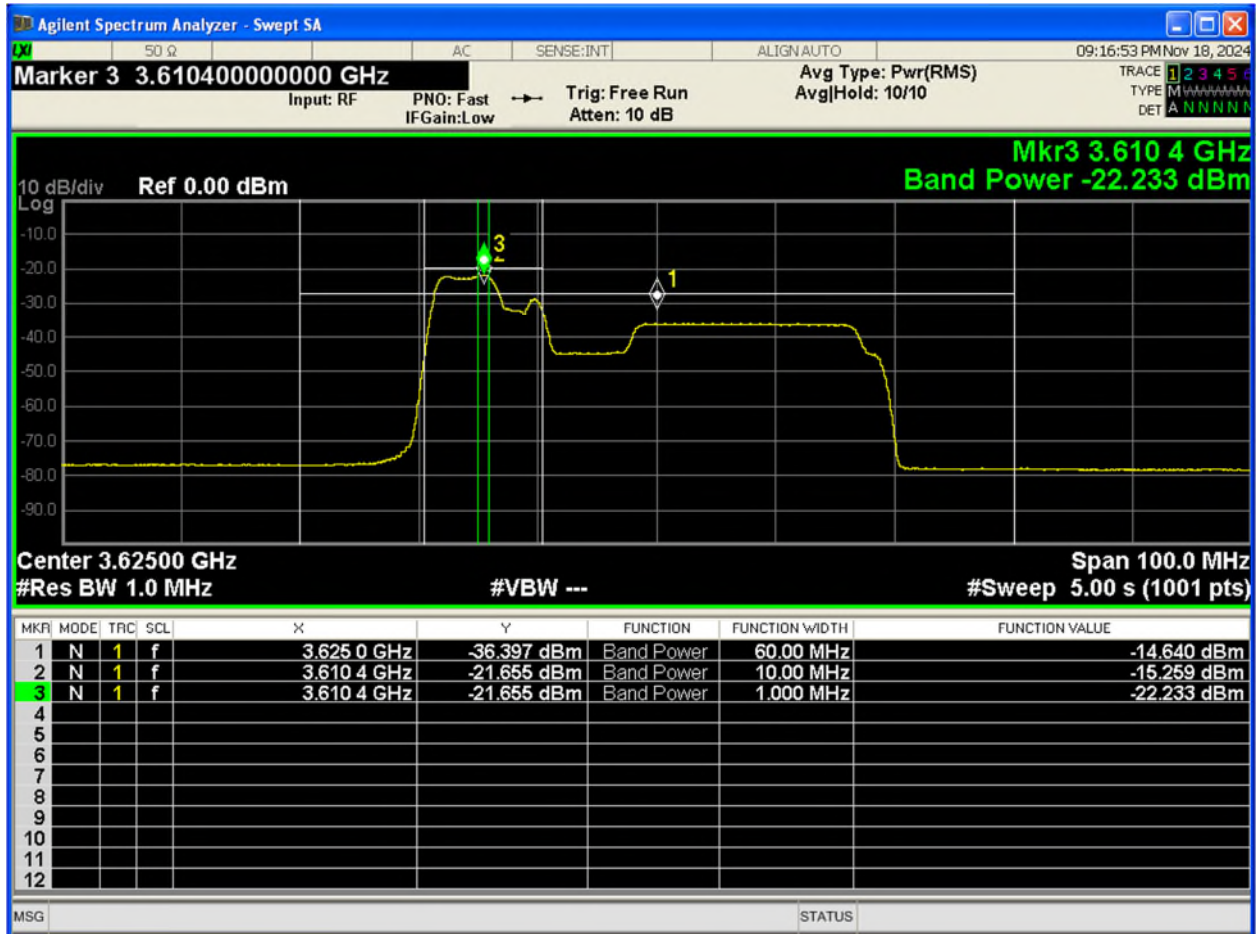
Client	NEC Corporation	
Product	PF54A0-mb480-05 Radio Unit	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	

3570



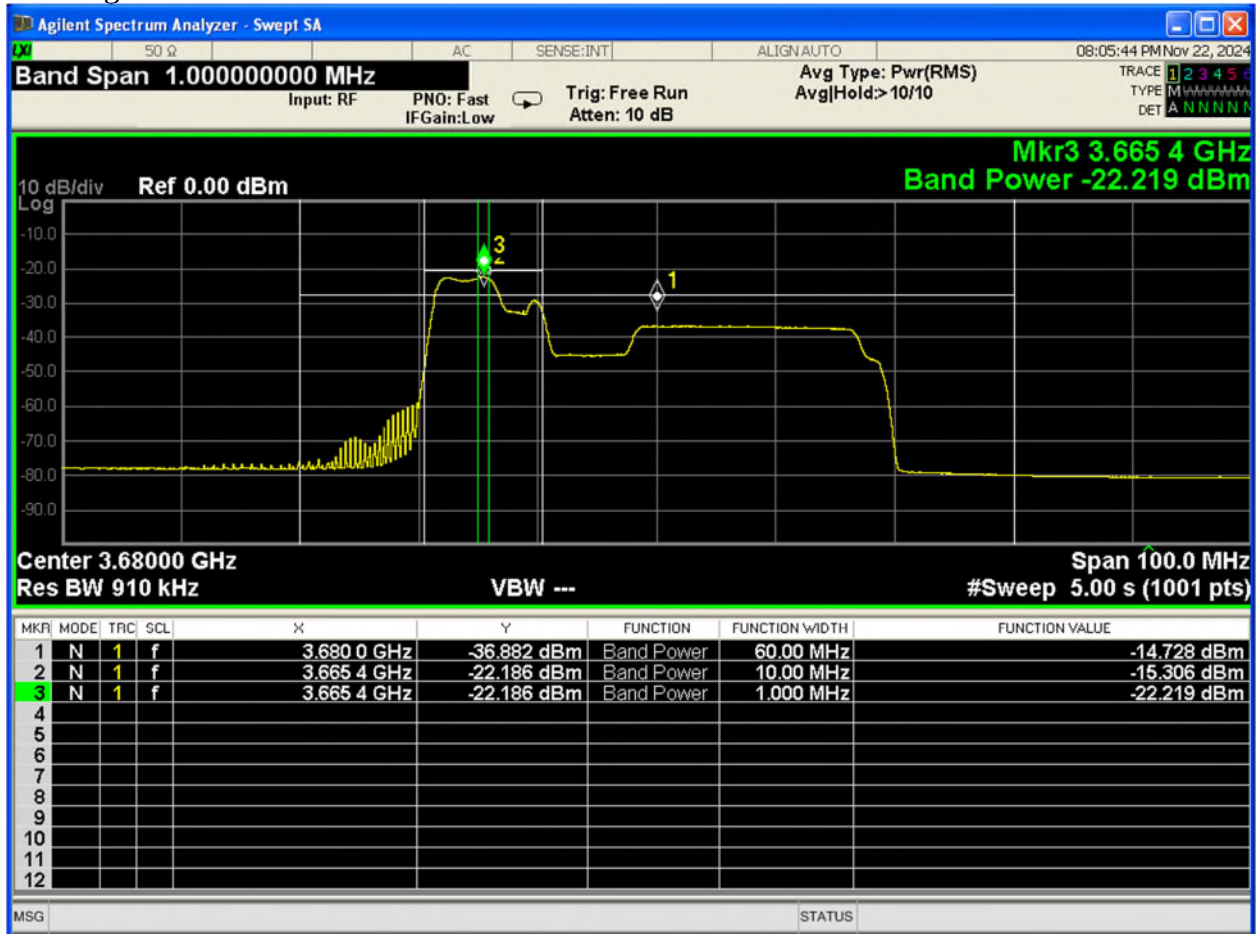
Client	NEC Corporation	
Product	PF54A0-mb480-05 Radio Unit	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	

3625 mid



Client	NEC Corporation	
Product	PF54A0-mb480-05 Radio Unit	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	

3680 high



Client	NEC Corporation	
Product	PF54A0-mb480-05 Radio Unit	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	

DOT CBRS Radio: WINNF / Security Test Case Analysis

WINNF Security Test Case Analysis

Client	NEC Corporation	
Product	PF54A0-mb480-05 Radio Unit	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	

WINNF.FT.C.SCS.1

WINNF test requirements:

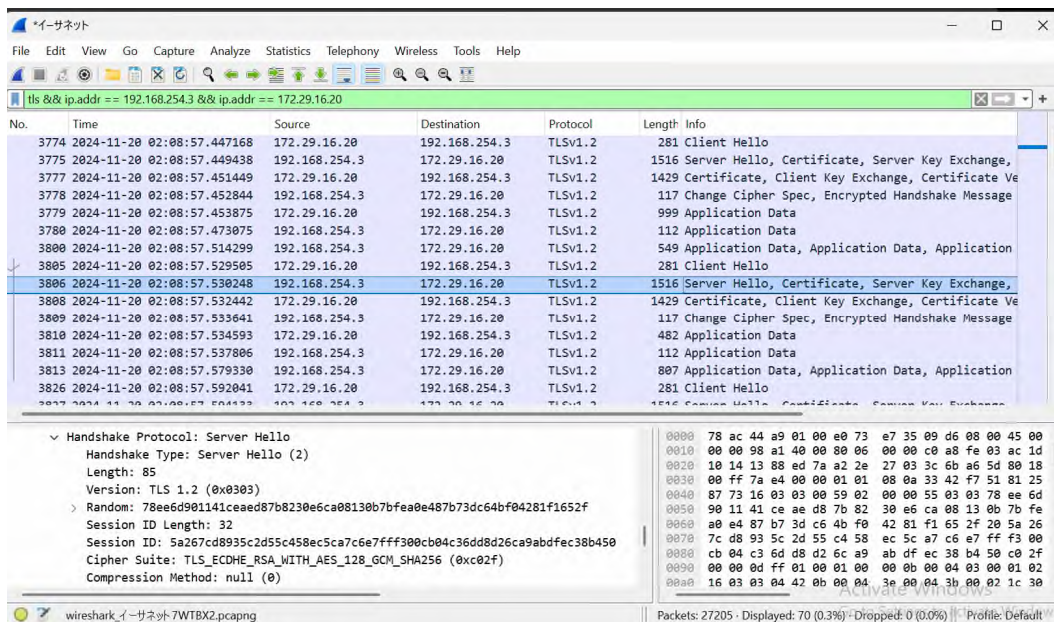
WINNF test requirements from WINNF-TS-0122-V1.0.2 CBRS CBSD Test Specification:

2	• Make sure that Mutual authentication happens between UUT and the SAS Test Harness. • Make sure that UUT uses TLS v1.2 • Make sure that cipher suites from one of the following is selected, • TLS_RSA_WITH_AES_128_GCM_SHA256 • TLS_RSA_WITH_AES_256_GCM_SHA384 • TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256 • TLS_ECDHE_ECDSA_WITH_AES_256_GCM_SHA384 • TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256	PASS
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Client	NEC Corporation	
Product	PF54A0-mb480-05 Radio Unit	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	

Analysis of WINNF Test Requirements

1. From Client Hello: TLS version = TLS 1.2
2. Cipher suite list from Client Hello is from WINNF approved list:
 TLS_RSA_WITH_AES_128_GCM_SHA256
 TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256
 TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256
3. Cipher suite chosen (from Server Hello):
 TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256



No.	Time	Source	Destination	Protocol	Length	Info
3774	2024-11-20 02:08:57.447168	172.29.16.20	192.168.254.3	TLSv1.2	281	Client Hello
3775	2024-11-20 02:08:57.449438	192.168.254.3	172.29.16.20	TLSv1.2	1516	Server Hello, Certificate, Server Key Exchange,
3777	2024-11-20 02:08:57.451449	172.29.16.20	192.168.254.3	TLSv1.2	1429	Certificate, Client Key Exchange, Certificate Ve
3778	2024-11-20 02:08:57.452844	192.168.254.3	172.29.16.20	TLSv1.2	117	Change Cipher Spec, Encrypted Handshake Message
3779	2024-11-20 02:08:57.453875	172.29.16.20	192.168.254.3	TLSv1.2	999	Application Data
3780	2024-11-20 02:08:57.473075	192.168.254.3	172.29.16.20	TLSv1.2	112	Application Data
3800	2024-11-20 02:08:57.514299	192.168.254.3	172.29.16.20	TLSv1.2	549	Application Data, Application Data, Application
3805	2024-11-20 02:08:57.529505	172.29.16.20	192.168.254.3	TLSv1.2	281	Client Hello
3806	2024-11-20 02:08:57.530248	192.168.254.3	172.29.16.20	TLSv1.2	1516	Server Hello, Certificate, Server Key Exchange,
3808	2024-11-20 02:08:57.532442	172.29.16.20	192.168.254.3	TLSv1.2	1429	Certificate, Client Key Exchange, Certificate Ve
3809	2024-11-20 02:08:57.533641	192.168.254.3	172.29.16.20	TLSv1.2	117	Change Cipher Spec, Encrypted Handshake Message
3810	2024-11-20 02:08:57.534593	172.29.16.20	192.168.254.3	TLSv1.2	482	Application Data
3811	2024-11-20 02:08:57.537806	192.168.254.3	172.29.16.20	TLSv1.2	112	Application Data
3813	2024-11-20 02:08:57.579330	192.168.254.3	172.29.16.20	TLSv1.2	807	Application Data, Application Data, Application
3826	2024-11-20 02:08:57.592041	172.29.16.20	192.168.254.3	TLSv1.2	281	Client Hello

Handshake Protocol: Server Hello	Hex Data
Handshake Type: Server Hello (2)	0000 78 ac 44 a9 01 00 e0 73 e7 35 09 d6 08 00 45 00
Length: 85	0010 00 00 98 a1 40 00 00 06 00 00 c0 a8 fe 03 ac 1d
Version: TLS 1.2 (0x0303)	0020 10 14 13 88 ed 7a a2 2e 27 03 3c 6b a6 5d 80 18
Random: 78ee6d901141ceaed87b8230e6ca08130b7bfea0e487b73dc64bf04281f1652f	0030 00 ff 7a e4 00 00 01 01 08 0a 33 42 f7 51 81 25
Session ID Length: 32	0040 87 73 16 03 03 00 59 02 00 00 55 03 03 78 ee 6d
Session ID: 5a267cd8935c2d55c458ec5ca7c6e7fff300cb04c36dd8d26ca9abdfec38b450	0050 90 11 41 ce ae d8 7b 82 30 e6 ca 08 13 0b 7b fe
Cipher Suite: TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256 (0xc02f)	0060 a0 e4 87 b7 3d c6 4b f0 42 81 f1 65 2f 20 5a 26
Compression Method: null (0)	0070 7c d8 93 5c 2d 55 c4 58 ec 5c a7 c6 e7 ff f3 00

4. The Registration request message arrived at the Test Harness, so authentication was completed.

Client	NEC Corporation	
Product	PF54A0-mb480-05 Radio Unit	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	

WINNF.FT.C.SCS.2

WINNF Test Requirements:

TLS failure due to revoked certificate.

WINNF test requirements from WINNF-TS-0122-V1.0.2 CBRS CBSD Test Specification:

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
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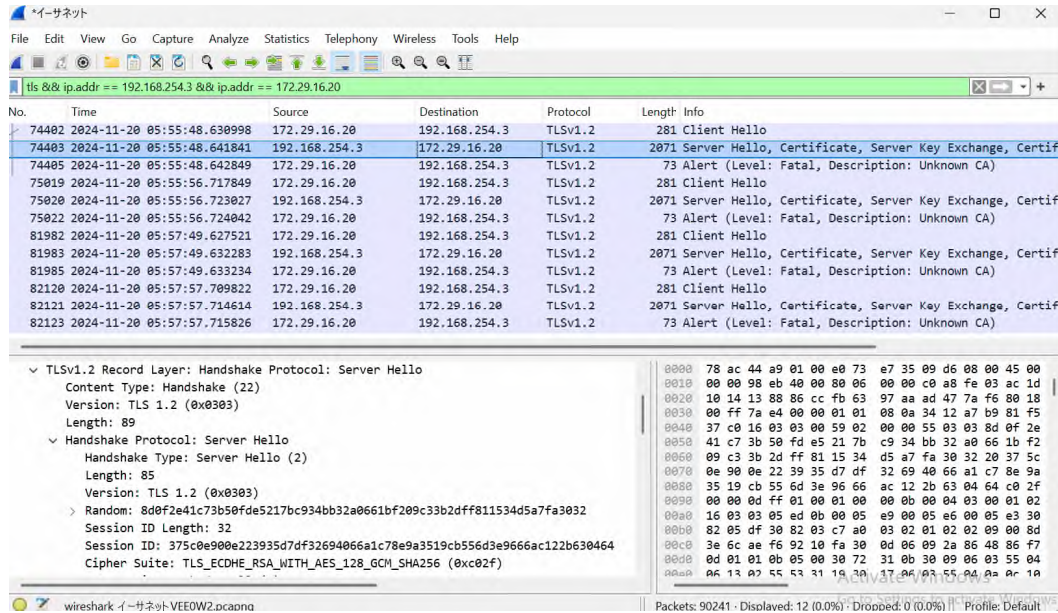
Analysis of WINNF Test Requirements

1. From Client Hello can read: TLS version = TLS 1.2
2. From Client Hello, cipher suite list is from WINNF approved list:

TLS_RSA_WITH_AES_128_GCM_SHA256
 TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256
TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256

3. From Server Hello, cipher suite chosen:
TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256
4. Read OSCP Request/Response to/from server.
Verified.
5. Authentication exchange ends with TLS Alert message (i.e. authentication fails):

Client	NEC Corporation	
Product	PF54A0-mb480-05 Radio Unit	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	



The image shows a Wireshark capture of network traffic. The top pane displays a list of packets, with several TLSv1.2 messages highlighted. The bottom pane shows the details of a selected TLSv1.2 record, including the handshake protocol and alert messages. The alert message is a 'Fatal' alert with the description 'Unknown CA'.

No.	Time	Source	Destination	Protocol	Length	Info
74402	2024-11-20 05:55:48.630998	172.29.16.20	192.168.254.3	TLSv1.2	281	Client Hello
74403	2024-11-20 05:55:48.641841	192.168.254.3	172.29.16.20	TLSv1.2	2071	Server Hello, Certificate, Server Key Exchange, Certif
74405	2024-11-20 05:55:48.642849	172.29.16.20	192.168.254.3	TLSv1.2	73	Alert (Level: Fatal, Description: Unknown CA)
75019	2024-11-20 05:55:56.717849	172.29.16.20	192.168.254.3	TLSv1.2	281	Client Hello
75020	2024-11-20 05:55:56.723027	192.168.254.3	172.29.16.20	TLSv1.2	2071	Server Hello, Certificate, Server Key Exchange, Certif
75022	2024-11-20 05:55:56.724042	172.29.16.20	192.168.254.3	TLSv1.2	73	Alert (Level: Fatal, Description: Unknown CA)
81982	2024-11-20 05:57:49.627521	172.29.16.20	192.168.254.3	TLSv1.2	281	Client Hello
81983	2024-11-20 05:57:49.632283	192.168.254.3	172.29.16.20	TLSv1.2	2071	Server Hello, Certificate, Server Key Exchange, Certif
81985	2024-11-20 05:57:49.633234	172.29.16.20	192.168.254.3	TLSv1.2	73	Alert (Level: Fatal, Description: Unknown CA)
82120	2024-11-20 05:57:57.709822	172.29.16.20	192.168.254.3	TLSv1.2	281	Client Hello
82121	2024-11-20 05:57:57.714614	192.168.254.3	172.29.16.20	TLSv1.2	2071	Server Hello, Certificate, Server Key Exchange, Certif
82123	2024-11-20 05:57:57.715826	172.29.16.20	192.168.254.3	TLSv1.2	73	Alert (Level: Fatal, Description: Unknown CA)

Details of 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: 80f2e41c73b50fde5217bc934bb32a0661bf209c33b2dff811534d5a7fa3032
- Session ID Length: 32
- Session ID: 375c0e900e223935d7df32694066a1c78e9a3519cb556d3e9666ac122b630464
- Cipher Suite: TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256 (0xc02f)

Hex dump of the alert message:

```

0000 78 ac 44 a9 01 00 e0 73 e7 35 09 d6 08 00 45 00
0010 00 00 98 ab 40 00 00 06 00 00 c0 a8 fe 03 ac 1d
0020 10 14 13 88 86 cc fb 63 97 aa ad 47 7a f6 80 18
0030 00 ff 7a e4 00 00 01 01 08 0a 34 12 a7 b9 81 f5
0040 37 c0 16 03 03 00 59 02 00 00 55 03 03 0d 0f 2e
0050 41 c7 3b 50 fd e5 21 7b c9 34 bb 32 a0 66 1b f2
0060 09 c3 3b 2d ff 81 15 34 d5 a7 fa 30 32 20 37 5c
0070 0e 90 0e 22 39 35 d7 df 32 69 40 66 a1 c7 8e 9a
0080 35 19 cb 55 6d 3e 96 66 ac 12 2b 63 04 64 c0 2f
0090 00 00 0d ff 01 00 01 00 00 0b 00 04 03 00 01 02
00a0 16 03 03 05 ed 0b 00 05 e9 00 05 e6 00 05 e3 30
00b0 82 05 df 30 82 03 c7 a0 03 02 01 02 02 09 00 8d
00c0 3e 6c ae f6 92 10 fa 30 0d 06 09 2a 86 48 86 f7
00d0 0d 01 01 0b 05 00 30 72 31 0b 30 09 06 03 55 04
00e0 06 12 07 55 52 21 18 10 17 06 03 55 04 0a 0a 1a

```

6. Registration request message is not received at Test Harness (authentication fails)

Client	NEC Corporation	
Product	PF54A0-mb480-05 Radio Unit	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	

WINNF.FT.C.SCS.3

WINNF Test Requirements:

TLS failure due to expired server certificate.

WINNF test requirements from WINNF-TS-0122-V1.0.2 CBRS CBSD Test Specification:

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
---	--	------

Analysis of WINNF Test Requirements

1. From Client Hello can read: TLS version = TLS 1.2
2. From Client Hello, cipher suite list is from WINNF approved list:

 TLS_RSA_WITH_AES_128_GCM_SHA256
 TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256
TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256
3. From Server Hello, cipher suite chosen:
TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256
4. Authentication exchange ends with TLS Alert message (i.e. authentication fails):
5. Registration request message is not received at Test Harness (authentication fails)

Client	NEC Corporation	
Product	PF54A0-mb480-05 Radio Unit	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	

WINNF.FT.C.SCS.4

WINNF Test Requirements:

TLS failure when SAS Test Harness certificate is issued by an unknown CA

WINNF test requirements from WINNF-TS-0122-V1.0.2 CBRS CBSD Test Specification:

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
---	---	------

Analysis of WINNF Test Requirements

1. From Client Hello can read: TLS version = TLS 1.2
2. From Client Hello, cipher suite list is from WINNF approved list:

TLS_RSA_WITH_AES_128_GCM_SHA256
 TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256
TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256

3. From Server Hello, cipher suite chosen:
TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256

4. Authentication exchange ends with TLS Alert message (i.e. authentication fails):

Client	NEC Corporation	
Product	PF54A0-mb480-05 Radio Unit	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	

No.	Time	Source	Destination	Protocol	Length	Info
8033	2024-11-20 07:04:01.434520	172.29.16.20	192.168.254.3	TLSv1.2	281	Client Hello
8034	2024-11-20 07:04:01.440172	192.168.254.3	172.29.16.20	TLSv1.2	1926	Server Hello, Certificate, Server Key Exchange, Certi
8036	2024-11-20 07:04:01.441234	172.29.16.20	192.168.254.3	TLSv1.2	73	Alert (Level: Fatal, Description: Unknown CA)
9294	2024-11-20 07:04:10.514183	172.29.16.20	192.168.254.3	TLSv1.2	281	Client Hello
9295	2024-11-20 07:04:10.519049	192.168.254.3	172.29.16.20	TLSv1.2	1926	Server Hello, Certificate, Server Key Exchange, Certi
9297	2024-11-20 07:04:10.520051	172.29.16.20	192.168.254.3	TLSv1.2	73	Alert (Level: Fatal, Description: Unknown CA)
11229	2024-11-20 07:06:02.451072	172.29.16.20	192.168.254.3	TLSv1.2	281	Client Hello
11230	2024-11-20 07:06:02.455673	192.168.254.3	172.29.16.20	TLSv1.2	1926	Server Hello, Certificate, Server Key Exchange, Certi
11232	2024-11-20 07:06:02.456436	172.29.16.20	192.168.254.3	TLSv1.2	73	Alert (Level: Fatal, Description: Unknown CA)
11341	2024-11-20 07:06:11.527469	172.29.16.20	192.168.254.3	TLSv1.2	281	Client Hello
11342	2024-11-20 07:06:11.529873	192.168.254.3	172.29.16.20	TLSv1.2	1926	Server Hello, Certificate, Server Key Exchange, Certi
11344	2024-11-20 07:06:11.530706	172.29.16.20	192.168.254.3	TLSv1.2	73	Alert (Level: Fatal, Description: Unknown CA)

> Frame 8036: 73 bytes on wire (584 bits), 73 bytes captured (584 bits) on interface \Device > Ethernet II, Src: Dell_a9:01:00 (78:ac:44:a9:01:00), Dst: HP_35:09:d6 (e0:73:e7:35:09:d6) > Internet Protocol Version 4, Src: 172.29.16.20, Dst: 192.168.254.3 > Transmission Control Protocol, Src Port: 49864, Dst Port: 5000, Seq: 216, Ack: 1861, Len: > Transport Layer Security	0000 e0 73 e7 35 09 d6 78 ac 44 a9 01 00 08 00 45 00 0010 00 30 ec 43 40 00 3f 06 d4 3b ac 1d 10 14 c0 a8 0020 fe 03 c2 c8 13 88 48 ed 67 3f a7 23 fa 32 80 18 0030 00 88 0c 6c 00 00 01 01 08 0a 82 33 ab 47 34 51 0040 1b 37 15 03 03 00 02 02 30
--	---

TLSv1.2 Record Layer: Alert (Level: Fatal, Description: Unknown CA) Content Type: Alert (21) Version: TLS 1.2 (0x0303) Length: 2 Alert Message Level: Fatal (2) Description: Unknown CA (48)	Activate Windows
--	------------------

5. Registration request message is not received at Test Harness (authentication fails)

Client	NEC Corporation	
Product	PF54A0-mb480-05 Radio Unit	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	

WINNF.FT.C.SCS.5

WINNF Test Requirements:

WINNF test requirements from WINNF-TS-0122-V1.0.2 CBRS CBSD Test Specification:

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
---	--	------

Analysis of WINNF Test Requirements

1. From Client Hello can read: TLS version = TLS 1.2
2. From Client Hello, cipher suite list is from WINNF approved list:

TLS_RSA_WITH_AES_128_GCM_SHA256
 TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256
TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256

3. From Server Hello, cipher suite chosen:
4. **TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256**
5. Authentication exchange ends with TLS Alert message (i.e. authentication fails):

Client	NEC Corporation	
Product	PF54A0-mb480-05 Radio Unit	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	

No.	Time	Source	Destination	Protocol	Length	Info
8033	2024-11-20 07:04:01.434520	172.29.16.20	192.168.254.3	TLSv1.2	281	Client Hello
8034	2024-11-20 07:04:01.440172	192.168.254.3	172.29.16.20	TLSv1.2	1926	Server Hello, Certificate, Server Key Exchange, Certif
8036	2024-11-20 07:04:01.441234	172.29.16.20	192.168.254.3	TLSv1.2	73	Alert (Level: Fatal, Description: Unknown CA)
9294	2024-11-20 07:04:10.514183	172.29.16.20	192.168.254.3	TLSv1.2	281	Client Hello
9295	2024-11-20 07:04:10.519049	192.168.254.3	172.29.16.20	TLSv1.2	1926	Server Hello, Certificate, Server Key Exchange, Certif
9297	2024-11-20 07:04:10.520051	172.29.16.20	192.168.254.3	TLSv1.2	73	Alert (Level: Fatal, Description: Unknown CA)
11229	2024-11-20 07:06:02.451072	172.29.16.20	192.168.254.3	TLSv1.2	281	Client Hello
11230	2024-11-20 07:06:02.455673	192.168.254.3	172.29.16.20	TLSv1.2	1926	Server Hello, Certificate, Server Key Exchange, Certif
11232	2024-11-20 07:06:02.456436	172.29.16.20	192.168.254.3	TLSv1.2	73	Alert (Level: Fatal, Description: Unknown CA)
11341	2024-11-20 07:06:11.527469	172.29.16.20	192.168.254.3	TLSv1.2	281	Client Hello
11342	2024-11-20 07:06:11.529873	192.168.254.3	172.29.16.20	TLSv1.2	1926	Server Hello, Certificate, Server Key Exchange, Certif
11344	2024-11-20 07:06:11.530706	172.29.16.20	192.168.254.3	TLSv1.2	73	Alert (Level: Fatal, Description: Unknown CA)

> Frame 8036: 73 bytes on wire (584 bits), 73 bytes captured (584 bits) on interface \Device	0000	e0 73 e7 35 09 d6 78 ac 44 a9 01 00 08 00 45 00
> Ethernet II, Src: Dell_a9:01:00 (78:ac:44:a9:01:00), Dst: HP_35:09:d6 (e0:73:e7:35:09:d6)	0010	00 3b ec 43 40 00 3f 06 d4 9b ac 1d 10 14 c0 a8
> Internet Protocol Version 4, Src: 172.29.16.20, Dst: 192.168.254.3	0020	fe 03 c2 c8 13 88 48 ed 67 3f a7 23 fa 32 80 18
> Transmission Control Protocol, Src Port: 49864, Dst Port: 5000, Seq: 216, Ack: 1861, Len:	0030	00 88 0c 6c 00 00 01 01 08 0a 82 33 ab 47 34 51
> Transport Layer Security	0040	1b 37 15 03 03 00 02 02 3c

TLSv1.2 Record Layer: Alert (Level: Fatal, Description: Unknown CA) Content Type: Alert (21) Version: TLS 1.2 (0x0303) Length: 2 Alert Message Level: Fatal (2) Description: Unknown CA (48)	Activate Windows Go to Settings to activate Windows
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6. Registration request message is not received at Test Harness (authentication fails)

Client	NEC Corporation	
Product	PF54A0-mb480-05 Radio Unit	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	

Test Equipment

Instrument	Manufacturer	Type No.	Serial No	Calibration Period (months)	Calibration Due
Signal Analyzer	Agilent	MXA	SSG013930		

Client	NEC Corporation	
Product	PF54A0-mb480-05 Radio Unit	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	

Appendix A – EUT & Client Provided Details

Client	NEC Corporation	
Product	PF54A0-mb480-05 Radio Unit	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	

General EUT Description

Manufacturer	NEC Corporation
Address	7-1, Shiba 5-chome, Minato-ku, Tokyo, 108-8001 Japan.
Product Name	Radio Unit for wireless base station
Product Number	PF54A0-mb480-05
Serial Number(s)	Na23X9011123 / Na23X9011124(spare)
Software Version	04.07
Hardware/Model Version	PF54A0-mb480-05
Test Specification/Issue/Date	FCC CFR 47 Part 2: 2023 FCC CFR 47 Part 96:2023
Start of Test	Oct 28, 2024
Finish of Test	Dec 6, 2024
Name of Tester(s)	Scott Drysdale
Report issue / Revisions	Dec 9, 2024 – 000 First Issue following CBRS testing
Related Document(s)	WINNF-TS-0122 Version V1.0.2 25 November 2020 Conformance and Performance Test Technical Specification; CBSD/DP as Unit Under Test (UUT)

Client	NEC Corporation	
Product	PF54A0-mb480-05 Radio Unit	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	

Technical Description

The Equipment Under Test (EUT) PF54A0-mb480-05 Radio Unit is a NEC Corporation working in the citizens band radio service (3550-3700 MHz) band which provides communication connections to the 3550-3700 MHz network. The EUT is powered from a Power over ethernet.

A full technical description can be found in the Manufacturer's documentation.

EUT Configuration

Please see test photo exhibit for close up pictures of the unit as configured during protocol testing

- Cables and earthing when applicable were connected as per manufacturer's specification.

Domain Proxy Software Version: NEC CBRS Domain Proxy version 1