CBSD Test Report

Report No.:	RF180607D01-2
Test Model:	P208-TP
Received Date:	Jun. 07, 2018
Test Date:	Jul. 25 ~ Aug. 08, 2018
Issued Date:	Aug. 08, 2018
Applicant:	Sercomm Corp.
Address:	8F, No. 3-1, YuanQu St., NanKang, Taipei 115, Taiwan, R.O.C. (NanKang Software Park)
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
Lab Address:	No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan, R.O.C.
Test Location:	No.19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, TAIWAN (R.O.C.)
FCC Registration / Designation Number:	788550 / TW0003

Testing Laboratory
2021

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Release Control Record

Issue No.	Description	Date Issued
RF180607D01-2	Original release.	Aug. 08, 2018

1 Certificate of Conformity

Product:	CBRS Outdoor Small Cell
Brand:	Sercomm
Test Model:	P208-TP
Sample Status:	MASS-PRODUCTION
Applicant:	Sercomm Corp.
Test Date:	Jul. 25 ~ Aug. 08, 2018
Standards:	WINNF-TS-0122 V1.0.0 CBRSA-TS-9001 V1.0.0

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's conformance characteristics under the conditions specified in this report.

Prepared by : _____ , **Date:** Aug. 08, 2018

Polly Chien / Specialist

Approved by : _____ , **Date:** Aug. 08, 2018

Look Huang / Supervisor

2 Summary of Test Results

WINNF-TS-0122 Version V1.0.0			
Classes	Test Case Items	Pass Items	Pass Rate (%)
FT(CBSD, DP/CBSD)	32	32	100
PT(CBSD, DP/CBSD)	1	1	100
Total	33	33	100

Note:

1. Functional Test (FT): Test to validate the conformance of the Protocols and functionalities implemented in the CBSD/DP UUT to the requirements developed by WInnForum and supporting FCC/DoD requirements.
2. Field/Performance Test (PT): Test to check the capability of the CBSD/DP UUT to support various traffic models and actual operations in the field.

WINNF-TS-0122 Test Case			
Section	**Test Case ID**	**Test Case Title**	**Test Result**
6.1.4.1.1	WINNF.FT.C.REG.1	Multi-Step registration	PASS
6.1.4.1.2	WINNF.FT.D.REG.2	Domain Proxy Multi-Step registration	NA
6.1.4.1.3	WINNF.FT.C.REG.3	Single-Step registration for Category A CBSD	NA
6.1.4.1.4	WINNF.FT.D.REG.4	Domain Proxy Single-Step registration for Cat A CBSD	NA
6.1.4.1.5	WINNF.FT.C.REG.5	Single-Step registration for CBSD with CPI signed data	PASS
6.1.4.1.6	WINNF.FT.D.REG.6	Domain Proxy Single-Step registration for CBSD with CPI signed data	NA
6.1.4.1.7	WINNF.FT.C.REG.7	Registration due to change of an installation parameter	NA
6.1.4.2.1	WINNF.FT.C.REG.8	Missing Required parameters (responseCode 102)	PASS
6.1.4.2.2	WINNF.FT.D.REG.9	Domain Proxy Missing Required parameters (responseCode 102)	NA
6.1.4.2.3	WINNF.FT.C.REG.10	Pending registration (responseCode 200)	PASS
6.1.4.2.4	WINNF.FT.D.REG.11	Domain Proxy Pending registration (responseCode 200)	NA
6.1.4.2.5	WINNF.FT.C.REG.12	Invalid parameter (responseCode 103)	PASS
6.1.4.2.6	WINNF.FT.D.REG.13	Domain Proxy Invalid parameters (responseCode 103)	NA
6.1.4.2.7	WINNF.FT.C.REG.14	Blacklisted CBSD (responseCode 101)	PASS
6.1.4.2.8	WINNF.FT.D.REG.15	Domain Proxy Blacklisted CBSD (responseCode 101)	NA
6.1.4.2.9	WINNF.FT.C.REG.16	Unsupported SAS protocol version (responseCode 100)	PASS
6.1.4.2.10	WINNF.FT.D.REG.17	Domain Proxy Unsupported SAS protocol version responseCode 100)	NA
6.1.4.2.11	WINNF.FT.C.REG.18	Group Error (responseCode 201)	PASS
6.1.4.2.12	WINNF.FT.D.REG.19	Domain Proxy Group Error (responseCode 201)	NA
6.1.4.3.1	WINNF.FT.C.REG.20	Category A CBSD location update	NA

WINNF-TS-0122 Test Case			
Section	**Test Case ID**	**Test Case Title**	**Test Result**
6.3.4.2.1	WINNF.FT.D.GRA.1	Unsuccessful Grant responseCode=400 (INTERFERENCE)	PASS
6.3.4.2.2	WINNF.FT.C.GRA.2	Unsuccessful Grant responseCode=401 (GRANT_CONFLICT)	PASS
6.4.4.1.1	WINNF.FT.C.HBT.1	Heartbeat Success Case (first Heartbeat Response)	PASS
6.4.4.1.2	WINNF.FT.D.HBT.2	Domain Proxy Heartbeat Success Case (first Heartbeat Response)	NA
6.4.4.2.1	WINNF.FT.C.HBT.3	Heartbeat responseCode=105 (DEREGISTER)	PASS
6.4.4.2.2	WINNF.FT.C.HBT.4	Heartbeat responseCode=500 (TERMINATED_GRANT)	PASS
6.4.4.2.3	WINNF.FT.C.HBT.5	Heartbeat responseCode=501 (SUSPENDED_GRANT) in First Heartbeat Response	PASS
6.4.4.2.4	WINNF.FT.C.HBT.6	Heartbeat responseCode=501 (SUSPENDED_GRANT) in Subsequent Heartbeat Response	PASS
6.4.4.2.5	WINNF.FT.C.HBT.7	Heartbeat responseCode=502 (UNSYNC_OP_PARAM)	PASS
6.4.4.2.6	WINNF.FT.D.HBT.8	Domain Proxy Heartbeat responseCode=500 (TEMINATED_GRANT)	NA
6.4.4.3.1	WINNF.FT.C.HBT.9	Heartbeat Response Absent (First Heartbeat)	PASS
6.4.4.3.2	WINNF.FT.C.HBT.10	Heartbeat Response Absent (Subsequent Heartbeat)	PASS
6.4.4.4.1	WINNF.FT.C.HBT.11	Successful Grant Renewal in Heartbeat Test Case	PASS
6.5.4.2.1	WINNF.FT.C.MES.1	Registration Response contains measReportConfig	PASS
6.5.4.2.2	WINNF.FT.D.MES.2	Domain Proxy Registration Response contains measReportConfig	NA
6.5.4.2.3	WINNF.FT.C.MES.3	Grant Response contains measReportConfig	PASS
6.5.4.2.4	WINNF.FT.C.MES.4	Heartbeat Response contains measReportConfig	NA
6.5.4.2.5	WINNF.FT.D.MES.5	Domain Proxy Heartbeat Response contains measReportConfig	NA

WINNF-TS-0122 Test Case			
Section	**Test Case ID**	**Test Case Title**	**Test Result**
6.6.4.1.1	WINNF.FT.C.RLQ.1	Successful Relinquishment	PASS
6.6.4.1.2	WINNF.FT.D.RLQ.2	Domain Proxy Successful Relinquishment	NA
6.6.4.2.1	WINNF.FT.C.RLQ.3	Unsuccessful Relinquishment, responseCode=102	PASS
6.6.4.2.2	WINNF.FT.D.RLQ.4	Domain Proxy Unsuccessful Relinquishment, responseCode=102	NA
6.6.4.3.1	WINNF.FT.C.RLQ.5	Unsuccessful Relinquishment, responseCode=103	PASS
6.6.4.3.2	WINNF.FT.D.RLQ.6	Domain Proxy Unsuccessful Relinquishment, responseCode=103	NA
6.7.4.1.1	WINNF.FT.C.DRG.1	Successful Deregistration	PASS
6.7.4.1.2	WINNF.FT.D.DRG.2	Domain Proxy Successful Deregistration	NA
6.7.4.2.1	WINNF.FT.C.DRG.3	Deregistration responseCode=102	PASS
6.7.4.2.2	WINNF.FT.D.DRG.4	Domain Proxy Deregistration responseCode=102	NA
6.7.4.3.1	WINNF.FT.C.DRG.5	Deregistration responseCode=103	PASS
6.8.4.1.1	WINNF.FT.C.SCS.1	Successful TLS connection between UUT and SAS Test Harness	PASS
6.8.4.2.1	WINNF.FT.C.SCS.2	TLS failure due to revoked certificate	PASS
6.8.4.2.2	WINNF.FT.C.SCS.3	TLS failure due to expired server certificate	PASS
6.8.4.2.3	WINNF.FT.C.SCS.4	TLS failure when SAS Test Harness certificate is issue by unknown CA	PASS
6.8.4.2.4	WINNF.FT.C.SCS.5	TLS failure when certificate at the SAS Test Harness is corrupted	PASS
7.1.4.1.1	WINNF.PT.C.HBT	UUT RF Transmit Power Measurement	PASS

2.1 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	CBRS Outdoor Small Cell		
Brand	Sercomm		
Test Model	P208-TP		
Hardware Version	3.4		
FCC ID	P27P208		
Serial Number	1801BVV000034		
Software Version	FF3451		
Status of EUT	MASS-PRODUCTION		
Power Supply Rating	48Vdc from PoE		
Modulation Type	QPSK, 16QAM, 64QAM		
Operating Frequency	LTE	Channel Bandwidth 5MHz	TX: 3552.5 ~ 3697.5 MHz
			RX: 3552.5 ~ 3697.5 MHz
		Channel Bandwidth 10MHz	TX: 3555 ~ 3695 MHz
			RX: 3555 ~ 3695 MHz
		Channel Bandwidth 15MHz	TX: 3557.5 ~ 3692.5 MHz
			RX: 3557.5 ~ 3692.5 MHz
		Channel Bandwidth 20MHz	TX: 3560 ~ 3690 MHz
			RX: 3560 ~ 3690 MHz
Channel Bandwidth	LTE	5MHz, 10MHz, 15MHz & 20MHz	
Max. EIRP Power	LTE	Channel Bandwidth 5MHz	32.72 dBm
		Channel Bandwidth 10MHz	32.74 dBm
		Channel Bandwidth 15MHz	32.73 dBm
		Channel Bandwidth 20MHz	32.71 dBm
Emission Designator	LTE	Channel Bandwidth 5MHz	QPSK: 4M49G7D
			16QAM: 4M50D7W
			64QAM: 4M50D7W
		Channel Bandwidth 10MHz	QPSK: 8M96G7D
			16QAM: 8M94D7W
			64QAM: 8M96D7W
		Channel Bandwidth 15MHz	QPSK: 13M4G7D
			16QAM: 13M4D7W
			64QAM: 13M4D7W
		Channel Bandwidth 20MHz	QPSK: 17M9G7D
			16QAM: 17M9D7W
			64QAM: 17M9D7W

Antenna Type	Refer to note as below
Antenna Connector	Refer to note as below
Accessory Device	N/A
Data Cable Supplied	N/A

Note:

1. The EUT uses following PoE.

Brand	Microsemi
Model	PD-9601G/AC
Input Power	100-240Vac, 50/60Hz, 1.35A,
Output Power	55Vdc, 1.75A

2. The antennas provided to the EUT, please refer to the following table:

Antenna	Brand	Model	Antenna Type	Antenna Connector	Antenna Gain (dBi)	Frequency Range
Chain 0	Sercomm	617210UG	Patch	IPEX	7.62	3.5~3.7GHz
Chain 1	Sercomm	617210UG	Patch	IPEX	7.16	3.5~3.7GHz

Cable Spec.				
Brand	Model	Connector Type	Cable Loss(dB)	Cable Length (mm)
NA	NA	Right angle MMCX Plug	peak gain included	287mm

3. The EUT support signle carrier and two carriers in intra-band contiguous spectrum operation, the two carrier mode is operation in 20MHz channel bandwidth and MIMO technicalogy.
4. The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.

Test Condition:

Test Item	Environmental Conditions	Input Power	Tested By
WINNF-TS-0122	25deg. C, 65%RH	120Vac, 60Hz	Leo Tsai

4 Measurement

4.1 CBSD Measurement

The CBSD shall validate and ensure that the Conformance and Performance Test results from compliance with SAS functional requirements.

4.2 Test Procedure

a. Connect the UUT to SAS Test Harness system and RF Test instruments via the CBSD interface and RF components.The highest level is set to test configuration.
b. UUT shall be UTC time synchronized
c. The frequency band is granted and set as UUT supported Modulation and Channels, transmitted power of the UUT according to it granted parameters from the SAS Test Harness.
d. Each test case results was recorded and validated by SAS Test Harness system and RF instrumentstest cases was recorded test results from SAS Test Harness system

4.3 Test Environment

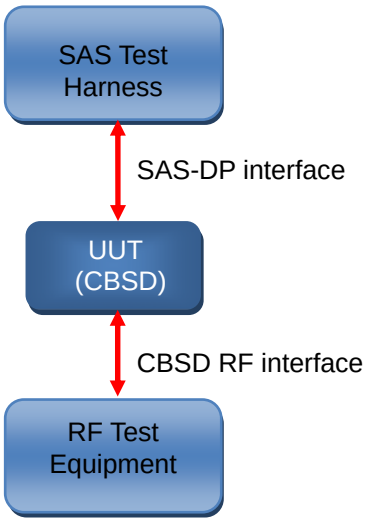
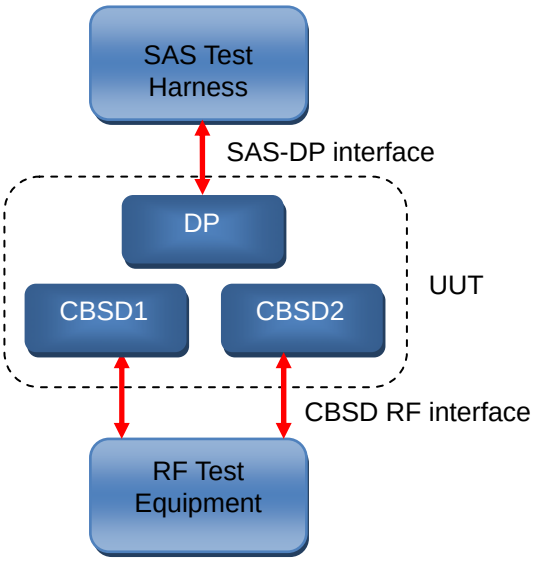
Test Harness Version	V1.0.0.2
Operating System	Microsoft Windows 10
TLS Version	1.2
Python	2.7.13

4.4 Test Equipment

Description & Manufacturer	Model no.	Serial No.	Calibrated Date	Calibrated Until
PXA Signal Analyzer Keysight	N9030A	MY54490617	Oct. 16, 2017	Oct. 15, 2018
Temperature & Humidity Chamber TERCHY	MHU-225AU	920842	Jun. 01, 2018	May 31, 2019
Horn_Antenna SCHWARZBECK	BBHA 9120D	9120D-1170	Mar. 25, 2018	Mar. 24, 2019
Laptop Lenovo	L470	PF-11H9B8	NA	NA

NOTE: 1. The test was performed in InfoSec Test Room.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
3. Tested Date: Jul. 25 ~ Aug. 08, 2018

4.5 Test Setup

■ Test configuration without Domain Proxy	☐ Test configuration with Domain Proxy
	

4.6 Test Results

Test case need to monitor RF interface and the measurement plots are in Section 5.

The test parameter used shall be referred to the test log file in Section 6.

4.6.1 CBSD Registration Process

4.6.1.1 Successful registration (responseCode 0)

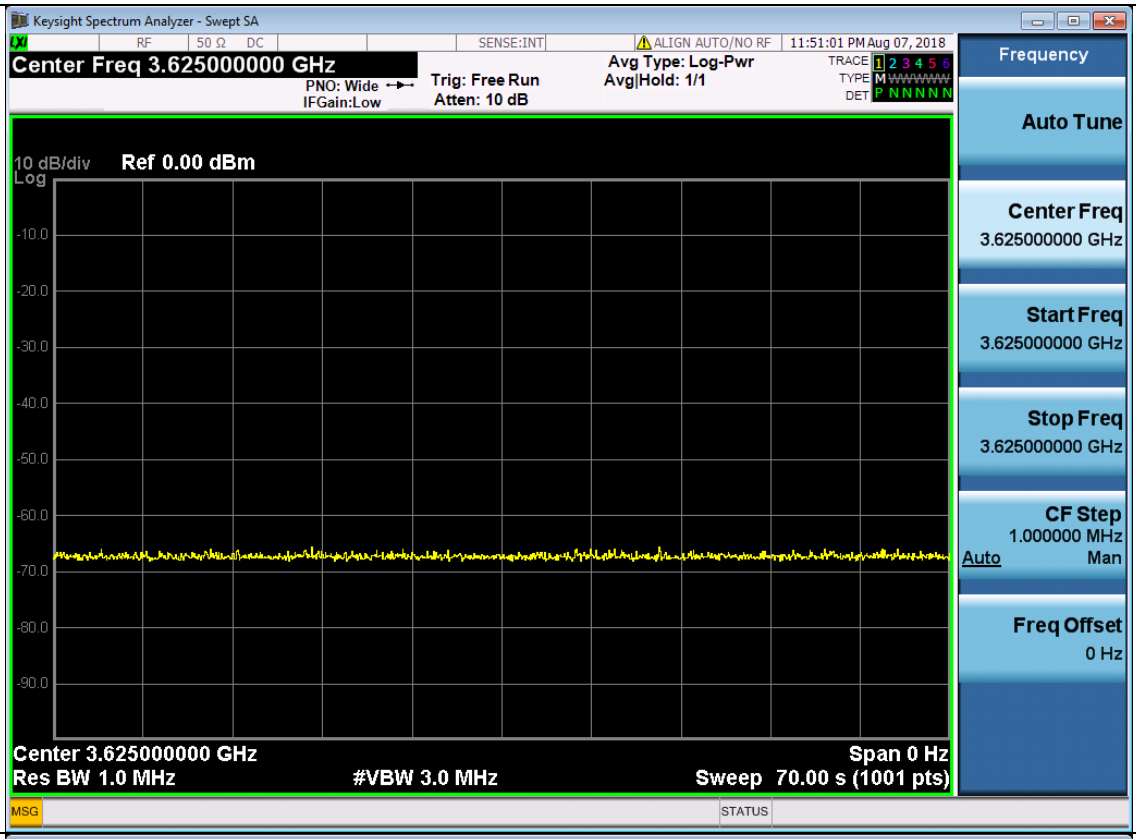
4.6.1.1.1 Multi-Step registration

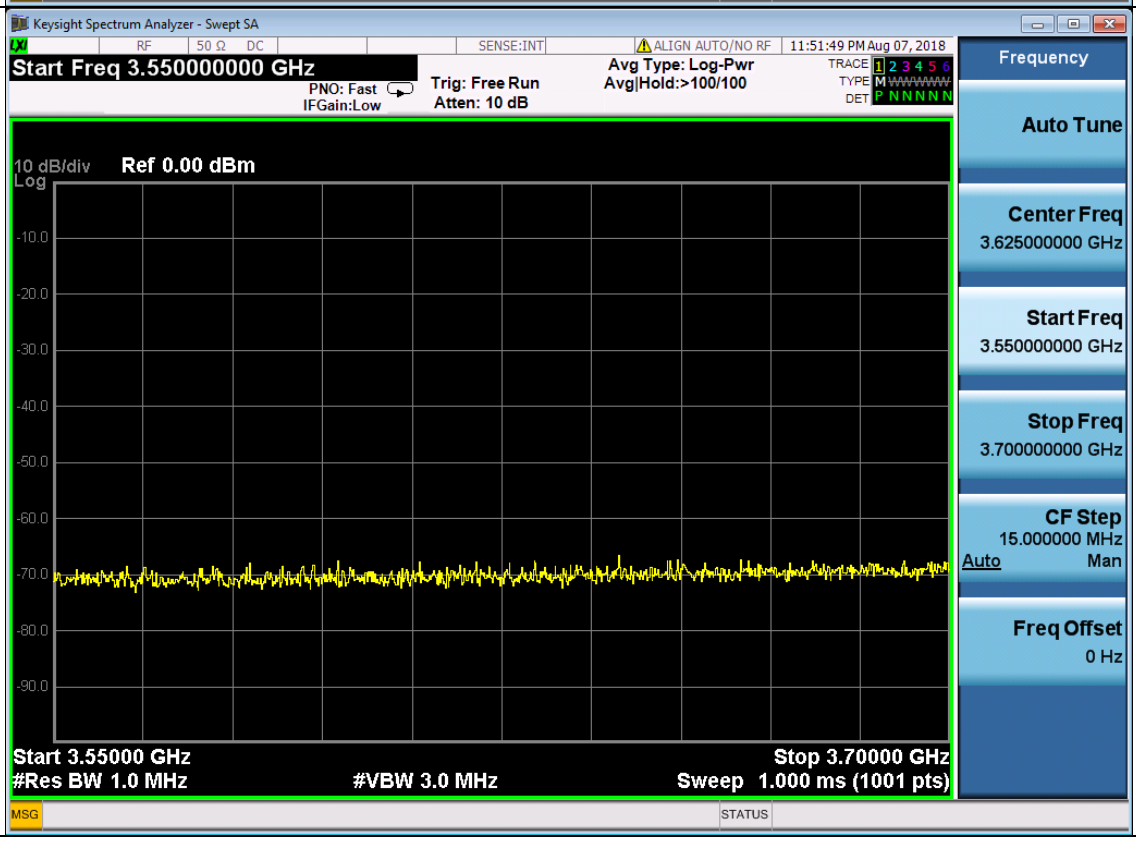
■Test Case ID : WINNF.FT.C.REG.1 □NA

#	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 is in the Unregistered state	--	--
2	CBSD sends correct Registration request information, as specified in [n.5], to the SAS Test Harness: ● The required userId, fccId and cbsdSerialNumber registration parameters shall be sent from the CBSD and conform to proper format and acceptable ranges. ● Any REG-conditional or optional registration parameters that may be included in the message shall be verified that they conform to proper format and are within acceptable ranges. Note: It is outside the scope of this document to test the Registration information that is supplied via another means.	■ PASS	□ FAIL
3	● SAS Test Harness sends a CBSD Registration Response as follows: - *cbsdId* = C - *measReportConfig* shall not be included - *responseCode = 0*	--	--
4	After completion of step 3, SAS Test Harness will not provide any positive response (*responseCode*=0) to further request messages from the UUT.	--	--
5	Monitor the RF output of the UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify: ● UUT shall not transmit RF	■ PASS	□ FAIL

RF measurement plot for Test Case :

- UUT shall not transmit.





4.6.1.1.2 Domain Proxy Multi-Step registration

☐Test Case ID : WINNF.FT.D.REG.2 ■NA

#	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 is in the Unregistered state	--	--
2	DP with two CBSD sends correct Registration request information, as specified in [n.5], in the form of one 2-element Array or as individual messages to the SAS Test Harness: ● The required userId, fccId and cbsdSerialNumber registration parameters shall be sent from the CBSD and conform to proper format and acceptable ranges. ● Any REG-conditional or optional registration parameters that may be included in the message shall be verified that they conform to proper format and are within acceptable ranges. Note: It is outside the scope of this document to test the Registration information that is supplied via another means.	☐ PASS	☐ FAIL
3	● SAS Test Harness sends a CBSD Registration Response as follows: - *cbsdId* = Ci - *measReportConfig* shall not be included - *responseCode = 0 for each CBSD*	--	--
4	After completion of step 3, SAS Test Harness will not provide any positive response (*responseCode*=0) to further request messages from the UUT.	--	--
5	Monitor the RF output of the UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify: ● UUT shall not transmit RF	☐ PASS	☐ FAIL

4.6.1.1.3 Single-Step registration for Category A CBSD

☐Test Case ID : WINNF.FT.C.REG.3 ■NA

#	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 is in the Unregistered state	--	--
2	CBSD sends Registration request to SAS Test Harness: all required and REG-Conditional parameter included (userId, fccId, cbsdSerialNumber, cbsdCategory, airInterface, installationParam, measCapability) for a Category A CBSD. ● The required userId, fccId and cbsdSerialNumber and REG-Conditional cbsdCategory, airInterface, installationParam, and measCapability 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	☐ FAIL
3	● SAS Test Harness sends a CBSD Registration Response as follows: - *cbsdId* = C - *measReportConfig* shall not be included - *responseCode = 0*	--	--
4	After completion of step 3, SAS Test Harness will not provide any positive response (*responseCode*=0) to further request messages from the UUT.	--	--
5	Monitor the RF output of the UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify: ● UUT shall not transmit RF	☐ PASS	☐ FAIL

4.6.1.1.4 Domain Proxy Single-Step registration for Cat A CBSD

☐Test Case ID : WINNF.FT.D.REG.4 ■NA

#	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 is in the Unregistered state	--	--
2	The DP with two CBSDs sends Registration requests in the form of one 2-element Array or as individual messages to SAS Test Harness. ● The required userId, fccId and cbsdSerialNumber and REG-Conditional cbsdCategory, airInterface, installationParam, and measCapability 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	☐ FAIL
3	● SAS Test Harness sends a CBSD Registration Response in the form of one 2-element Array or individual messages as follows: - *cbsdId* = C - *measReportConfig for each CBSD* shall not be included - *responseCode = 0 for each CBSD*	--	--
4	After completion of step 3, SAS Test Harness will not provide any positive response (*responseCode*=0) to further request messages from the UUT.	--	--
5	Monitor the RF output of the UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify: ● UUT shall not transmit RF	☐ PASS	☐ FAIL

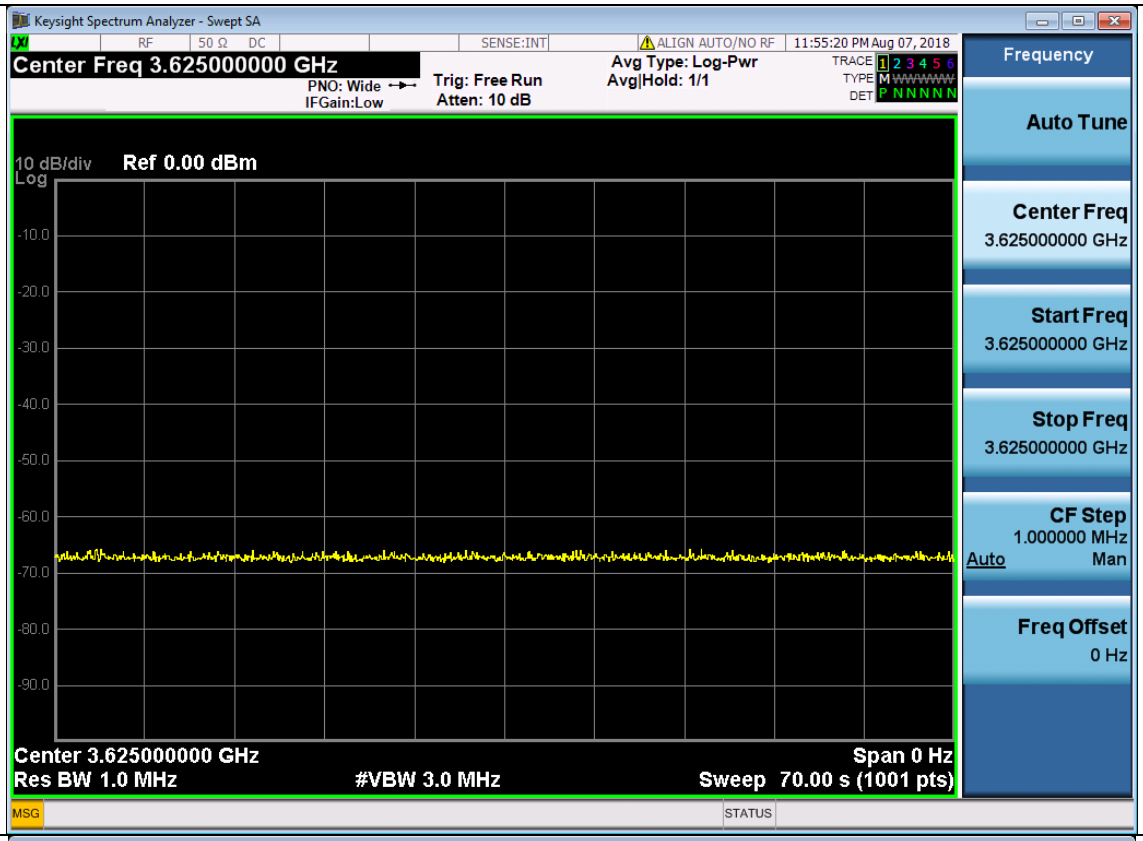
4.6.1.1.5 Single-Step registration for CBSD with CPI signed data

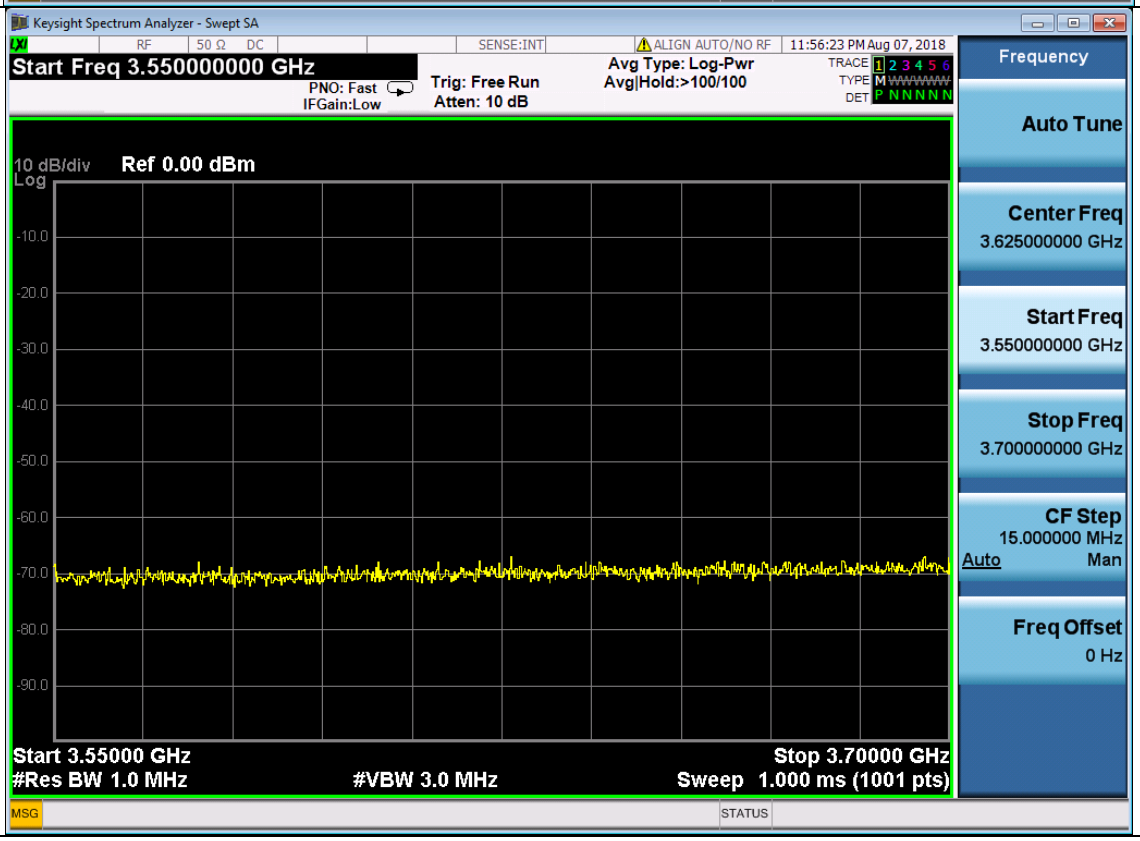
■Test Case ID : WINNF.FT.C.REG.5 □NA

#	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 userId, fccId and cbsdSerialNumber and REG-Conditional cbsdCategory, airInterface, measCapability and cpiSignatureData registration parameters shall be sent from the CBSD and conform to proper format and acceptable ranges. ● Any optional registration parameters that may be included in the message shall be verified that they conform to proper format and are within acceptable ranges.	■ PASS	□ FAIL
3	● SAS Test Harness sends a CBSD Registration Response as follows: - *cbsdId* = C - *measReportConfig* shall not be included. - responseCode = 0	--	--
4	After completion of step 3, SAS Test Harness will not provide any positive response (*responseCode*=0) to further request messages from the UUT.	--	--
5	Monitor the RF output of the UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify: ● UUT shall not transmit RF	■ PASS	□ FAIL

RF measurement plot for Test Case :

- UUT shall not transmit.





4.6.1.1.6 Domain Proxy Single-Step registration for CBSD with CPI signed data

☐Test Case ID : WINNF.FT.D.REG.6 ■NA

#	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	The DP with two CBSD sends Registration request in the form of one 2-element Array or as individual messages to the SAS Test Harness: ● The required userId, fccId and cbsdSerialNumber and REG-Conditional cbsdCategory, airInterface, measCapability and cpiSignatureData registration parameters shall be sent from the CBSD and conform to proper format and acceptable ranges. ● Any optional registration parameters that may be included in the message shall be verified that they conform to proper format and are within acceptable ranges.	☐ PASS	☐ FAIL
3	● SAS Test Harness sends a CBSD Registration Response as follows: - *cbsdId* = Ci - *measReportConfig* for each CBSD shall not be included. - responseCode = 0 for each CBSD	--	--
4	After completion of step 3, SAS Test Harness will not provide any positive response (*responseCode*=0) to further request messages from the UUT.	--	--
5	Monitor the RF output of the UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify: ● UUT shall not transmit RF	☐ PASS	☐ FAIL

4.6.1.1.7 Registration due to change of an installation parameter

☐Test Case ID : WINNF.FT.C.REG.7 ■NA

#	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 has successfully registered with SAS Test Harness	--	--
3	Change an installation parameters at the UUT (time T) Tester needs to record the current time at which the parameter change is executed.	--	--
4	Monitor the SAS-CBSD interface. UUT sends a deregistrationRequest to the SAS Test Harness The deregistration request shall be sent within (T + 60 seconds) from step 3.	☐ PASS	☐ FAIL

4.6.1.2 Unsuccessful registration: non-zero responseCodes

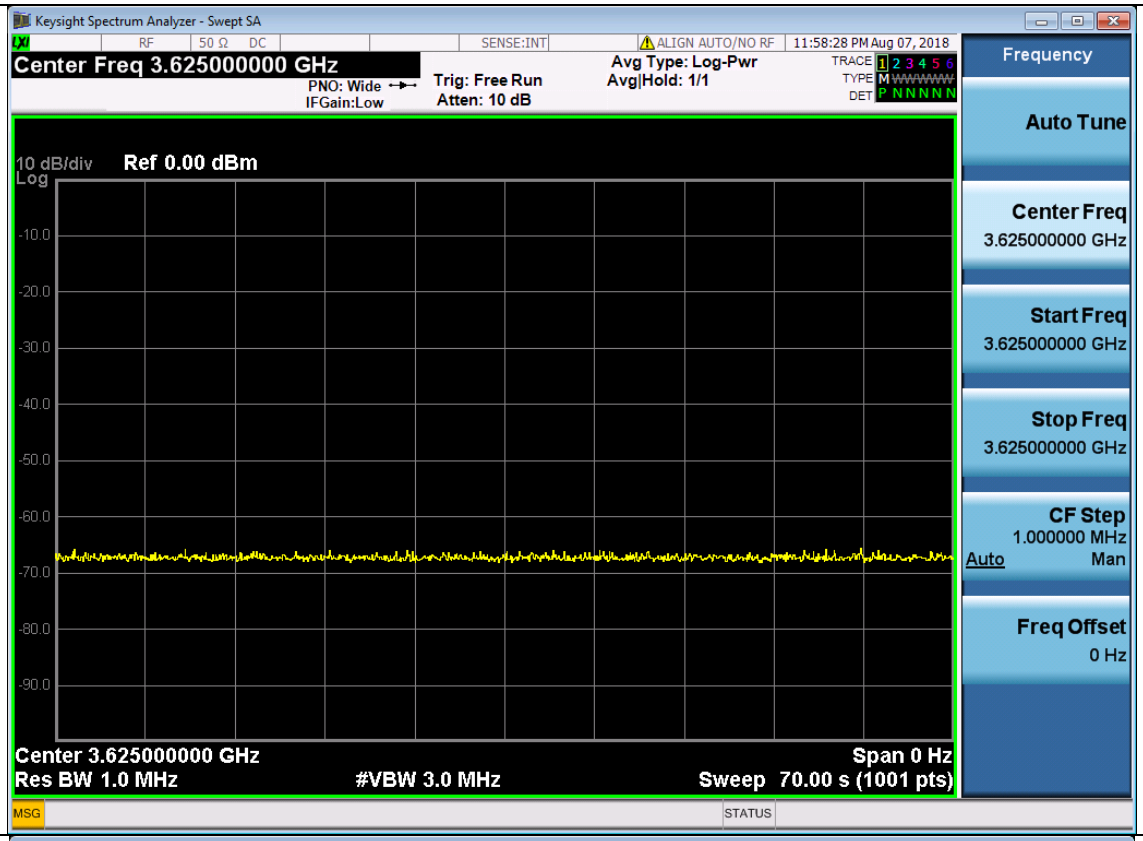
4.6.1.2.1 Missing Required parameters (responseCode 102)

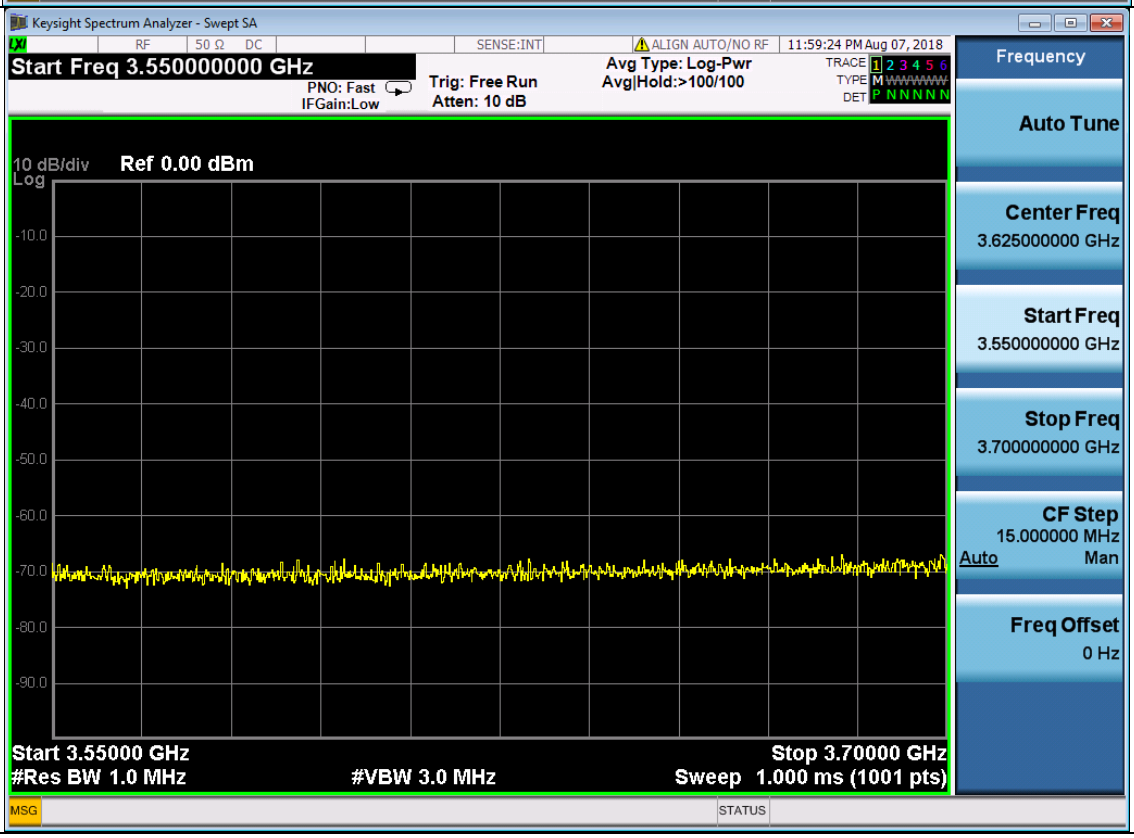
■Test Case ID : WINNF.FT.C.REG.8 ☐NA

#	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 *cbsdId* - *responseCode* = R	--	--
4	After completion of step 3, SAS Test Harness will not provide any positive response (*responseCode*=0) to further request messages from the UUT.	--	--
5	Monitor the RF output of the UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify: ● UUT shall not transmit RF	■ PASS	☐ FAIL

RF measurement plot for Test Case :

- UUT shall not transmit.





4.6.1.2.2 Domain Proxy Missing Required parameters (responseCode 102)

☐Test Case ID : WINNF.FT.D.REG.9 ■NA

#	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	The DP with two CBSDs sends a Registration request in the form of one 2-element Array or as individual messages to SAS Test Harness.	--	--
3	SAS Test Harness sends a CBSD Registration Response in the form of one 2-element Array or as individual messages as follows: - SAS response does not include a *cbsdId*. - *responseCode* = Ri for CBSD1 and CBSD2	--	--
4	After completion of step 3, SAS Test Harness will not provide any positive response (*responseCode*=0) to further request messages from the UUT.	--	--
5	Monitor the RF output of each UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify: ● UUT shall not transmit RF	☐ PASS	☐ FAIL

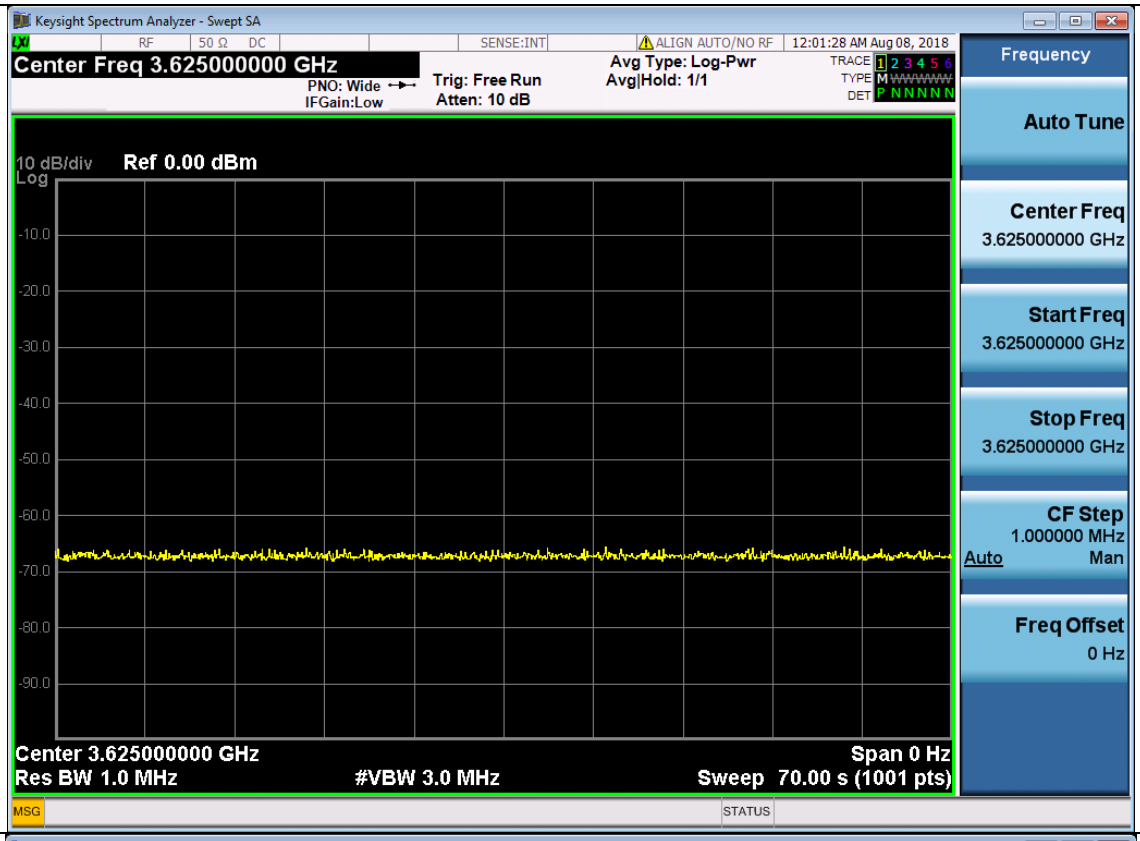
4.6.1.2.3 Pending registration (responseCode 200)

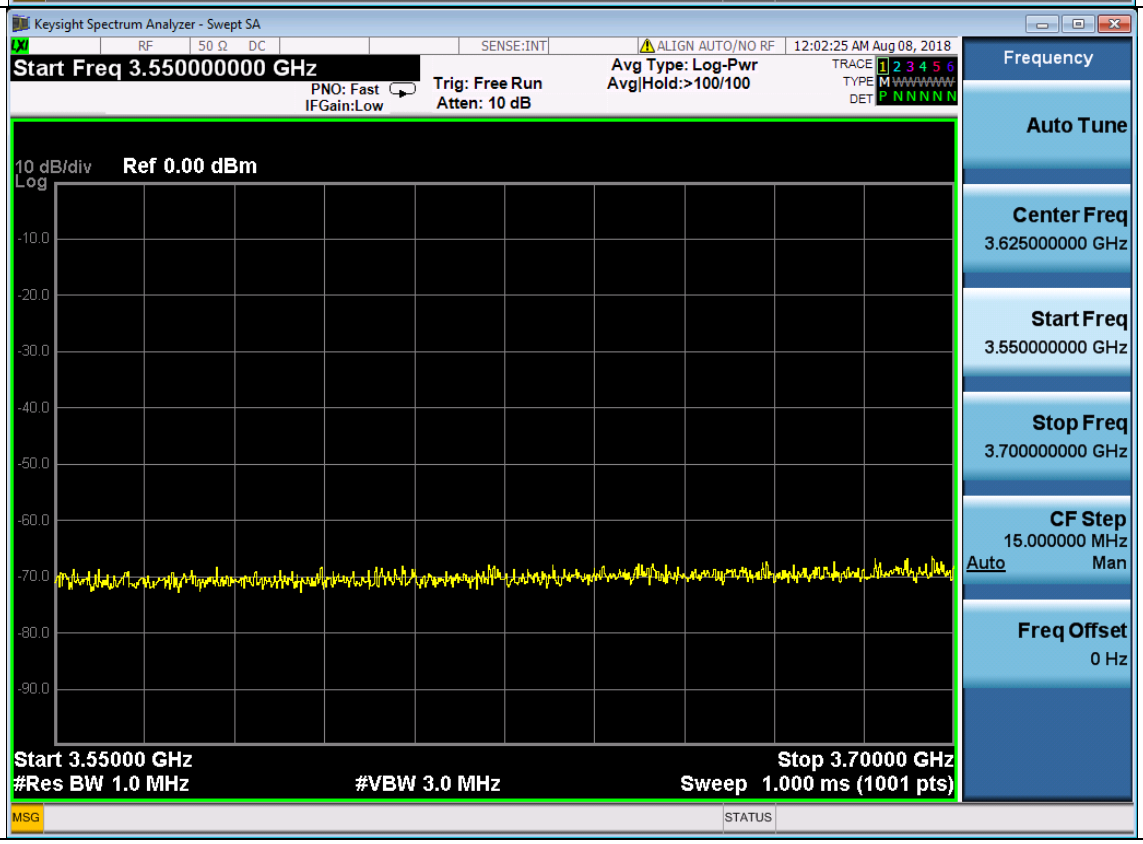
■Test Case ID : WINNF.FT.C.REG.10 ☐NA

#	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 *cbsdId* - *responseCode* = R	--	--
4	After completion of step 3, SAS Test Harness will not provide any positive response (*responseCode*=200) to further request messages from the UUT.	--	--
5	Monitor the RF output of the UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify: ● UUT shall not transmit RF	■ PASS	☐ FAIL

RF measurement plot for Test Case :

- UUT shall not transmit.





4.6.1.2.4 Domain Proxy Pending registration (responseCode 200)

☐Test Case ID : WINNF.FT.D.REG.11 ■NA

#	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	The DP with two CBSDs sends a Registration request in the form of one 2-element Array or as individual messages to SAS Test Harness.	--	--
3	SAS Test Harness sends a CBSD Registration Response in the form of one 2-element Array or as individual messages as follows: - SAS response does not include a *cbsdId*. - *responseCode* = Ri for CBSD1 and CBSD2	--	--
4	After completion of step 3, SAS Test Harness will not provide any positive response (*responseCode*=200) to further request messages from the UUT.	--	--
5	Monitor the RF output of each UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify: ● UUT shall not transmit RF	☐ PASS	☐ FAIL

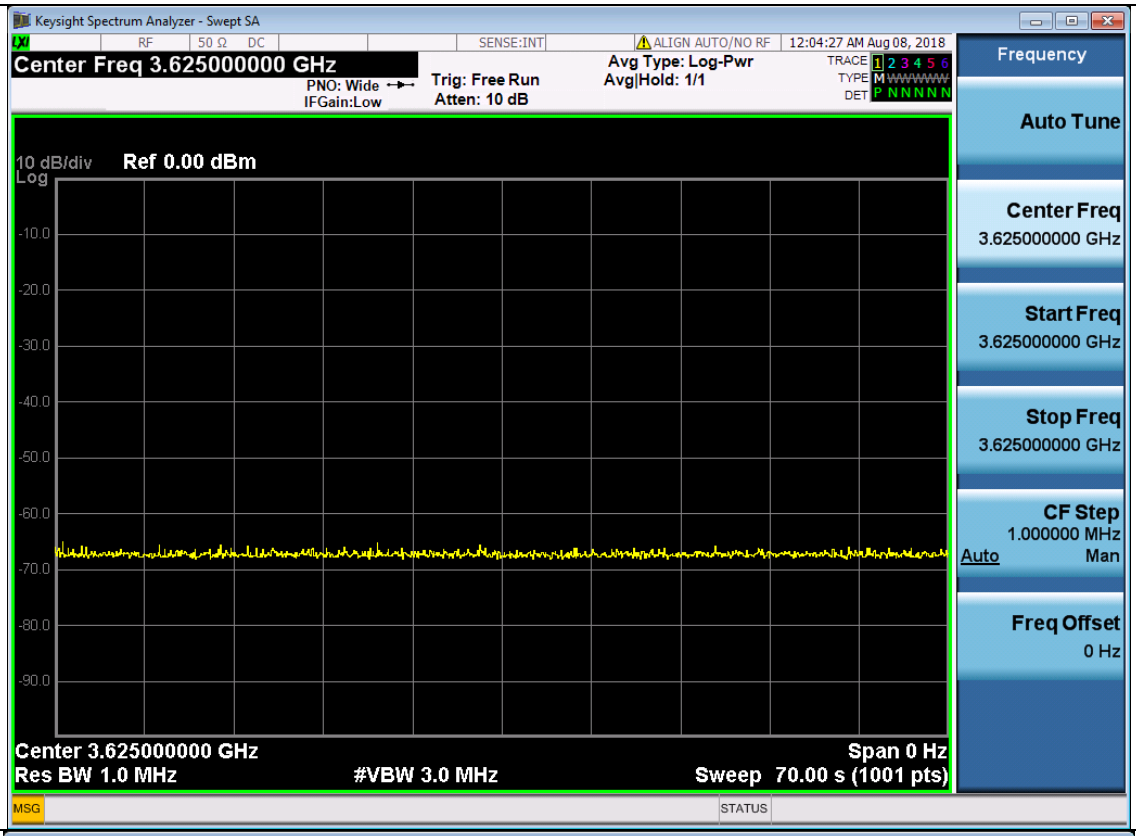
4.6.1.2.5 Invalid parameter (responseCode 103)

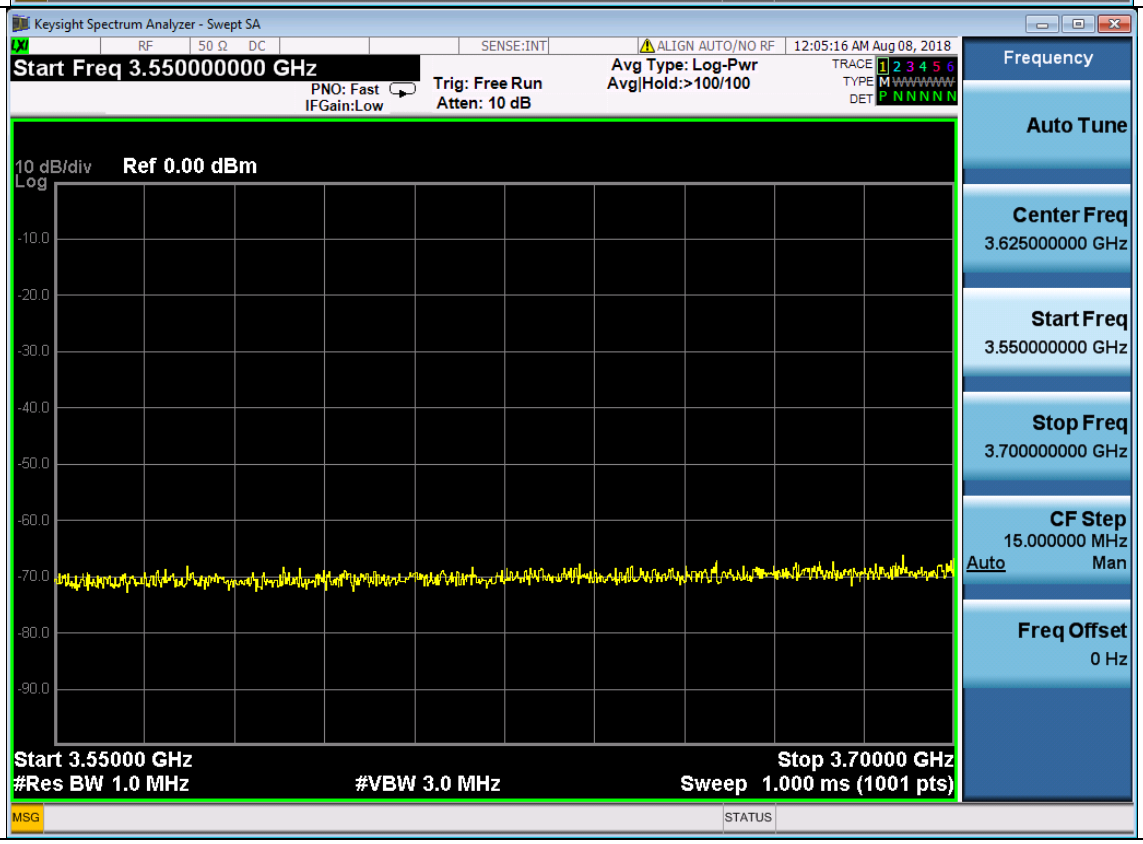
■Test Case ID : WINNF.FT.C.REG.12 ☐NA

#	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 *cbsdId* - *responseCode* = R	--	--
4	After completion of step 3, SAS Test Harness will not provide any positive response (*responseCode*=103) to further request messages from the UUT.	--	--
5	Monitor the RF output of the UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify: ● UUT shall not transmit RF	■ PASS	☐ FAIL

RF measurement plot for Test Case :

- UUT shall not transmit.





4.6.1.2.6 Domain Proxy Invalid parameters (responseCode 103)

☐Test Case ID : WINNF.FT.D.REG.13 ■NA

#	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	The DP with two CBSDs sends a Registration request in the form of one 2-element Array or as individual messages to SAS Test Harness.	--	--
3	SAS Test Harness sends a CBSD Registration Response in the form of one 2-element Array or as individual messages as follows: - SAS response does not include a *cbsdId*. - *responseCode* = Ri for CBSD1 and CBSD2	--	--
4	After completion of step 3, SAS Test Harness will not provide any positive response (*responseCode* R1 = 0 for CBSD1 and R2 = 103 for CBSD2) to further request messages from the UUT.	--	--
5	Monitor the RF output of each UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify: ● UUT shall not transmit RF	☐ PASS	☐ FAIL

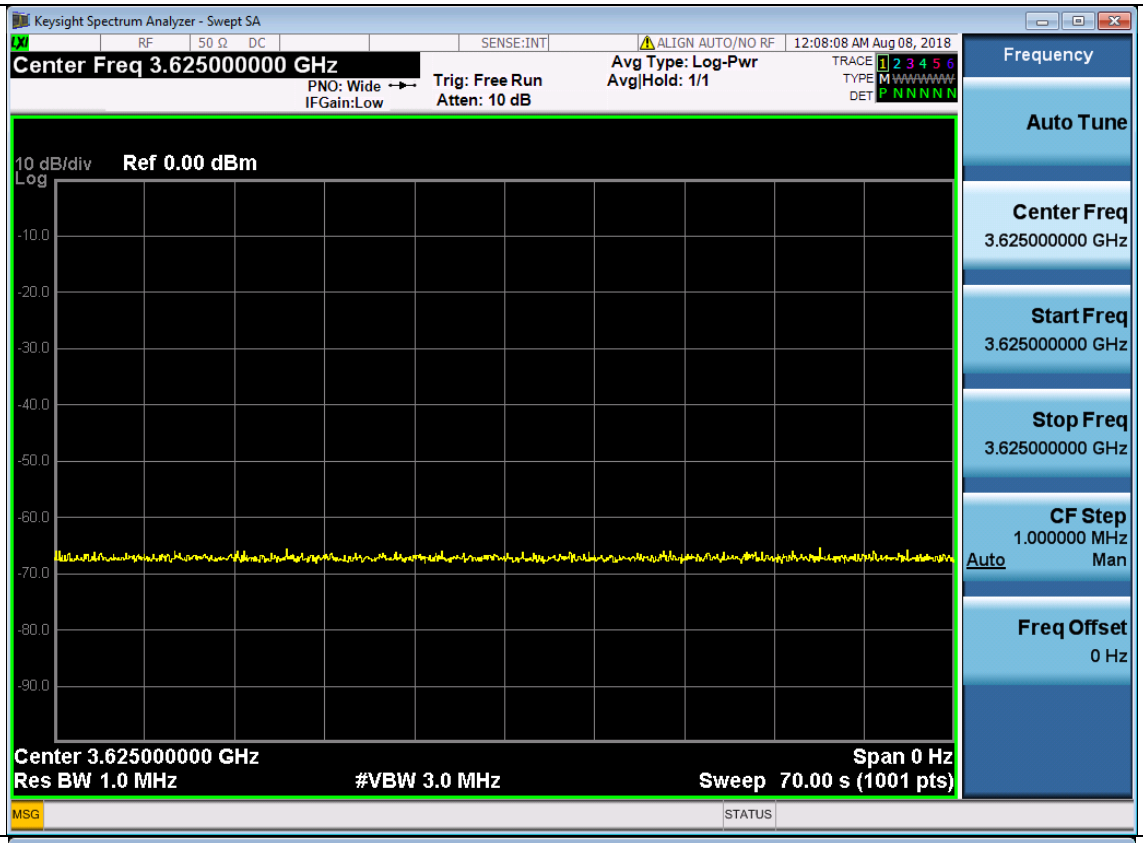
4.6.1.2.7 Blacklisted CBSD (responseCode 101)

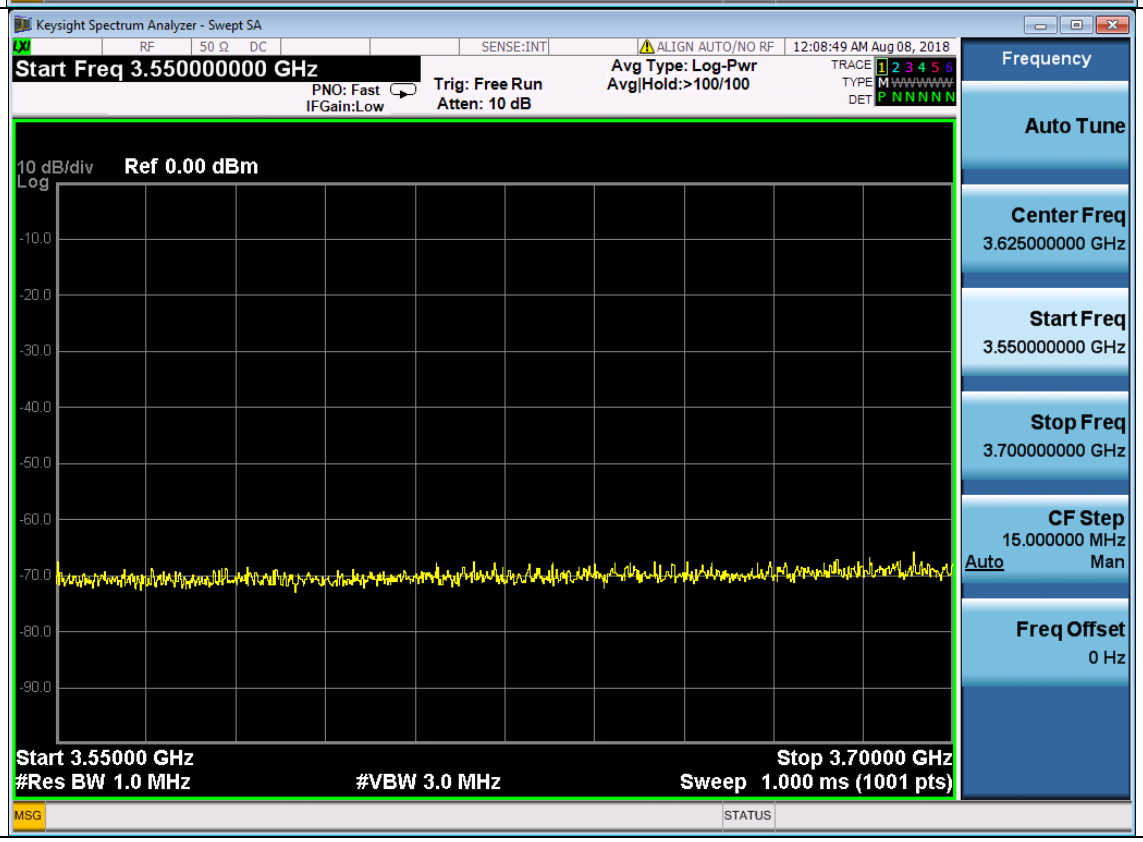
■Test Case ID : WINNF.FT.C.REG.14 ☐NA

#	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 *cbsdId* - *responseCode* = R	--	--
4	After completion of step 3, SAS Test Harness will not provide any positive response (*responseCode*=101) to further request messages from the UUT.	--	--
5	Monitor the RF output of the UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify: ● UUT shall not transmit RF	■ PASS	☐ FAIL

RF measurement plot for Test Case :

- UUT shall not transmit.





4.6.1.2.8 Domain Proxy Blacklisted CBSD (responseCode 101)

☐Test Case ID : WINNF.FT.D.REG.15 ■NA

#	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	The DP with two CBSDs sends a Registration request in the form of one 2-element Array or as individual messages to SAS Test Harness.	--	--
3	SAS Test Harness sends a CBSD Registration Response in the form of one 2-element Array or as individual messages as follows: - SAS response does not include a *cbsdId*. - *responseCode* = Ri for CBSD1 and CBSD2	--	--
4	After completion of step 3, SAS Test Harness will not provide any positive response (*responseCode* R1 = 0 for CBSD1 and R2 = 101 for CBSD2) to further request messages from the UUT.	--	--
5	Monitor the RF output of each UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify: ● UUT shall not transmit RF	☐ PASS	☐ FAIL

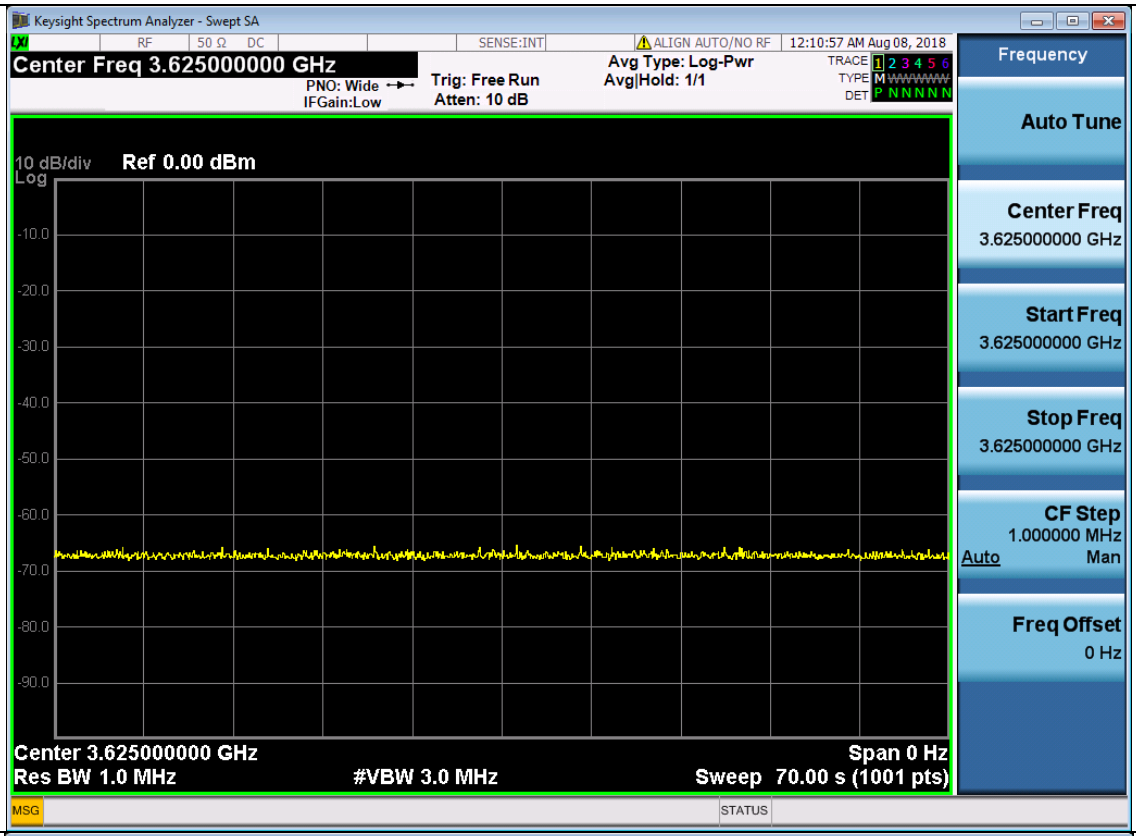
4.6.1.2.9 Unsupported SAS protocol version (responseCode 100)

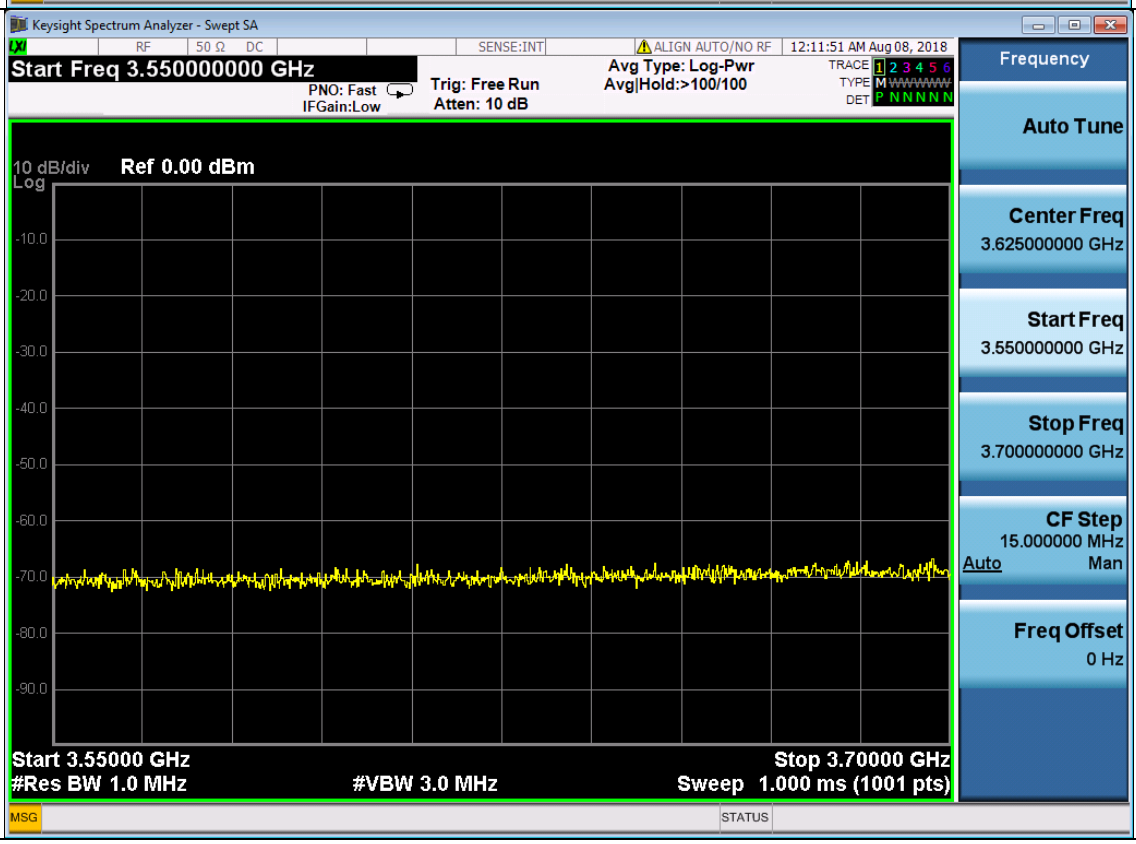
■Test Case ID : WINNF.FT.C.REG.16 ☐NA

#	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 *cbsdId* - *responseCode* = R	--	--
4	After completion of step 3, SAS Test Harness will not provide any positive response (*responseCode*=100) to further request messages from the UUT.	--	--
5	Monitor the RF output of the UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify: ● UUT shall not transmit RF	■ PASS	☐ FAIL

RF measurement plot for Test Case :

- UUT shall not transmit.





4.6.1.2.10 Domain Proxy Unsupported SAS protocol version (responseCode 100)

☐Test Case ID : WINNF.FT.D.REG.17 ■NA

#	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	The DP with two CBSDs sends a Registration request in the form of one 2-element Array or as individual messages to SAS Test Harness.	--	--
3	SAS Test Harness sends a CBSD Registration Response in the form of one 2-element Array or as individual messages as follows: - SAS response does not include a *cbsdId*. - *responseCode* = Ri for CBSD1 and CBSD2	--	--
4	After completion of step 3, SAS Test Harness will not provide any positive response (*responseCode* (Ri) = 100 for each CBS) to further request messages from the UUT.	--	--
5	Monitor the RF output of each UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify: ● UUT shall not transmit RF	☐ PASS	☐ FAIL

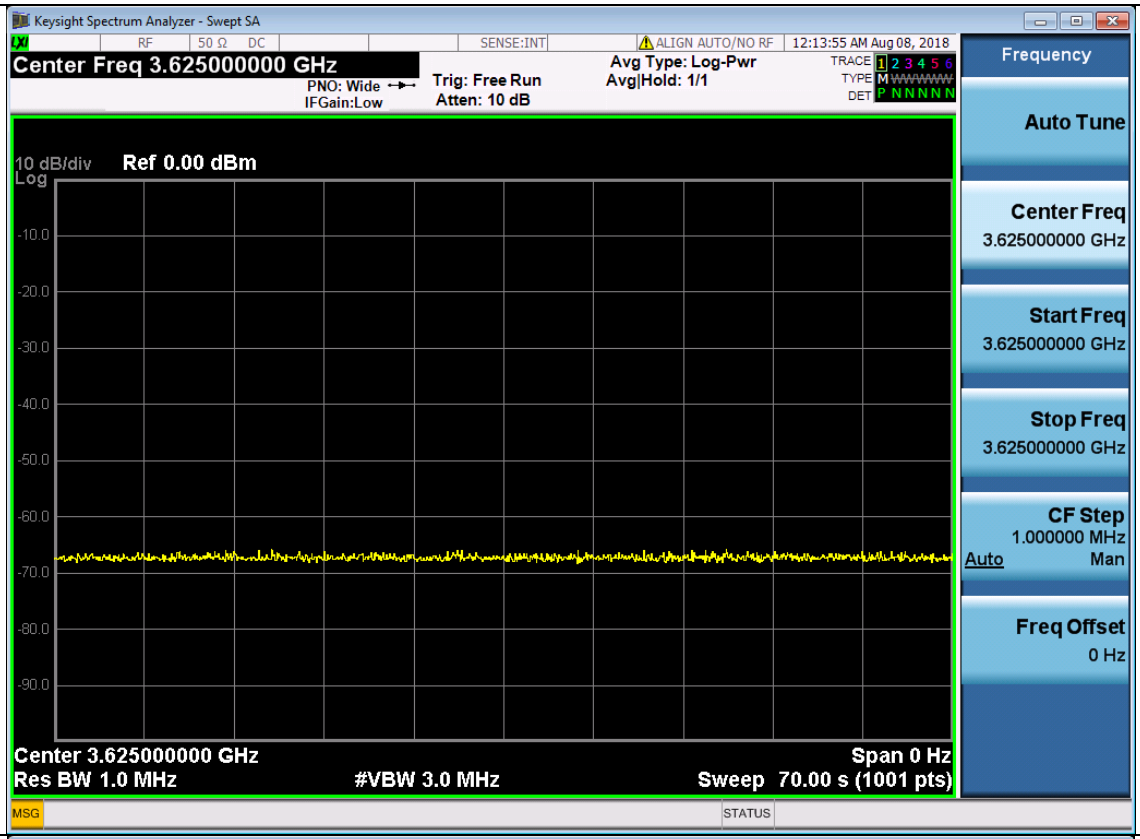
4.6.1.2.11 Group Error (responseCode 201)

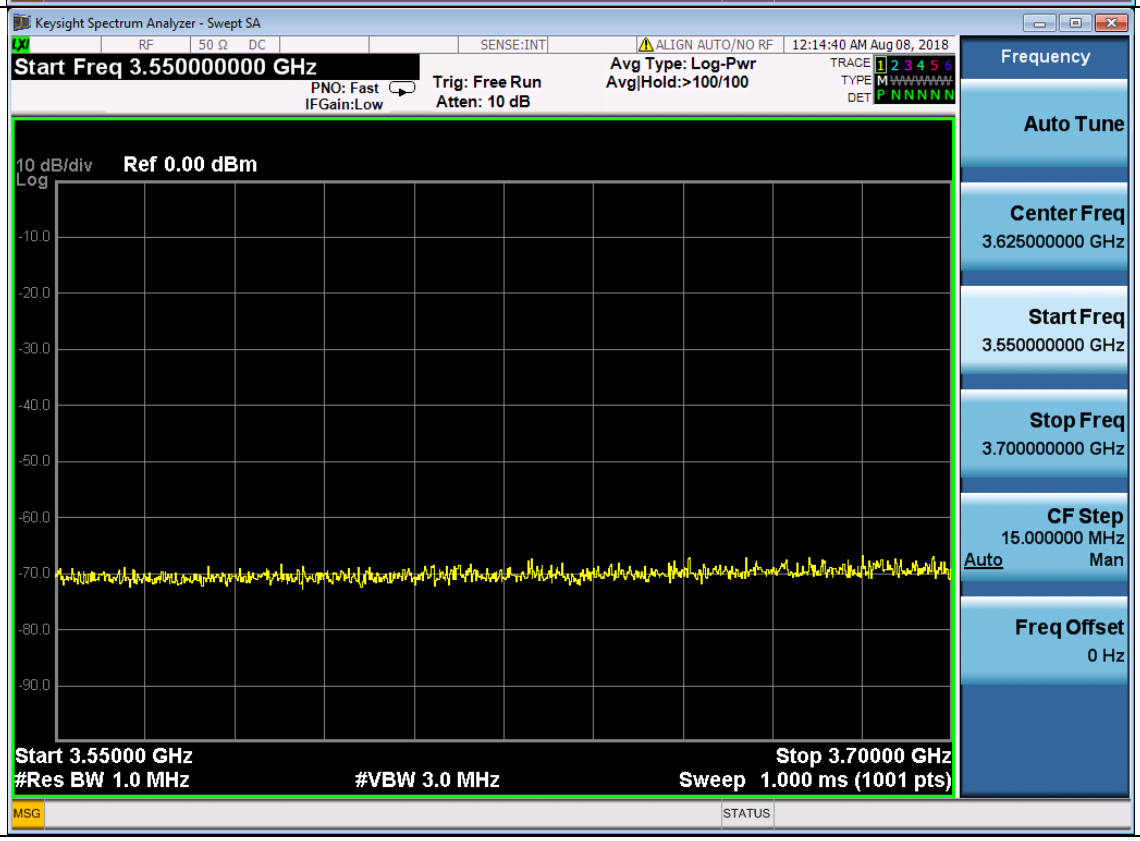
■Test Case ID : WINNF.FT.C.REG.18 ☐NA

#	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 *cbsdId* - *responseCode* = R	--	--
4	After completion of step 3, SAS Test Harness will not provide any positive response (*responseCode*=201) to further request messages from the UUT.	--	--
5	Monitor the RF output of the UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify: ● UUT shall not transmit RF	■ PASS	☐ FAIL

RF measurement plot for Test Case :

- UUT shall not transmit.





4.6.1.2.12 Domain Proxy Group Error (responseCode 201)

☐Test Case ID : WINNF.FT.D.REG.19 ■NA

#	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	The DP with two CBSDs sends a Registration request in the form of one 2-element Array or as individual messages to SAS Test Harness.	--	--
3	SAS Test Harness sends a CBSD Registration Response in the form of one 2-element Array or as individual messages as follows: - SAS response does not include a *cbsdId*. - *responseCode* = Ri for CBSD1 and CBSD2	--	--
4	After completion of step 3, SAS Test Harness will not provide any positive response (*responseCode* R1 = 0 for CBSD1 and R2 = 201 for CBSD2.) to further request messages from the UUT.	--	--
5	Monitor the RF output of each UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify: ● UUT shall not transmit RF	☐ PASS	☐ FAIL

4.6.1.3 Category A CBSD location update

4.6.1.3.1 Category A CBSD location update

☐Test Case ID : WINNF.FT.C.REG.20 ■NA

The test case ID is provided as a means to ensure that evidence is provided showing compliance to this requirement.

4.6.2 CBSD Spectrum Grant Process

4.6.2.1 Successful responses from the SAS Test Harness

4.6.2.1.1 Successful Grant response

Test Case ID : WINNF.FT.C.HBT.1

This test case is incorporated into WINNF.FT.C.HBT.1, which validates successful Grant messaging as part of that test case.

4.6.2.1.2 Domain Proxy Successful Grant response

Test Case ID : WINNF.FT.D.HBT.2

This test case is incorporated into WINNF.FT.D.HBT.2, which validates successful Grant messaging as part of that test case

4.6.2.2 Unsuccessful responses from the SAS Test Harness

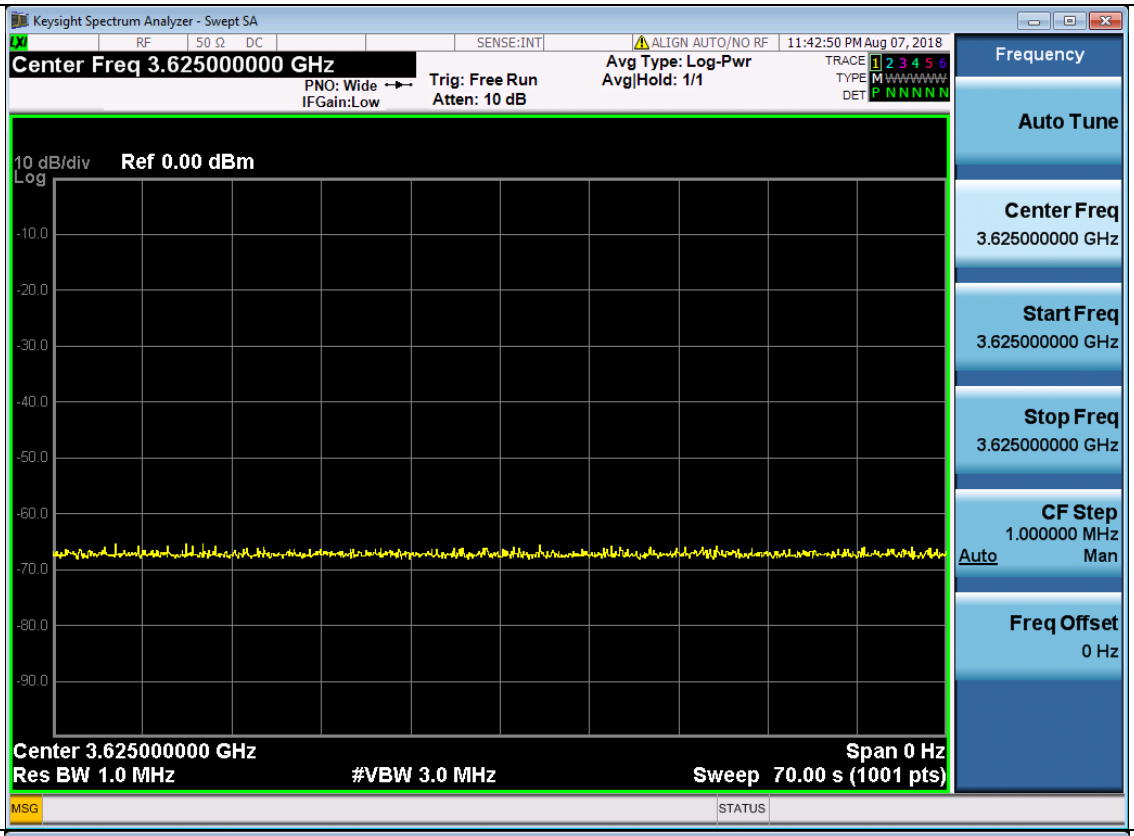
4.6.2.2.1 Unsuccessful Grant responseCode=400 (INTERFERENCE)

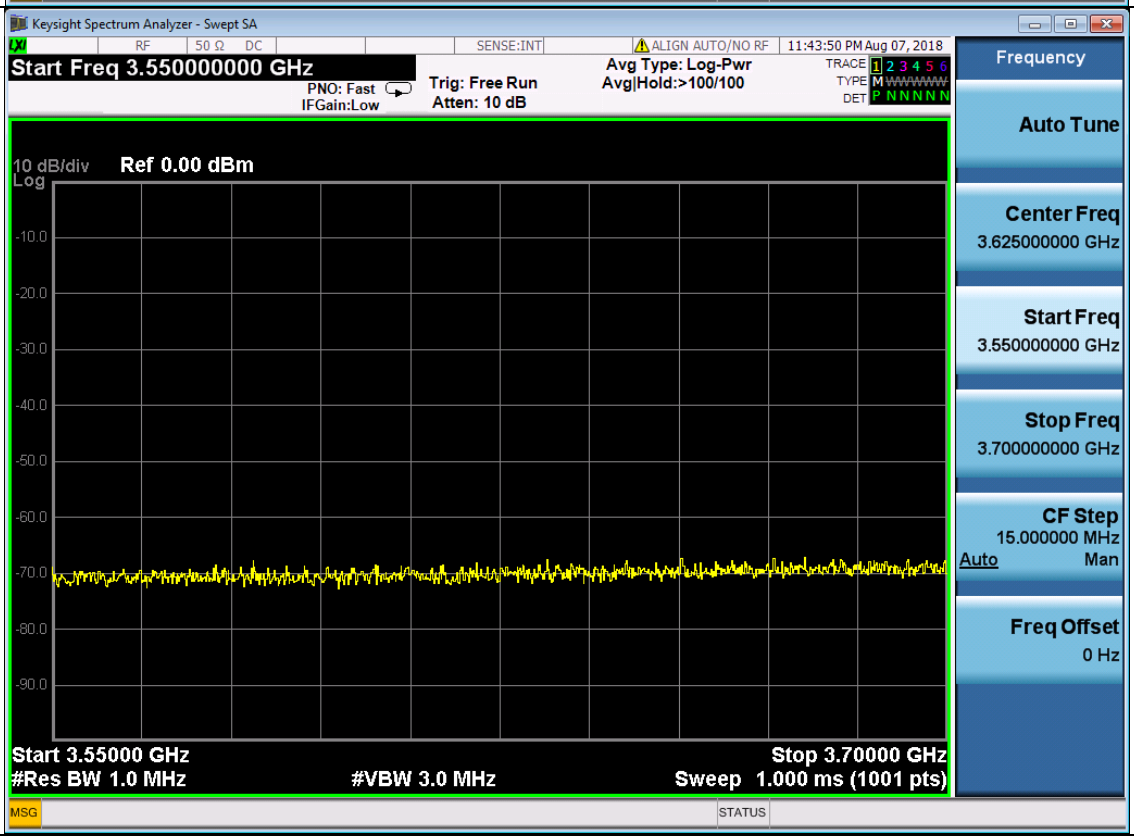
■Test Case ID : WINNF.FT.C.GRA.1 □NA

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

RF measurement plot for Test Case :

- UUT shall not transmit.





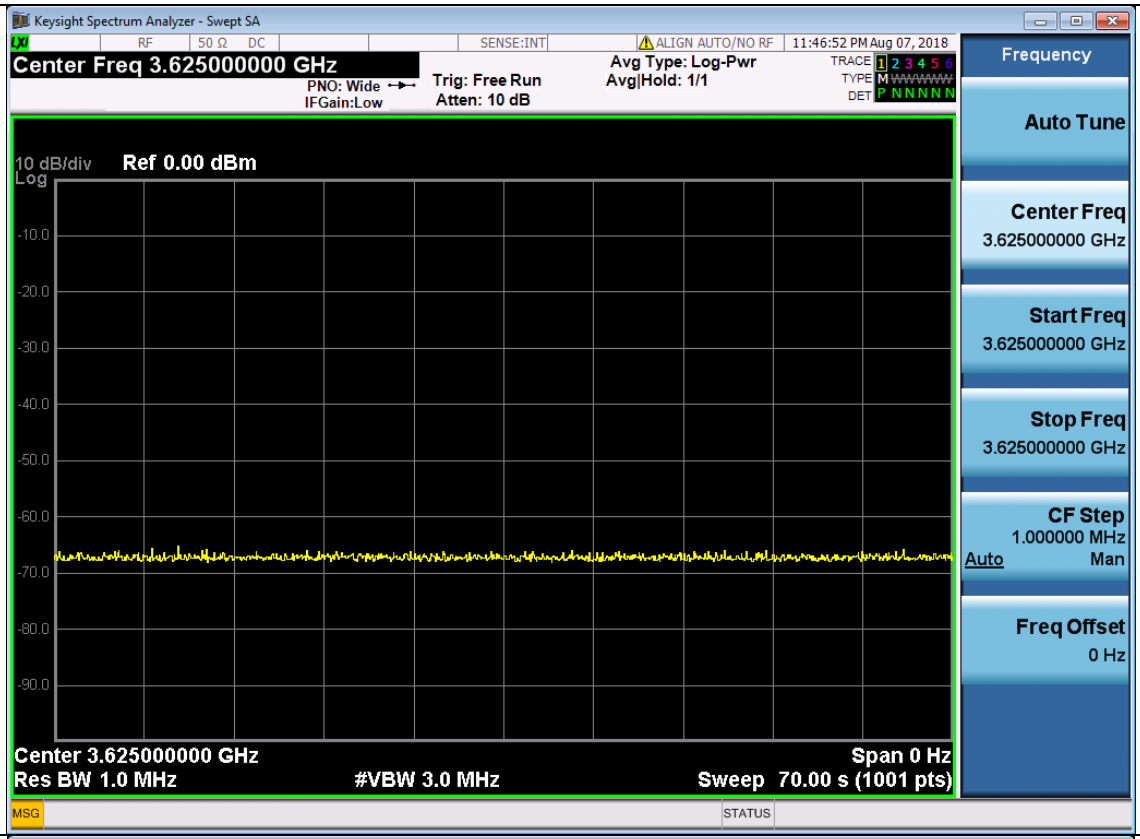
4.6.2.2.2 Unsuccessful Grant responseCode=401(GRANT_CONFLICT)

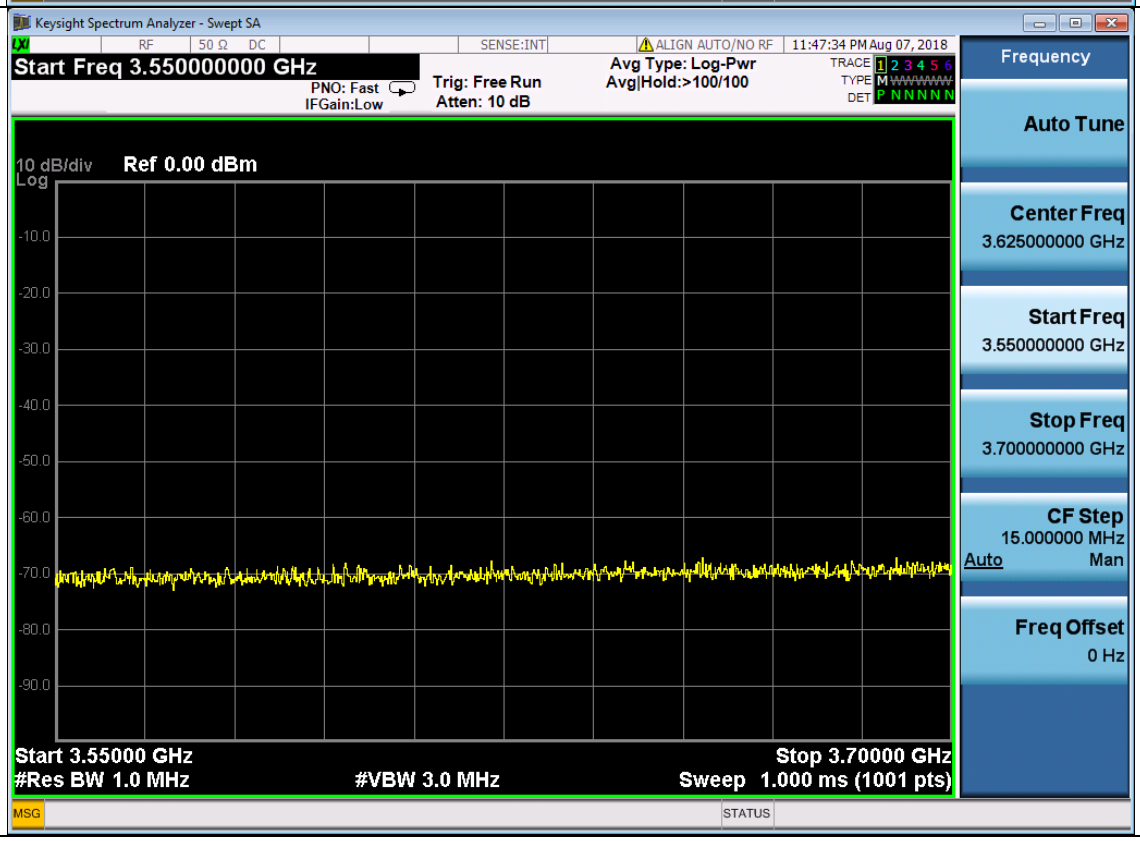
■Test Case ID : WINNF.FT.C.GRA.2 □NA

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: ● UUT has registered successfully with SAS Test Harness, with *cbsdId* = C	--	--
2	UUT sends valid Grant Request.	--	--
3	SAS Test Harness sends a Grant Response message, including ● *cbsdId*=C ● responseCode = R	--	--
4	After completion of step 3, SAS Test Harness will not provide any positive response (*responseCode*=401) to further request messages from the UUT.	--	--
5	Monitor the RF output of the UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify: ● UUT shall not transmit RF	■ PASS	□ FAIL

RF measurement plot for Test Case :

- UUT shall not transmit.





CBSD HEART BEAT PROCESS

4.6.2.3 Successful Heartbeat (responseCode=0)

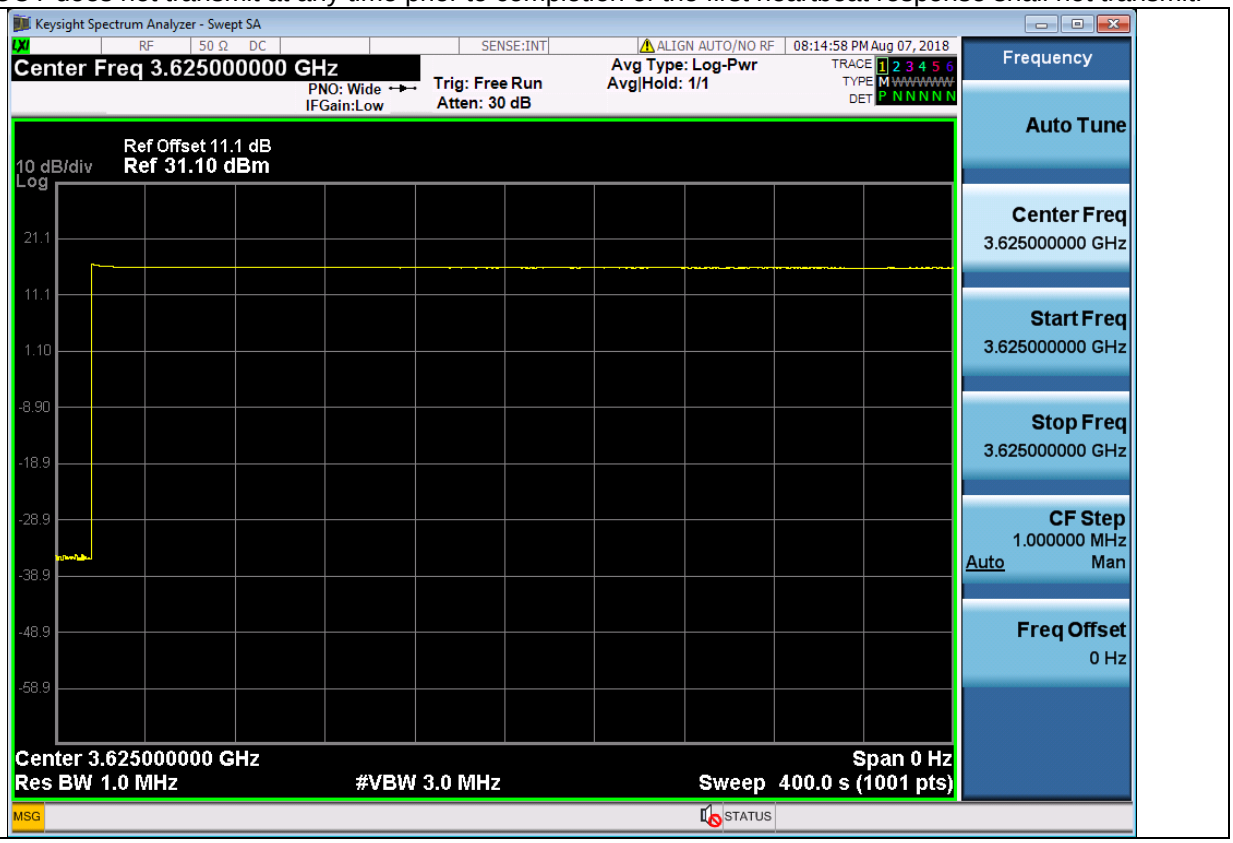
4.6.2.3.1 Heartbeat Success Case (first Heartbeat Response)

■Test Case ID : WINNF.FT.C.HBT.1 □NA

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: ● UUT has registered successfully with SAS Test Harness, with *cbsdId* = 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: ● *cbsdId* = C ● List of frequencyRange objects sent by UUT are within the CBRS frequency range	■ PASS	□ FAIL
4	SAS Test Harness sends a Spectrum Inquiry Response message, including the following parameters: ● *cbsdId* = C ● availableChannel is an array of availableChannel objects ● *responseCode* = 0	--	--
5	UUT sends Grant Request message. Validate: ● *cbsdId* = C ● maxEIRP is at or below the limit appropriate for CBSD category as defined by Part 96 ● operationFrequencyRange, F, sent by UUT is a valid range within the CBRS band	■ PASS	□ FAIL
6	SAS Test Harness sends a Grant Response message, including the parameters: ● *cbsdId* = C ● *grantId* = G = a valid grant ID ● grantExpireTime = UTC time greater than duration of the test ● *responseCode* = 0	--	--
7	UUT sends a first Heartbeat Request message. Verify Heartbeat Request message is formatted correctly, including: ● *cbsdId* = C ● *grantId* = G ● *operationState* = “GRANTED”	■ PASS	□ FAIL
8	SAS Test Harness sends a Heartbeat Response message, with the following parameters: ● *cbsdId* = C ● *grantId* = G ● *transmitExpireTime* = current UTC time + 200 seconds ● *responseCode* = 0	--	--
9	For further Heartbeat Request messages sent from UUT after completion of step 8, validate message is sent within latest specified heartbeatInterval, and: ● *cbsdId* = C ● *grantId* = G ● *operationState* = “AUTHORIZED” and SAS Test Harness responds with a Heartbeat Response message including the following parameters: ● *cbsdId* = C ● *grantId* = G ● *transmitExpireTime* = current UTC time + 200 seconds ● *responseCode* = 0	■ PASS	□ FAIL
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	□ FAIL

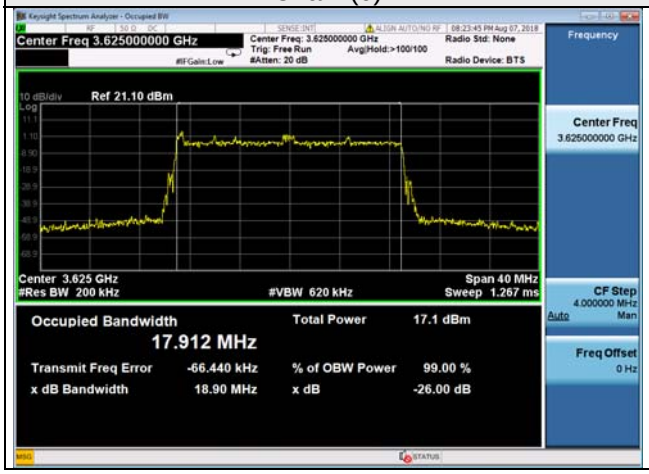
RF measurement plot for Test Case :

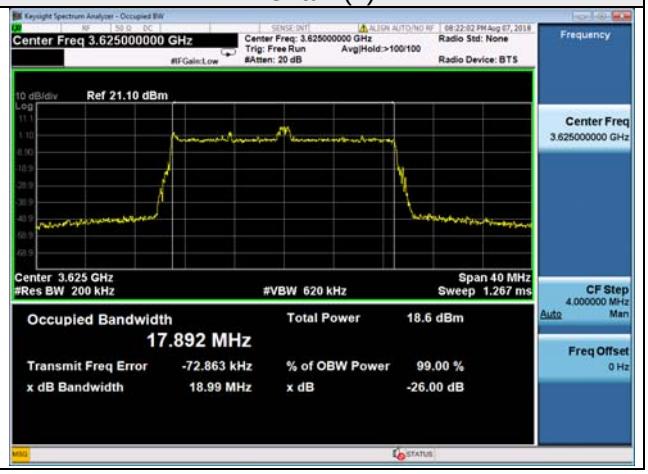
- UUT does not transmit at any time prior to completion of the first heartbeat response shall not transmit.



- UUT transmits after step 8 is complete, and its transmission is limited to within the bandwidth range F.

Channel	Freq. (MHz)	OCP 99 Band Width (MHz)	
		F = 20MHz	
		Chain (0)	Chain (1)
Middle	3625	17.912	17.892
Spectrum Plot			
Chain (0)		Chain (1)	





4.6.2.3.2 Domain Proxy Heartbeat Success Case (first Heartbeat Response)

☐Test Case ID : WINNF.FT.D.HBT.2 ■NA

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: ? DP has two CBSD has registered successfully with SAS Test Harness, with *cbsdId* = Ci, i={1,2}	--	--
2	DP 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	DP sends Spectrum Inquiry Request message for each CBSD. This may occur in a separate message per CBSD, or together in a single message with array of 2. Verify Spectrum Inquiry Request message is formatted correctly for each CBSD, including for CBSDi, i={1,2}: ● *cbsdId* = Ci ● List of frequencyRange objects sent by DP are within the CBRS frequency range	☐ PASS	☐ FAIL
4	If a separate Spectrum Inquiry Request message was sent for each CBSD, the SAS Test Harness shall respond to each Spectrum Inquiry Request message with a separate Spectrum Inquiry Response message. If a single Spectrum Inquiry Request message was sent containing a 2-object array (one per CBSD), the SAS Test Harness shall respond with a single Spectrum Inquiry Response message containing a 2-object array. Verify parameters for each CBSD within the Spectrum Inquiry Response message are as follows, for CBSDi, i={1,2}: ● *cbsdId* = Ci ● availableChannel is an array of availableChannel objects ● *responseCode* = 0	--	--
5	DP sends a Grant Request message for each CBSD. This may occur in a separate message per CBSD, or together in a single message with array of 2. Verify Grant Request message is formatted correctly for each CBSD, including for CBSDi, i={1,2}: ● *cbsdId* = Ci ● maxEIRP is at or below the limit appropriate for CBSD category as defined by Part 96 ● operationFrequencyRange, F, sent by UUT is a valid range within the CBRS band	☐ PASS	☐ FAIL
6	If a separate Grant Request message was sent for each CBSD, the SAS Test Harness shall respond to each Grant Request message with a separate Grant Response message. If a single Grant Request message was sent containing a 2-object array (one per CBSD), the SAS Test Harness shall respond with a single Grant Response message containing a 2-object array. Verify parameters for each CBSD within the Grant Response message are as follows, for CBSDi, i={1,2}: ● *cbsdId* = Ci ● *grantId* = Gi = a valid grant ID ● grantExpireTime = UTC time greater than duration of the test ● *responseCode* = 0	--	--

#	Test Execution Steps	Results	
7	Ensure DP sends first Heartbeat Request message for each CBSD. This may occur in a separate message per CBSD, or together in a single message with array of 2. Verify Heartbeat Request message is formatted correctly for each CBSD, including, for CBSDi i={1,2}: ● *cbsdId* = Ci, i={1,2} ● *grantId* = Gi, i={1,2} ● *operationState* = "GRANTED"	☐ PASS	☐ FAIL
8	If a separate Heartbeat Request message was sent for each CBSD by the DP, the SAS Test Harness shall respond to each Heartbeat Request message with a separate Heartbeat Response message. If a single Heartbeat Request message was sent by the DP containing a 2-object array (one per CBSD), the SAS Test Harness shall respond with a single Heartbeat Response message containing a 2-object array. Verify parameters for each CBSD within the Heartbeat Response message are as follows, for CBSDi: ● *cbsdId* = Ci ● *grantId* = Gi ● *transmitExpireTime* = current UTC time + 200 seconds ● *responseCode* = 0	--	--
9	For further Heartbeat Request messages sent from DP after completion of step 8, validate message is sent within latest specified heartbeatInterval for CBSDi: ● *cbsdId* = Ci ● *grantId* = Gi ● *operationState* = "AUTHORIZED" and SAS Test Harness responds with a Heartbeat Response message including the following parameters, for CBSDi ● *cbsdId* = Ci ● *grantId* = Gi ● *transmitExpireTime* = current UTC time + 200 seconds ● *responseCode* = 0	☐ PASS	☐ FAIL
10	Monitor the RF output of the UUT from start of test until UUT transmission commences. Monitor the RF output of the UUT from start of test until RF transmission commences. Verify: ● 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 Fi.	☐ PASS	☐ FAIL

4.6.2.4 Unsuccessful Heartbeat Test Cases (responseCode != 0)

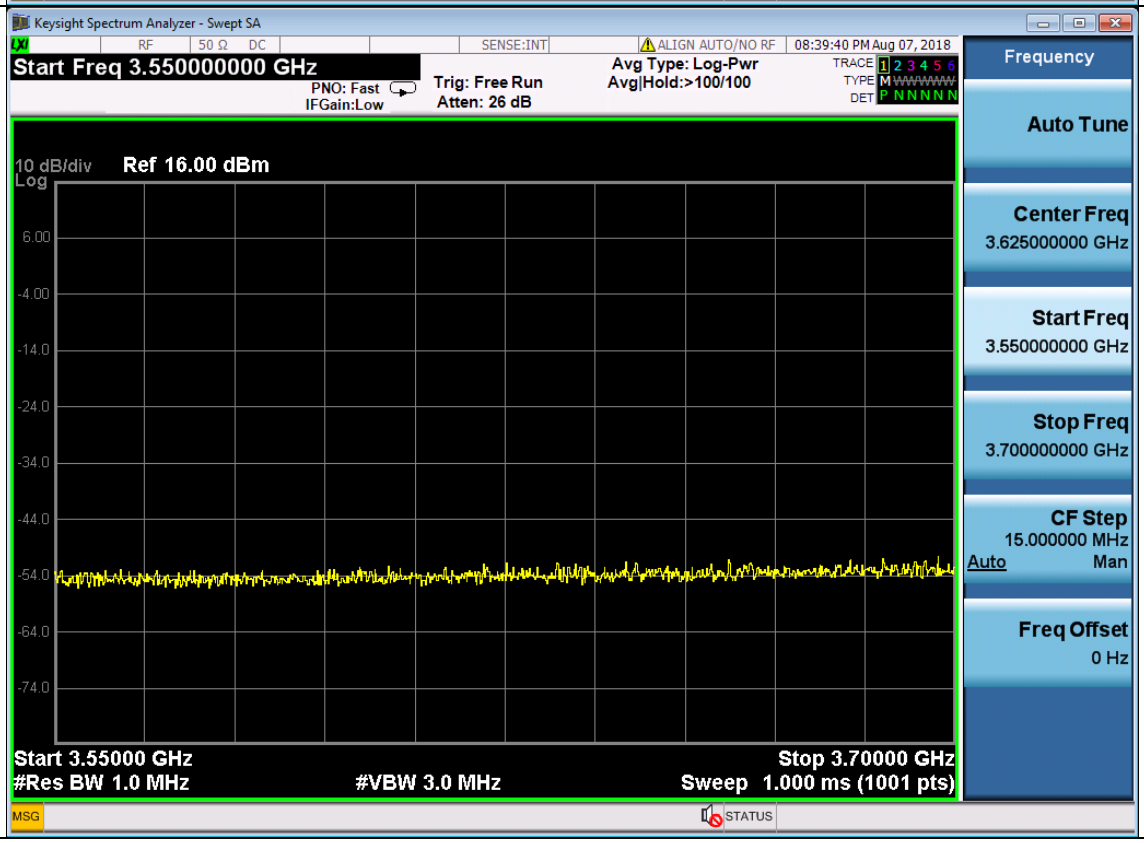
4.6.2.4.1 Heartbeat responseCode=105 (DEREGISTER)

■Test Case ID : WINNF.FT.C.HBT.3 □NA

#	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 *cbsdId* = C ○ valid *grantId* = G ○ grant is for frequency range F, power P ○ *grantExpireTime* = UTC time greater than duration of the test ● UUT is in AUTHORIZED state and is transmitting within the grant bandwidth F on RF interface	--	--
2	UUT sends a Heartbeat Request message. Ensure Heartbeat Request message is sent within Heartbeat Interval specified in the latest Heartbeat Response, and formatted correctly, including: ● *cbsdId* = C ● *grantId* = G ● *operationState* = "AUTHORIZED"	--	--
3	SAS Test Harness sends a Heartbeat Response message, including the following parameters: ● *cbsdId* = C ● *grantId* = G ● *transmitExpireTime = T = Current UTC time* ● *responseCode = 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	□ FAIL

RF measurement plot for Test Case :

- UUT shall stop transmission within (T + 60 seconds) of completion of step 3.



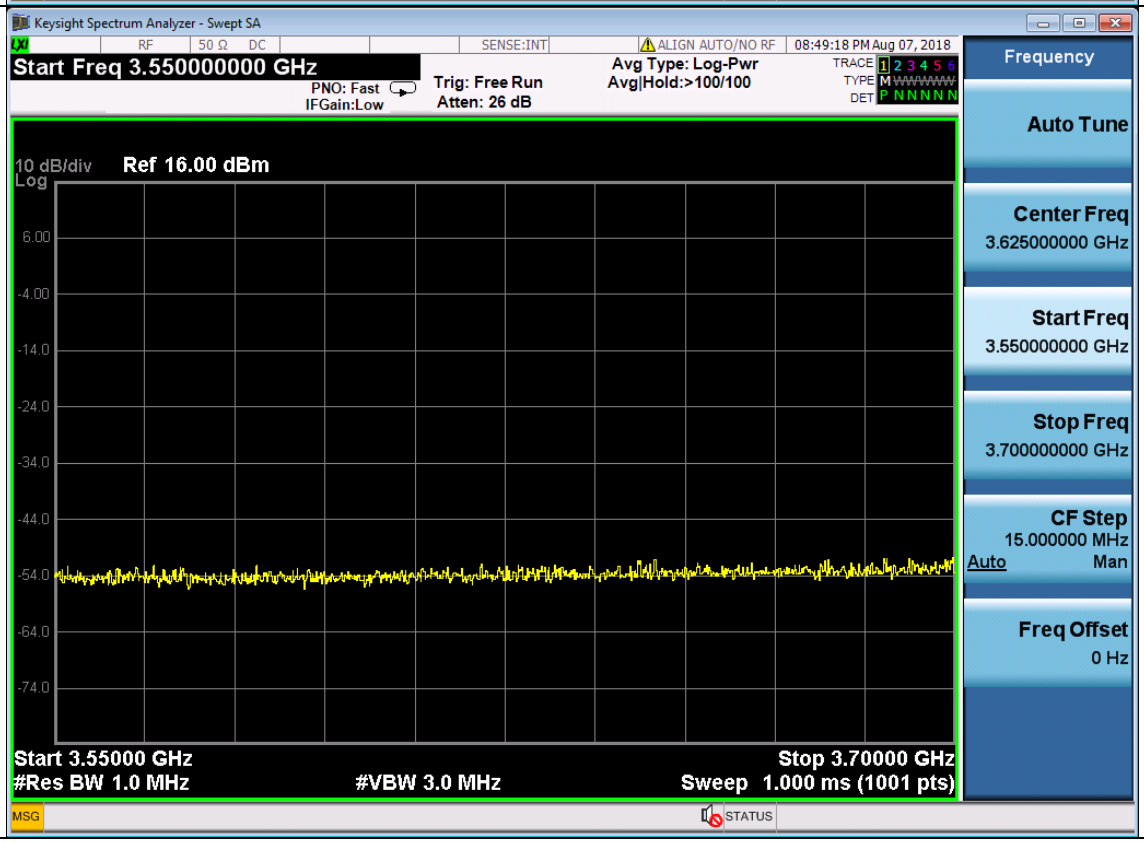
4.6.2.4.2 Heartbeat responseCode=500 (TERMINATED_GRANT)

■Test Case ID : WINNF.FT.C.HBT.4 □NA

#	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 *cbsdId* = C ○ valid *grantId* = G ○ grant is for frequency range F, power P ○ *grantExpireTime* = UTC time greater than duration of the test ● UUT is in AUTHORIZED state and is transmitting within the grant bandwidth F on RF interface	--	--
2	UUT sends a Heartbeat Request message. Ensure Heartbeat Request message is sent within latest specified heartbeatInterval, and is formatted correctly, including: ● *cbsdId* = C ● *grantId* = G ● *operationState* = "AUTHORIZED"	■ PASS	□ FAIL
3	SAS Test Harness sends a Heartbeat Response message, including the following parameters: ● *cbsdId* = C ● *grantId* = G ● *transmitExpireTime* = T = current UTC time ● *responseCode* = 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	□ FAIL

RF measurement plot for Test Case :

- UUT shall stop transmission within (T + 60 seconds) of completion of step 3.



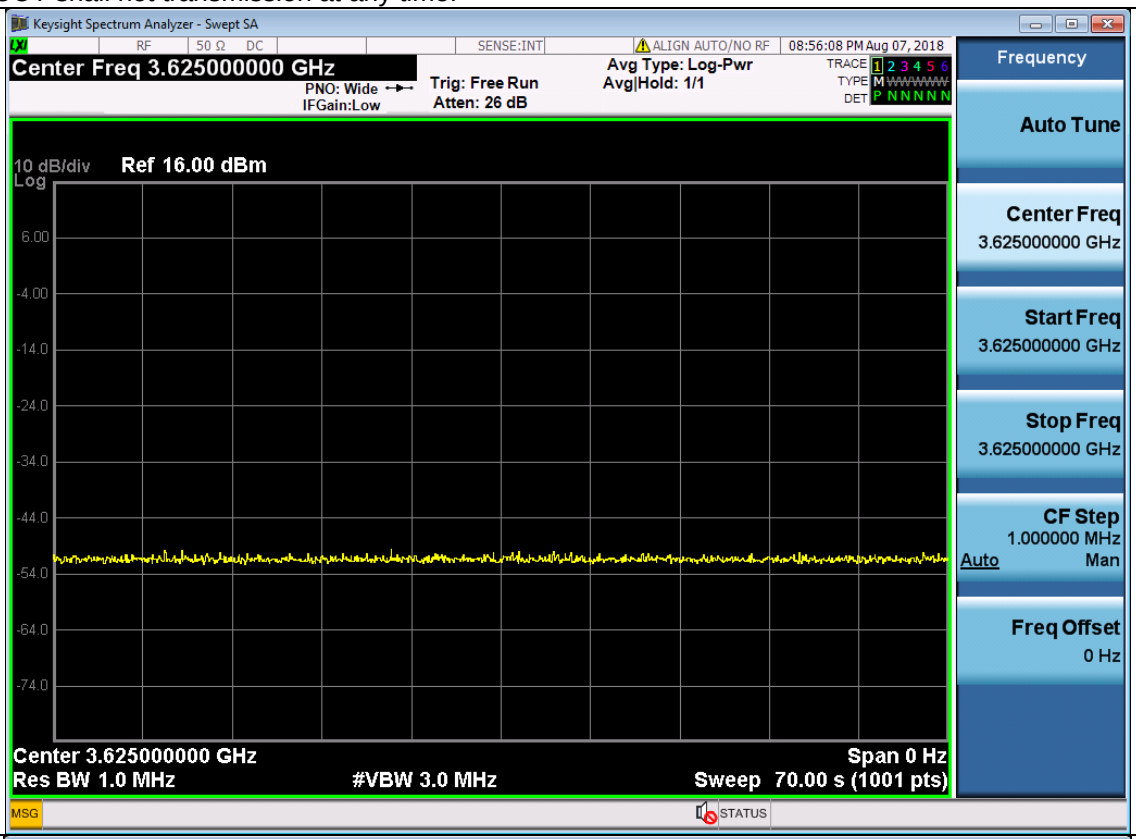
4.6.2.4.3 Heartbeat responseCode=501 (SUSPENDED_GRANT) in First Heartbeat Response

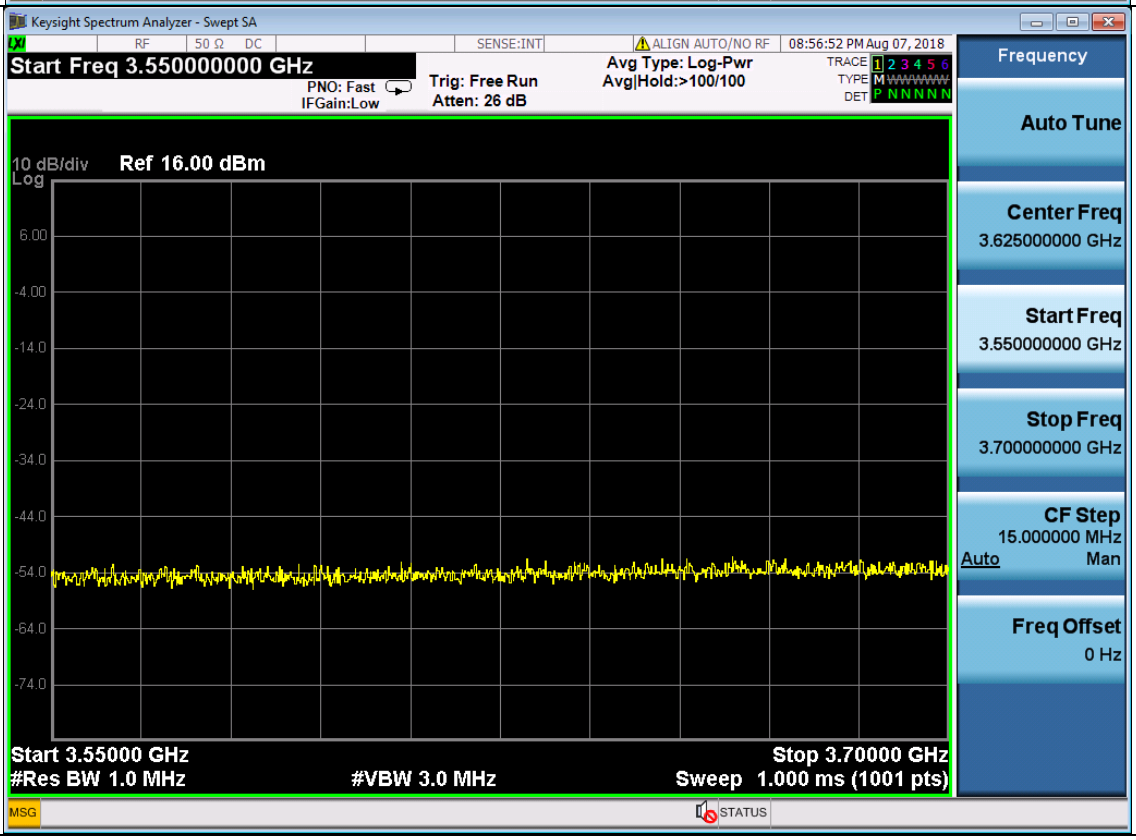
■Test Case ID : WINNF.FT.C.HBT.5 □NA

#	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 *cbsdId* = C ○ valid *grantId* = G ○ grant is for frequency range F, power P ○ *grantExpireTime* = UTC time greater than duration of the test ● UUT is in AUTHORIZED state and is transmitting within the grant bandwidth F on RF interface	--	--
2	UUT sends a Heartbeat Request message. Ensure Heartbeat Request message is sent within latest specified heartbeatInterval, and is formatted correctly, including: ● *cbsdId* = C ● *grantId* = G ● *operationState* = "AUTHORIZED"	■ PASS	□ FAIL
3	SAS Test Harness sends a Heartbeat Response message, including the following parameters: ● *cbsdId* = C ● *grantId* = G ● *transmitExpireTime* = T = current UTC time ? *responseCode* = 501 (SUSPENDED_GRANT)	--	--
4	After completion of step 3, SAS Test Harness shall not allow any further grants to the UUT.	--	--
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: ● *cbsdId* = C ● *grantId* = G ● *operationState* = "GRANTED" B. UUT sends a Relinquishment request message. Ensure message is correctly formatted with parameters: ● *cbdsId* = C ● *grantId* = G Monitor the RF output of the UUT. Verify: ● UUT does not transmit at any time	■ PASS	□ FAIL

RF measurement plot for Test Case :

- UUT shall not transmission at any time.





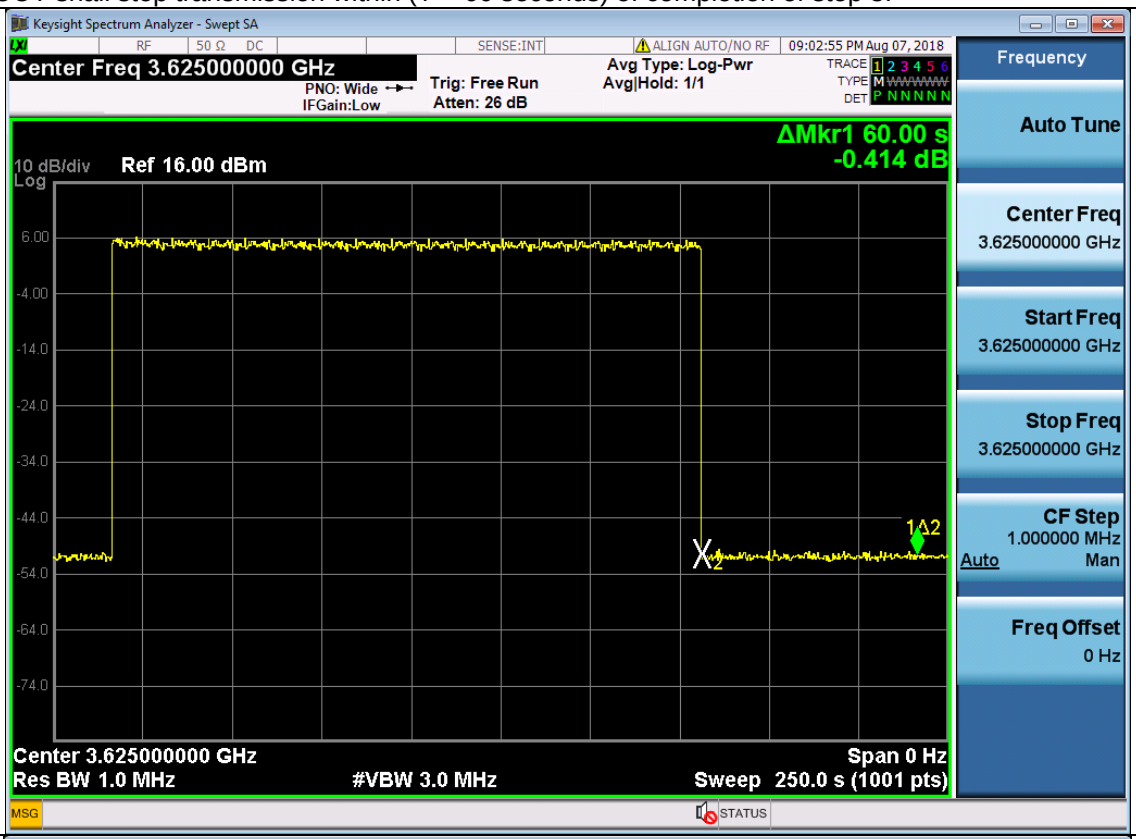
4.6.2.4.4 Heartbeat responseCode=501 (SUSPENDED_GRANT) in Subsequent Heartbeat Response

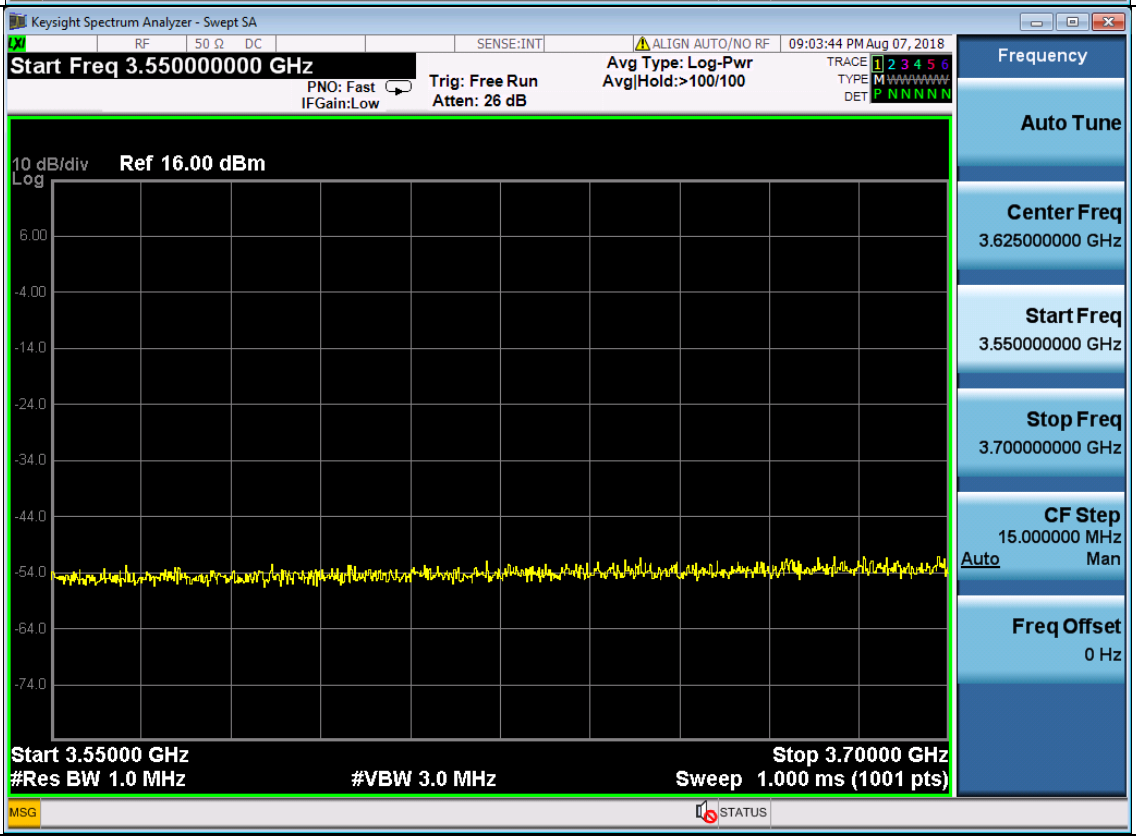
■Test Case ID : WINNF.FT.C.HBT.6 □NA

#	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 *cbsdId* = C ○ valid *grantId* = G ○ grant is for frequency range F, power P ○ *grantExpireTime* = UTC time greater than duration of the test ● UUT is in AUTHORIZED state and is transmitting within the grant bandwidth F on RF interface	--	--
2	UUT sends a Heartbeat Request message. Ensure Heartbeat Request message is sent within latest specified heartbeatInterval, and is formatted correctly, including: ● *cbsdId* = C ● *grantId* = G ● *operationState* = "AUTHORIZED"	■ PASS	□ FAIL
3	SAS Test Harness sends a Heartbeat Response message, including the following parameters: ● *cbsdId* = C ● *grantId* = G ● *transmitExpireTime* = T = current UTC time ● *responseCode* = 501 (SUSPENDED_GRANT)	--	--
4	After completion of step 3, SAS Test Harness shall not allow any further grants to the UUT.	--	--
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: ● *cbsdId* = C ● *grantId* = G ● *operationState* = "GRANTED" B. UUT sends a Relinquishment request message. Ensure message is correctly formatted with parameters: ● *cbdsId* = C ● *grantId* = G Monitor the RF output of the UUT. Verify: ● UUT shall stop transmission within (T+60) seconds of completion of step 3	■ PASS	□ FAIL

RF measurement plot for Test Case :

- UUT shall stop transmission within (T + 60 seconds) of completion of step 3.





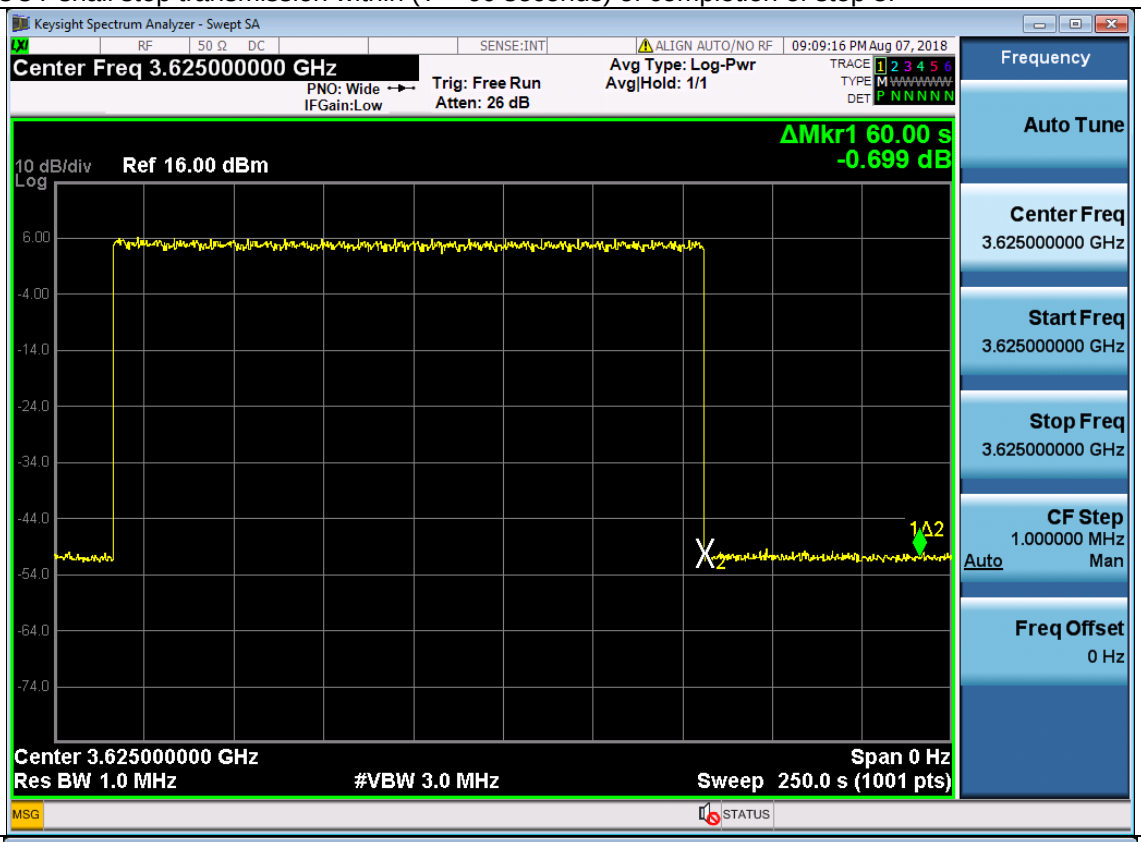
4.6.2.4.5 Heartbeat responseCode=502 (UNSYNC_OP_PARAM)

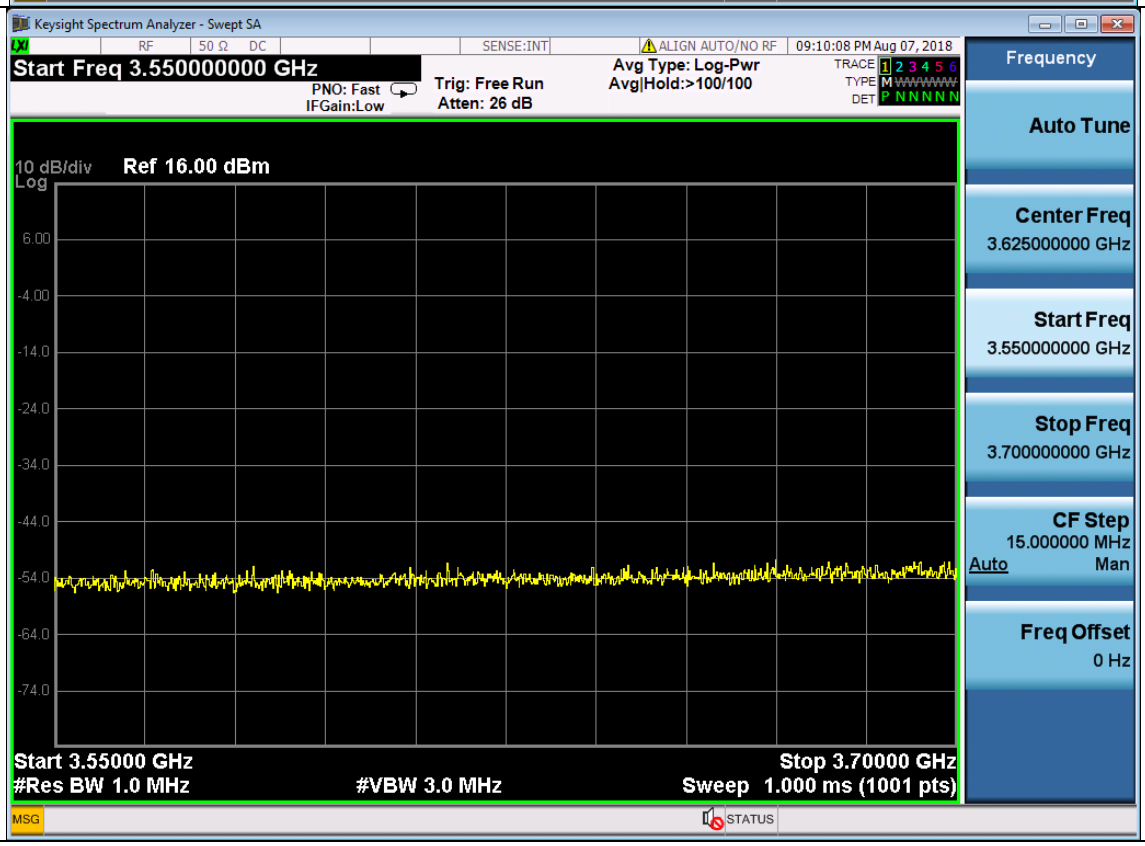
■Test Case ID : WINNF.FT.C.HBT.7 □NA

#	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 *cbsdId* = C ○ valid *grantId* = G ○ grant is for frequency range F, power P ○ *grantExpireTime* = UTC time greater than duration of the test ● UUT is in AUTHORIZED state and is transmitting within the grant bandwidth F on RF interface	--	--
2	UUT sends a Heartbeat Request message. Ensure Heartbeat Request message is sent within latest specified heartbeatInterval, and is formatted correctly, including: ● *cbsdId* = C ● *grantId* = G ● *operationState* = "AUTHORIZED"	■ PASS	□ FAIL
3	SAS Test Harness sends a Heartbeat Response message, including the following parameters: ● *cbsdId* = C ● *grantId* = G ● *transmitExpireTime* = T = current UTC time ● *responseCode* = 502 (UNSYNC_OP_PARAM)	--	--
4	After completion of step 3, SAS Test Harness shall not allow any further grants to the UUT.	--	--
5	Monitor the SAS-CBSD interface. Verify: ● UUT sends a Grant Relinquishment Request message. Verify message is correctly formatted with parameters: ○ cbsdId = C ○ grantId = G Monitor the RF output of the UUT. Verify: ● UUT shall stop transmission within (T+60) seconds of completion of step 3	■ PASS	□ FAIL

RF measurement plot for Test Case :

- UUT shall stop transmission within (T + 60 seconds) of completion of step 3.





4.6.2.4.6 Domain Proxy Heartbeat responseCode=500 (TERMINATED_GRANT)

☐Test Case ID : WINNF.FT.D.HBT.8 ■NA

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: ● DP has two CBSD registered successfully with SAS Test Harness ● Each CBSD {1,2} has a valid single grant as follows: ○ valid *cbsdId* = Ci, i={1,2} ○ valid *grantId* = Gi, i={1,2} ○ grant is for frequency range Fi, power Pi ○ *grantExpireTime* = UTC time greater than duration of the test ● Both CBSD are in AUTHORIZED state and transmitting within their granted bandwidth on RF interface	--	--
2	DP sends a Heartbeat Request message for each CBSD. This may occur in a separate message per CBSD, or together in a single message with array of size 2. Verify Heartbeat Request message is sent within latest specified *heartbeatInterval*, and is formatted correctly for each CBSD, including, for CBSDi i={1,2}: ● *cbsdId* = Ci, i = {1,2} ● *grantId* = Gi, i = {1,2} ● *operationState* = "AUTHORIZED"	☐ PASS	☐ FAIL
3	If separate Heartbeat Request message was sent for each CBSD by the DP, the SAS Test Harness shall respond to each Heartbeat Request message with a separate Heartbeat Response message. If a single Heartbeat Request message was sent by the DP containing a 2-object array (one per CBSD), the SAS Test Harness shall respond with a single Heartbeat Response message containing a 2-object array. Parameters for each CBSD within the Heartbeat Response message should be as follows, for CBSDi: ● *cbsdId* = Ci ● *grantId* = Gi ● For CBSD1: ○ *transmitExpireTime* = current UTC time + 200 seconds ○ *responseCode* = 0 ● For CBSD2: ○ *transmitExpireTime* = T = current UTC time ○ *responseCode* = 500 (TERMINATED_GRANT)	--	--
4	After completion of step 3, SAS Test Harness shall not allow any further grants to the UUT. If CBSD sends further Heartbeat Request messages for CBSD1, SAS Test Harness shall respond with a Heartbeat Response message with parameters: ● *cbsdId* = C1 ● *grantId* = G1 ● *transmitExpireTime* = current UTC time + 200 seconds ● *responseCode* = 0 ● Heartbeat Request message is within *heartbeatInterval* of previous Heartbeat Request message	--	--
5	Monitor the RF output of CBSD2. Verify: ● CBSD2 shall stop transmission within bandwidth F2 within (T + 60 seconds) of completion of step 3	☐ PASS	☐ FAIL

4.6.2.5 Heartbeat Response Absent Test Cases

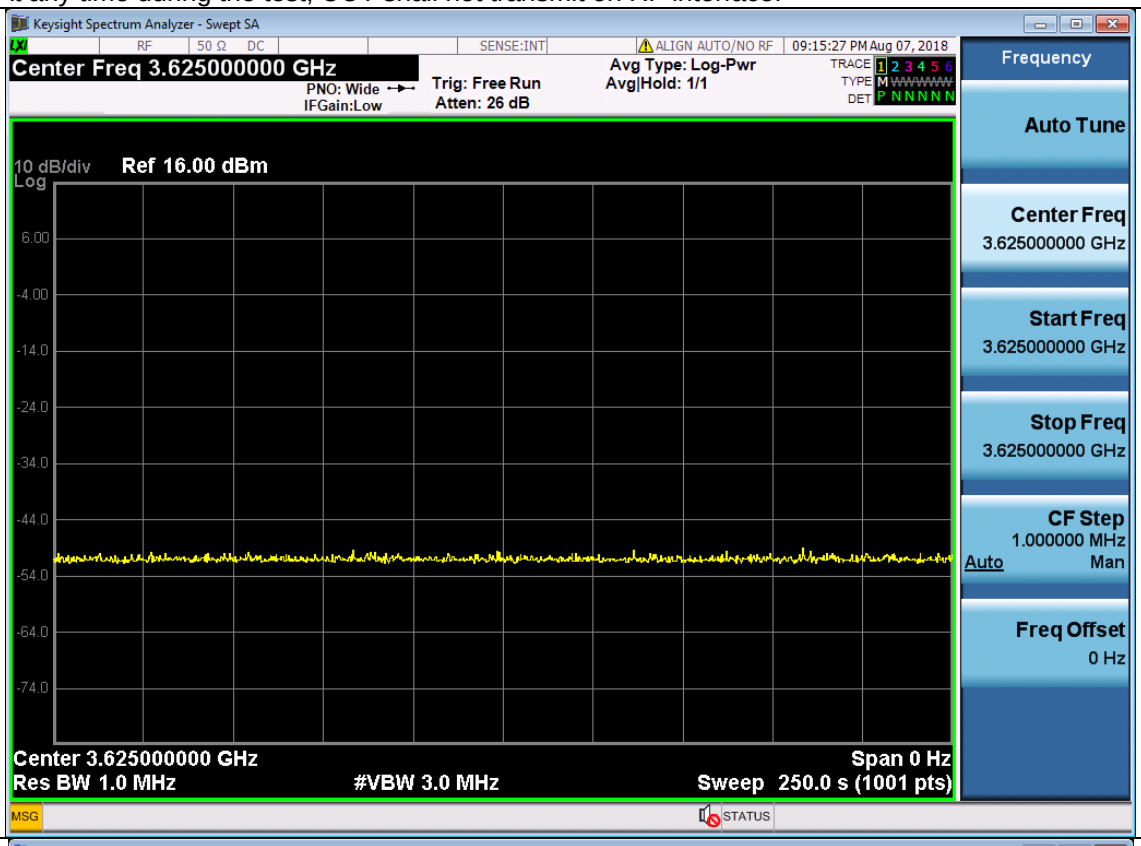
4.6.2.5.1 Heartbeat Response Absent (First Heartbeat)

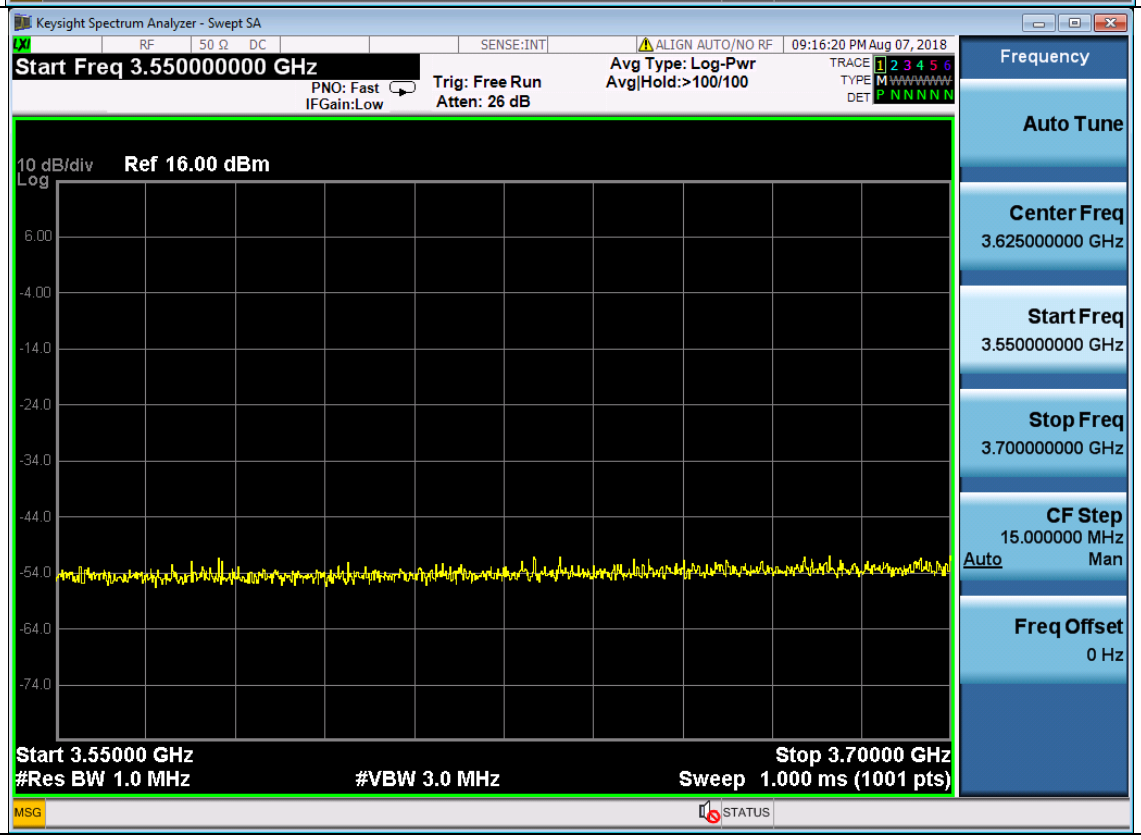
■Test Case ID : WINNF.FT.C.HBT.9 □NA

#	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 *cbsdId* = C ○ valid *grantId* = G ○ grant is for frequency range F, power P ○ *grantExpireTime* = UTC time greater than duration of the test ● UUT is in GRANTED, but not AUTHORIZED state(i.e. has not performed its first Heartbeat Request)	--	--
2	UUT sends a Heartbeat Request message. Ensure Heartbeat Request message is sent within latest specified heartbeatInterval, and is formatted correctly, including: ● *cbsdId* = C ● *grantId* = G ● *operationState* = “GRANTED”	■ PASS	□ FAIL
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	□ FAIL

RF measurement plot for Test Case :

- At any time during the test, UUT shall not transmit on RF interface.





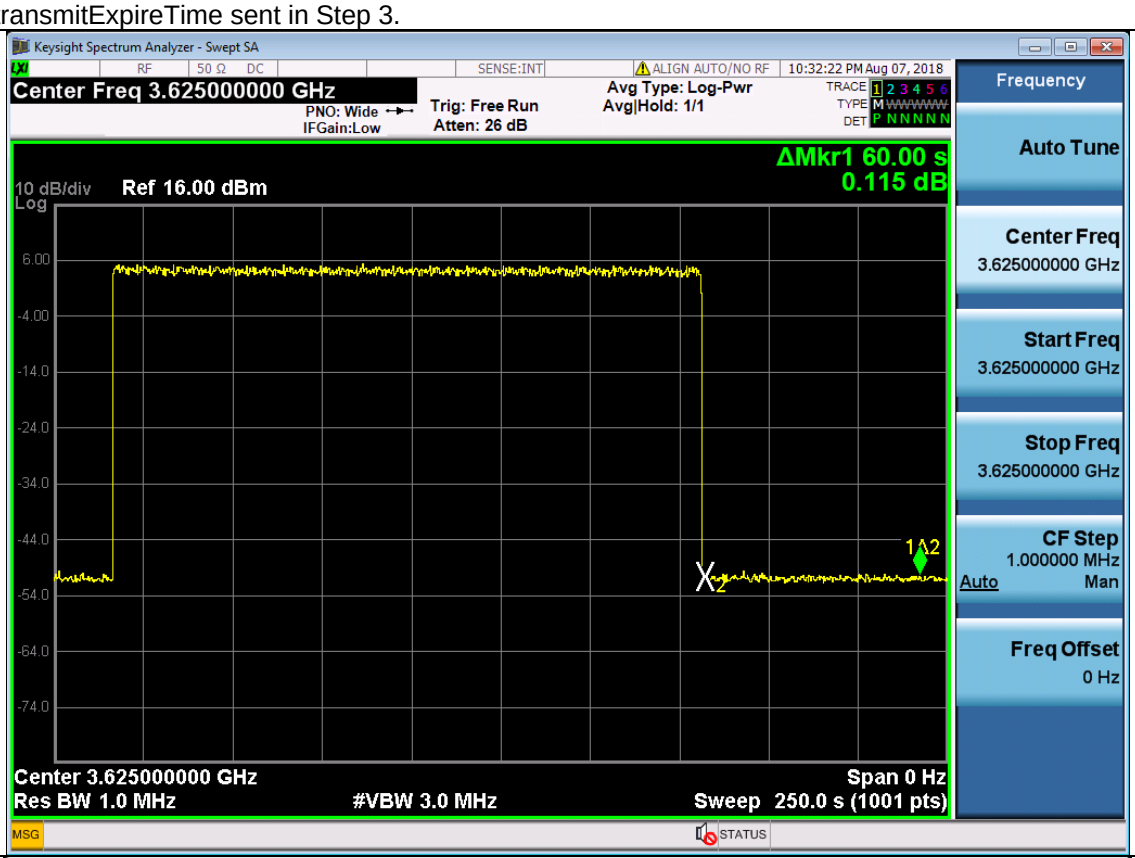
4.6.2.5.2 Heartbeat Response Absent (Subsequent Heartbeat)

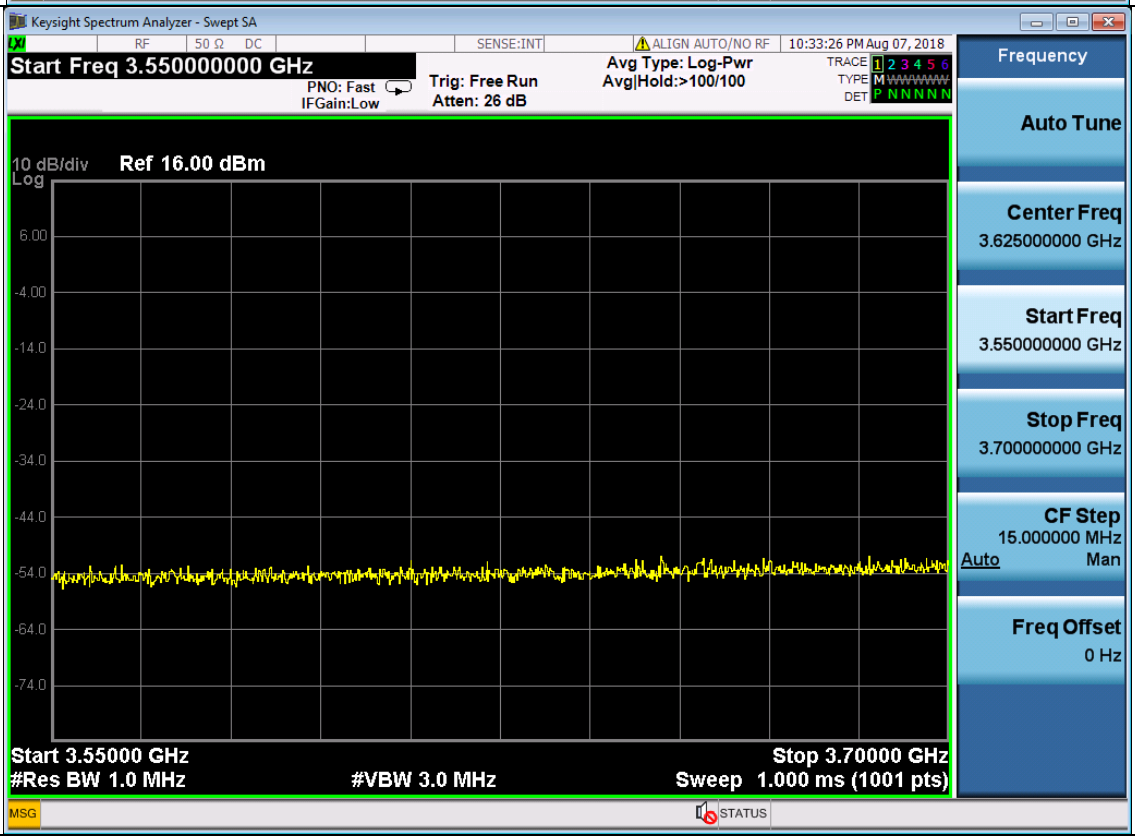
■Test Case ID : WINNF.FT.C.HBT.10 □NA

#	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 *cbsdId* = C ○ valid *grantId* = G ○ grant is for frequency range F, power P ○ *grantExpireTime* = UTC time greater than duration of the test ● UUT is in AUTHORIZED state and is transmitting within the grant bandwidth F on RF interface	--	--
2	UUT sends a Heartbeat Request message. Verify Heartbeat Request message is sent within latest specified heartbeatInterval, and is formatted correctly, including: ● *cbsdId* = C ● *grantId* = G ● *operationState* = "AUTHORIZED"	■ PASS	□ FAIL
3	SAS Test Harness sends a Heartbeat Response message, including the following parameters: ● *cbsdId* = C ● *grantId* = G ● *transmitExpireTime* = T = current UTC time ● *responseCode* = 0	--	--
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 all transmission on RF interface within (*transmitExpireTime* + 60 seconds), using the transmitExpireTime sent in Step 3.	■ PASS	□ FAIL

RF measurement plot for Test Case :

- UUT shall stop all transmission on RF interface within (transmitExpireTime + 60 seconds), using the transmitExpireTime sent in Step 3.





4.6.2.6 Heartbeat Grant Renewal Cases

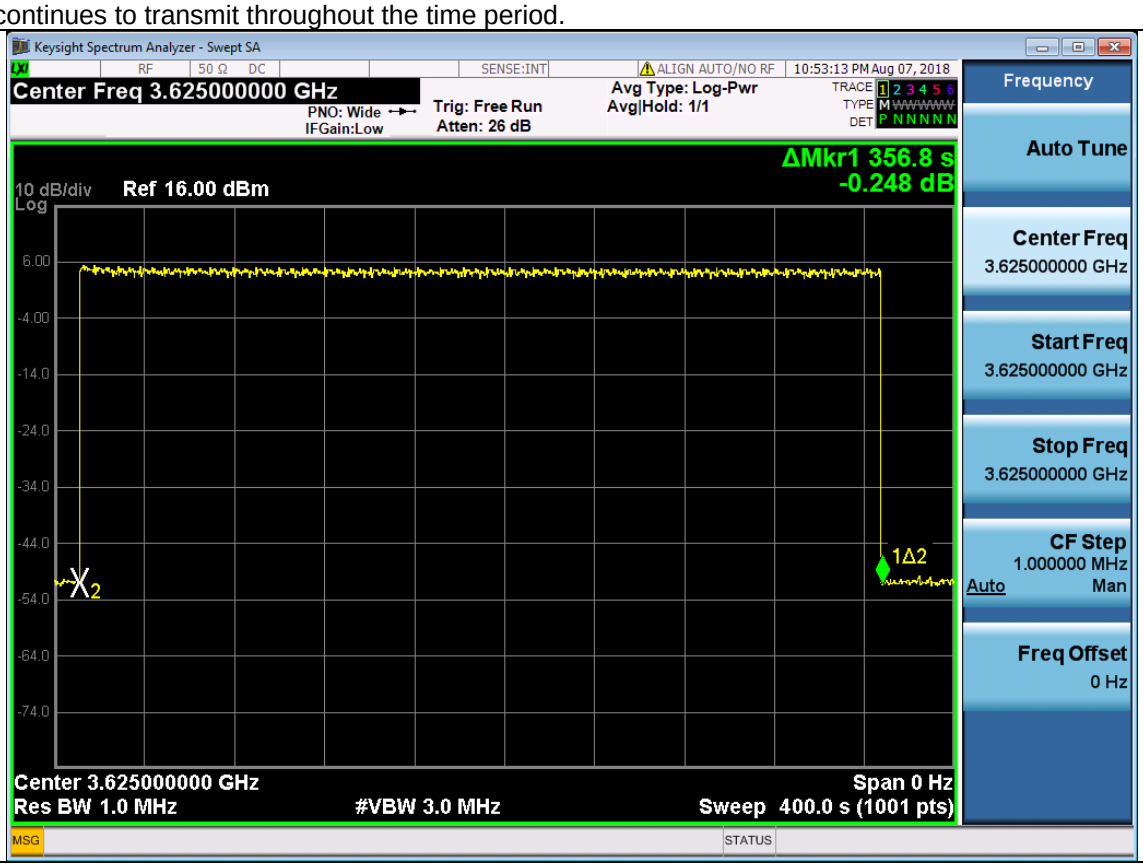
4.6.2.6.1 Successful Grant Renewal in Heartbeat Test Case

■Test Case ID : WINNF.FT.C.HBT.11 □NA

#	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 *cbsdId* = C ○ valid *grantId* = 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: ○ *grantExpireTime* =UTC time equal to time at start of test + 300 seconds = Tgrant_expire ○ *transmitExpireTime* = UTC time equal to time at start of test + 200 seconds ○ *heartbeatInterval* = 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 *heartbeatInterval*, and is formatted correctly, including: ● *cbsdId* = C ● *grantId* = G ● *operationState* = “AUTHORIZED”	■ PASS	□ FAIL
4	SAS Test Harness sends a Heartbeat Response message, with the following parameters: ● *cbsdId* = C ● *grantId* = G ● *transmitExpireTime* = current UTC + 200 seconds ● *grantExpireTime* = same as Step 1 ● *responseCode* = 0	--	--
5	Go to Step 2	--	--
6	Verify Heartbeat Request message is sent within the latest specified heartbeatInterval, and is formatted correctly, including: ● *cbsdId* = C ● *grantId* = G ● *operationState* = “AUTHORIZED” ● *grantRenew* = TRUE	■ PASS	□ FAIL
7	SAS Test Harness sends a Heartbeat Response message, with the following parameters: ● *cbsdId* = C ● *grantId* = G ● *grantExpireTime* = UTC time set far in the future ● *transmitExpireTime* = current UTC time + 200 seconds ● *responseCode* = 0	--	--
8	Continue to respond to any subsquentHeartbeat Request from CBSD with Heartbeat Response with the following parameters: ● *cbsdId* = C ● *grantId* = G ● *transmitExpireTime* = same as Step 7 ● *responseCode* = 0	--	--
9	Monitor RF transmission of UUT from start of test until Tgrant_expire + 60 seconds and ensure UUT continues to transmit throughout the time period.	■ PASS	□ FAIL

RF measurement plot for Test Case :

- Monitor RF transmission of UUT from start of test until Tgrant_expire + 60 seconds and ensure UUT continues to transmit throughout the time period.



4.6.3 CBSD Measurement Report

4.6.3.1 Measurement Report Test Cases

4.6.3.1.1 Registration Response contains measReportConfig

■Test Case ID : WINNF.FT.C.MES.1 □NA

#	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: *userId* is present and correct ● *fccId* is present and correct ● *cbsdSerialNumber* is present and correct ● *measCapability* = "RECEIVED_POWER_WITHOUT_GRANT"	■ PASS	□ FAIL
3	SAS Test Harness sends a Registration Response message, with the following parameters: ● *cbsdId* = C = valid cbsdId for this UUT ● *measReportConfig*= "RECEIVED_POWER_WITHOUT_GRANT" ● *responseCode* = 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: ● *cbsdId* = C ● *measReport* is present, and is a properly formatted *rcvdPowerMeasReport.*	■ PASS	□ FAIL
6	SAS Test Harness sends a Spectrum Inquiry Response, with the following parameters: ● *cbsdId* = C ● *availableChannel* is an array of *availableChannel* objects ● *responseCode* = 0	--	--
7	UUT sends message type Grant Request message. Verify message contains all required parameters properly formatted, and specifically: ● *cbsdId* = C ● *measReport* is present, and is a properly formatted *rcvdPowerMeasReport.*	■ PASS	□ FAIL

4.6.3.1.2 Domain Proxy Registration Response contains measReportConfig

☐Test Case ID : WINNF.FT.D.MES.2 ■NA

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

4.6.3.1.3 Grant Response contains measReportConfig

■Test Case ID : WINNF.FT.C.MES.3 □NA

#	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 *cbsdId*=C and *measCapability* = "RECEIVED_POWER_WITH_GRANT"	--	--
2	UUT sends a Grant Request message. Verify Grant Request message contains all required parameters properly formatted, and specifically: ● *cbsdId* = C ● *operationParam* is present and format is valid	■ PASS	□ FAIL
3	SAS Test Harness sends a Grant Response message, with the following parameters: ● *cbsdId* = C ● *grantId* = G = valid grant ID ● *grantExpireTime* = UTC time in the future ● *heartbeatInterval* = 60 seconds ● *measReportConfig*= "RECEIVED_POWER_WITH_GRANT" ● *operationParam* is set to valid operating parameters ● *channelType* = "GAA" ● *responseCode* = 0	--	--
4	UUT sends a Heartbeat Request message. Verify message contains all required parameters properly formatted, and specifically: ● *cbsdId* = C ● *grantId* = G ● *operationState* = "GRANTED"	■ PASS	□ FAIL
5	If Heartbeat Request message (step 4) contains *measReport* object, then: ● verify *measReport* is properly formatted as object *rcvdPowerMeasReport* ● end test, with PASS result else, if Heartbeat Request message (step 4) does not contain measReport object, then: ● If number of Heartbeat Requests sent by UUT after Step 3 is = 5, then stop test with result of FAIL	■ PASS	□ FAIL
6	SAS Test Harness sends a Heartbeat Response message, containing all required parameters properly formatted, and specifically: ● *cbsdId* = C ● grantId = G ● *transmitExpireTime* = current UTC time + 200 seconds ● *responseCode* = 0 Go to Step 4, above	--	--

4.6.3.1.4 Heartbeat Response contains measReportConfig

☐Test Case ID : WINNF.FT.C.MES.4 ■NA

#	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 *cbsdId*=C and *measCapability* = "RECEIVED_POWER_WITH_GRANT" ● UUT has received a valid grant with *grantId* = G ● UUT is in Grant State AUTHORIZED and is actively transmitting within the bounds of its grant. ● Grant has *heartbeatInterval* = 60 seconds	--	--
2	UUT sends a Heartbeat Request message. Verify Heartbeat Request message contains all required parameters properly formatted, and specifically: ● *cbsdId* = C ● *grantId* = G ● *operationState* = "AUTHORIZED"	☐ PASS	☐ FAIL
3	SAS Test Harness sends a Heartbeat Response message, containing all required parameters properly formatted, and specifically: ● *cbsdId* = C ● grantId = G ● *measReportConfig*= "RECEIVED_POWER_WITH_GRANT" ● *responseCode* = 0	--	--
4	UUT sends a Heartbeat Request message. Verify message contains all required parameters properly formatted, and specifically: ● *cbsdId* = C ● *grantId* = G ● operationState = "AUTHORIZED"	☐ PASS	☐ FAIL
5	If Heartbeat Request message (step 4) contains *measReport* object, then: ● verify *measReport* is properly formatted as object *rcvdPowerMeasReport* ● end test, with PASS result else, if Heartbeat Request message (step 4) does not contain measReport object, then: ● If number of Heartbeat Requests sent by UUT after Step 3 is = 5, then stop test with result of FAIL	☐ PASS	☐ FAIL
6	SAS Test Harness sends a Heartbeat Response message, containing all required parameters properly formatted, and specifically: ● *cbsdId* = C ● *grantId* = *G* ● *responseCode* = 0 Go to Step 4, above	--	--

4.6.3.1.5 Domain Proxy Heartbeat Response contains measReportConfig

☐Test Case ID : WINNF.FT.D.MES.5 ■NA

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: ● DP has successfully completed SAS Discovery and Authentication with SAS Test Harness ● DP has successfully registered 2 CBSD with SAS Test Harness, each with *cbsdId*=Ci, i={1,2} and *measCapability* = "RECEIVED_POWER_WITH_GRANT" ● DP has received a valid grant with *grantId* = Gi, i={1,2} for each CBSD ● Both CBSD are in Grant State AUTHORIZED and actively transmitting within the bounds of their grants. ● Grants have *heartbeatInterval* =60 seconds	--	--
2	Verify DP sends a Heartbeat Request message for each CBSD. This may occur in a separate message per CBSD, or together in a single message with array of 2. Verify Heartbeat Request message contains all required parameters properly formatted for each CBSD, specifically, for CBSDi: ● *cbsdId* = Ci ● *grantId* = Gi ● *operationState* = "AUTHORIZED"	☐ PASS	☐ FAIL
3	If a separate Heartbeat Request message was sent for each CBSD by the DP, the SAS Test Harness shall respond to each Heartbeat Request message with a separate Heartbeat Response message. If a single Heartbeat Request message was sent by the DP containing a 2-object array (one per CBSD), the SAS Test Harness shall respond with a single Heartbeat Response message containing a 2-object array. Parameters for each CBSD within the Heartbeat Response message containing all required parameters properly formatted, and specifically: ● *cbsdId* = Ci ● grantId = Gi ● *measReportConfig*= "RECEIVED_POWER_WITH_GRANT" ● *responseCode* = 0	--	--
4	Verify DP sends a Heartbeat Request message for each CBSD. This may occur in a separate message per CBSD, or together in a single message with array of 2. Verify Heartbeat Request message contains all required parameters properly formatted for each CBSD, and specifically, for CBSDi, i = {1,2}: ● *cbsdId* = Ci ● *grantId* = Gi ● operationState = "AUTHORIZED" ● Check whether *measReport* is present, and if present, ensure it is a properly formatted *rcvdPowerMeasReport* object, and record its reception for each CBSDi, i = {1,2}.	☐ PASS	☐ FAIL
5	If Heartbeat Request message (step 4) contains *measReport* object, then: ● Verify *measReport* is properly formatted as object *rcvdPowerMeasReport* ● record which CBSD have successfully sent a *measReport* object If all CBSDi, i = {1,2} have successfully sent a measReport object, then ● end test, with PASS result else, if the number of Heartbeat Requests sent per CBSD is 5 or more, then stop test with result of FAIL	☐ PASS	☐ FAIL

#	Test Execution Steps	Results	
6	If a separate Heartbeat Request message was sent for each CBSD by the DP, the SAS Test Harness shall respond to each Heartbeat Request message with a separate Heartbeat Response message. If a single Heartbeat Request message was sent by the DP containing a 2-object array (one per CBSD), the SAS Test Harness shall respond with a single Heartbeat Response message containing a 2-object array. Parameters for each CBSD within the Heartbeat Response message containing all required parameters properly formatted, and specifically: ● *cbsdId* = Ci ● grantId = Gi ● *responseCode* = 0 Go to Step 4, above.	--	--

4.6.4 CBSD Relinquishment Process

4.6.4.1 Successful Relinquishment Request (responseCode 0)

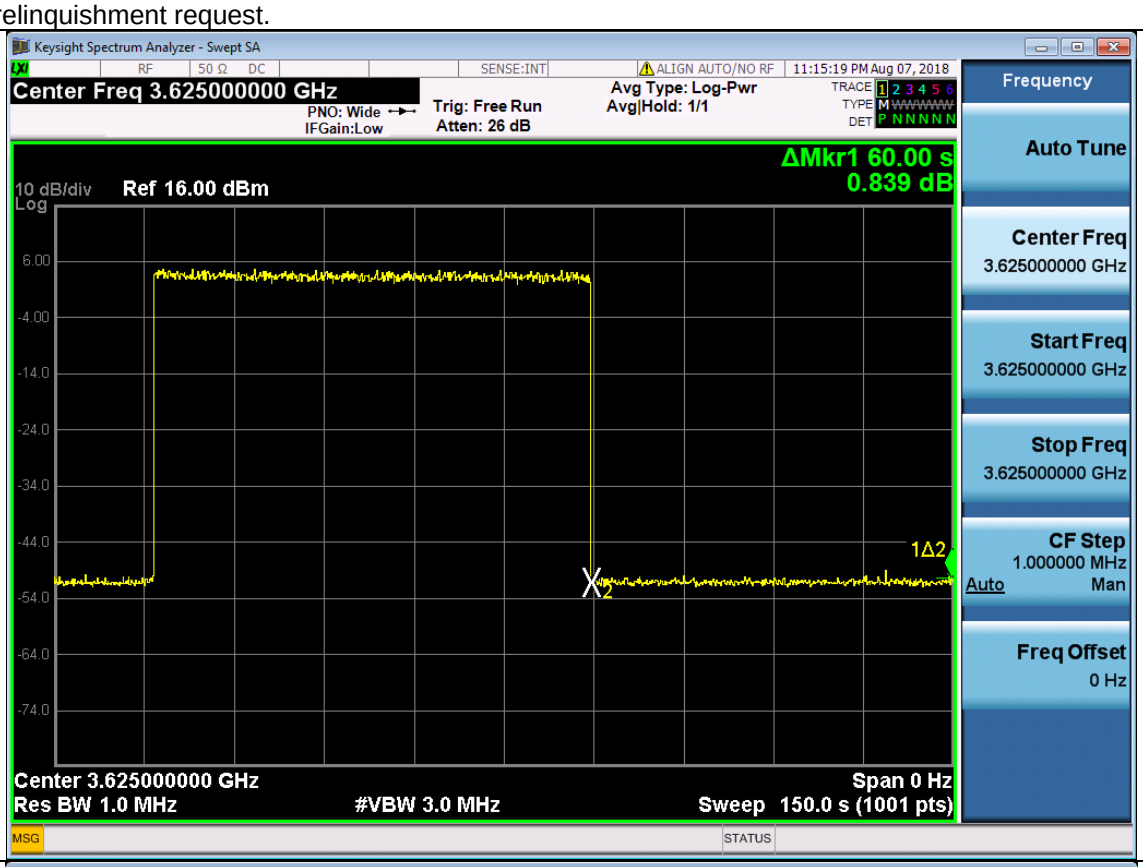
4.6.4.1.1 Successful Relinquishment

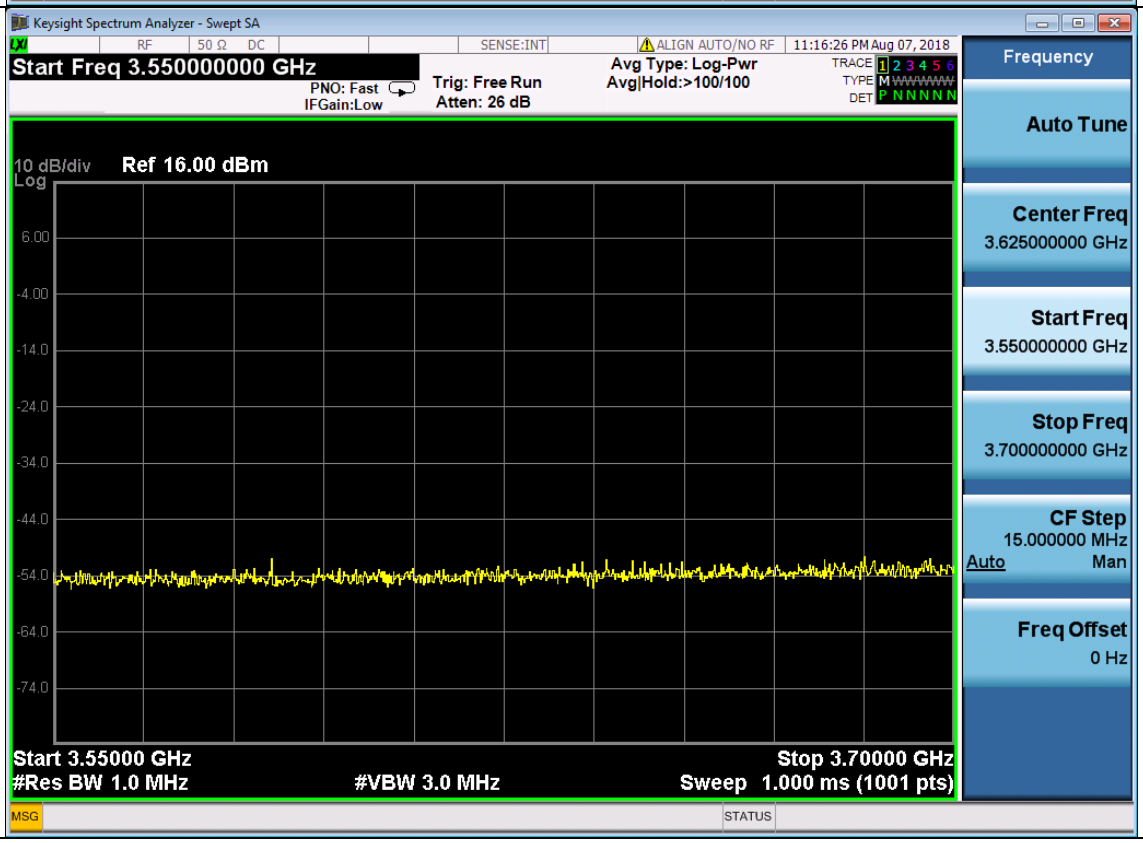
■Test Case ID : WINNF.FT.C.RLQ.1 □NA

#	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 *cbsdId*=C ● UUT has received a valid grant with *grantId* = 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: ● *cbsdId* = C ● *grantId* = G	■ PASS	□ FAIL
3	SAS Test Harness shall approve the request with a Relinquishment Response message with parameters: - *cbsdId* = C - *grantId* = G - responseCode = 0	--	--
4	After completion of step 3, SAS Test Harness will not provide any additional positive response (*responseCode*=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	□ FAIL

RF measurement plot for Test Case :

- UUT shall stop RF transmission at any time between triggering the relinquishment and UUT sending the relinquishment request.





4.6.4.1.2 Domain Proxy Successful Relinquishment

☐Test Case ID : WINNF.FT.D.RLQ.2 ■NA

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: ● DP has successfully completed SAS Discovery and Authentication with SAS Test Harness ● DP has successfully registered 2 CBSD with SAS Test Harness, each with *cbsdId*=Ci, i={1,2} ● DP has received a valid grant with *grantId* = Gi, i={1,2} for each CBSD ● Both CBSD are in Grant State AUTHORIZED and actively transmitting within the bounds of their grants. Invoke trigger to relinquish each UUT Grant from the SAS Test Harness	--	--
2	Verify DP sends a Relinquishment Request message for each CBSD. This may occur in a separate message per CBSD, or together in a single message with array of 2. Verify Relinquishment Request message contains all required parameters properly formatted for each CBSD, specifically, for CBSDi: ● *cbsdId* = Ci ● *grantId* = Gi	☐ PASS	☐ FAIL
3	If a separate Relinquishment Request message was sent for each CBSD by the DP, the SAS Test Harness shall respond to each request message with a separate response message. If a single Relinquishment Request message was sent by the DP containing a 2-object array (one per CBSD), the SAS Test Harness shall respond with a single Response message containing a 2-object array. Parameters for each CBSD within the Relinquishment Response shall be as follows: ● *cbsdId* = Ci ● *grantId* = Gi ● *responseCode* = 0	--	--
4	After completion of step 3, SAS Test Harness will not provide any additional positive response (*responseCode*=0) to further request messages from the UUT.	--	--
5	Monitor the RF output of each UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify: ● UUT shall stop RF transmission at any time between triggering the relinquishments and UUT sending the relinquishment requests for each CBSD.	☐ PASS	☐ FAIL

4.6.4.2 Missing Parameter (responseCode 102)

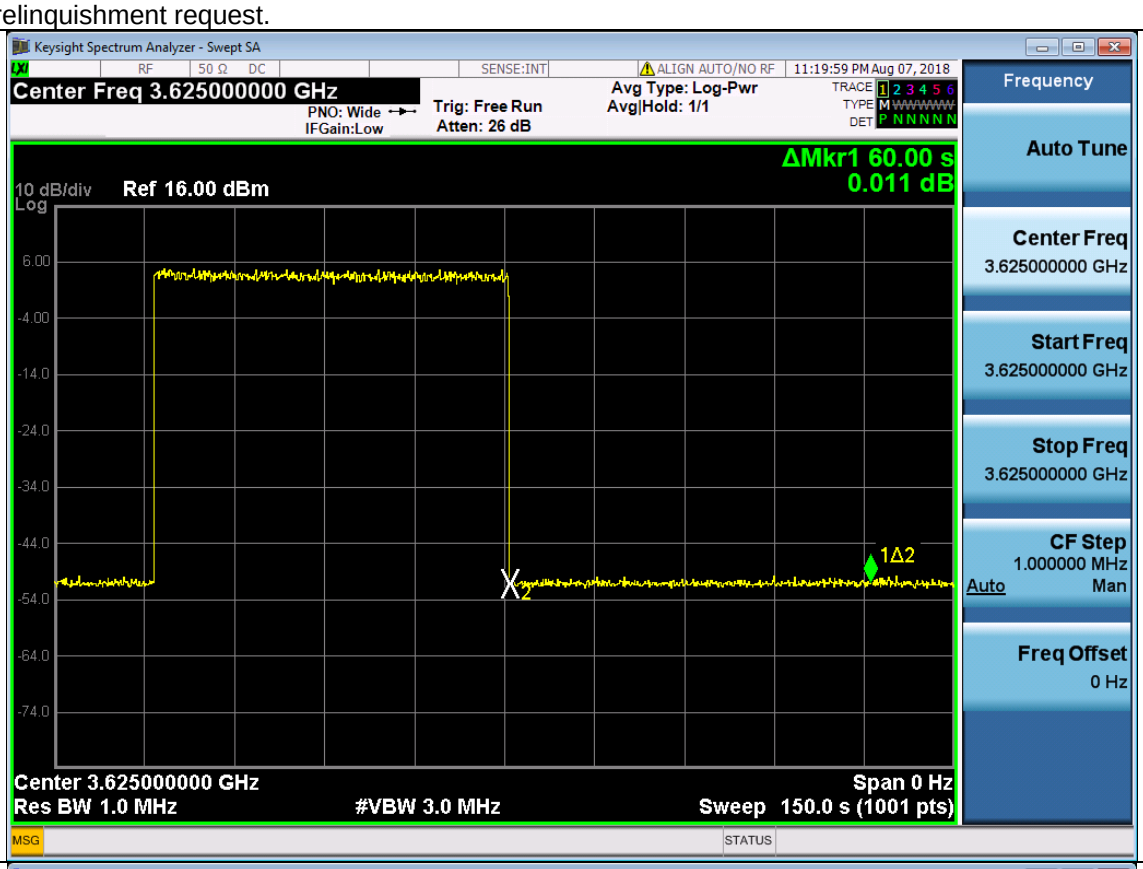
4.6.4.2.1 Unsuccessful Relinquishment, responseCode=102

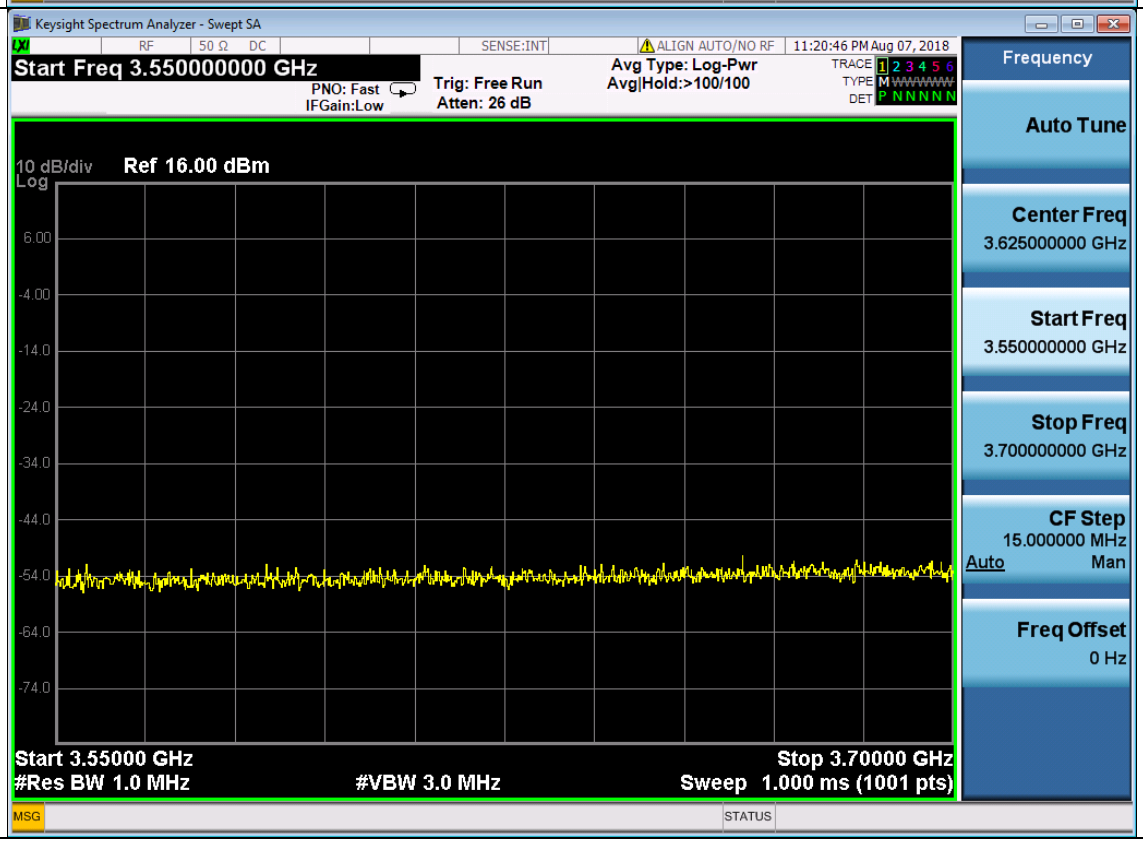
■Test Case ID : WINNF.FT.C.RLQ.3 □NA

#	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 *cbsdId*=C ● UUT has received a valid grant with *grantId* = 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: ● *cbsdId* = C ● *grantId* = G	--	--
3	SAS Test Harness shall send a Relinquishment Response message with parameters: ● *cbsdId* = C ● No grantId ● responseCode = R	--	--
4	After completion of step 3, SAS Test Harness will not provide any positive response (*responseCode*=0) to further request messages from the UUT.	--	--
5	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	□ FAIL

RF measurement plot for Test Case :

- UUT stopped RF transmission at any time between triggering the relinquishment and UUT sending the relinquishment request.





4.6.4.2.2 Domain Proxy Unsuccessful Relinquishment, responseCode=102

☐Test Case ID : WINNF.FT.D.RLQ.4 ■NA

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: ● DP has successfully completed SAS Discovery and Authentication with SAS Test Harness ● DP has successfully registered 2 CBSD with SAS Test Harness, each with *cbsdId*=Ci, i={1,2} ● DP has received a valid grant with *grantId* = Gi, i={1,2} for each CBSD ● Both CBSD are in Grant State AUTHORIZED and actively transmitting within the bounds of their grants. Invoke trigger on UUT to Relinquish Grant from the SAS Test Harness	--	--
2	DP with two CBSDs sends Relinquishment Request with two objects to the SAS Test Harness. This may occur in a separate message per CBSD, or together in a single message with array of 2. Verify DP sends a Relinquishment Request message for each CBSD. This may occur in a separate message per CBSD, or together in a single message with array of 2. Verify Relinquishment Request message contains all required parameters properly formatted for each CBSD, specifically, for CBSDi: ● *cbsdId* = Ci ● *grantId* = Gi	--	--
3	If a separate Relinquishment Request message was sent for each CBSD by the DP, the SAS Test Harness shall respond to each request message with a separate response message. If a single Relinquishment Request message was sent by the DP containing a 2-object array (one per CBSD), the SAS Test Harness shall respond with a single Response message containing a 2-object array. Parameters for each CBSD within the Relinquishment Response Message shall be as follows: ● *cbsdId* = Ci ● No grantId ● responseCode = Ri	--	--
4	After completion of step 3, SAS Test Harness will not provide any positive response (*responseCode*=0) to further request messages from the UUT.	--	--
5	Monitor the RF output of each UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify: A. UUT stopped RF transmission at any time between triggering the relinquishment and UUT sending the relinquishment request	☐ PASS	☐ FAIL

4.6.4.3 Invalid Parameter (responseCode 103)

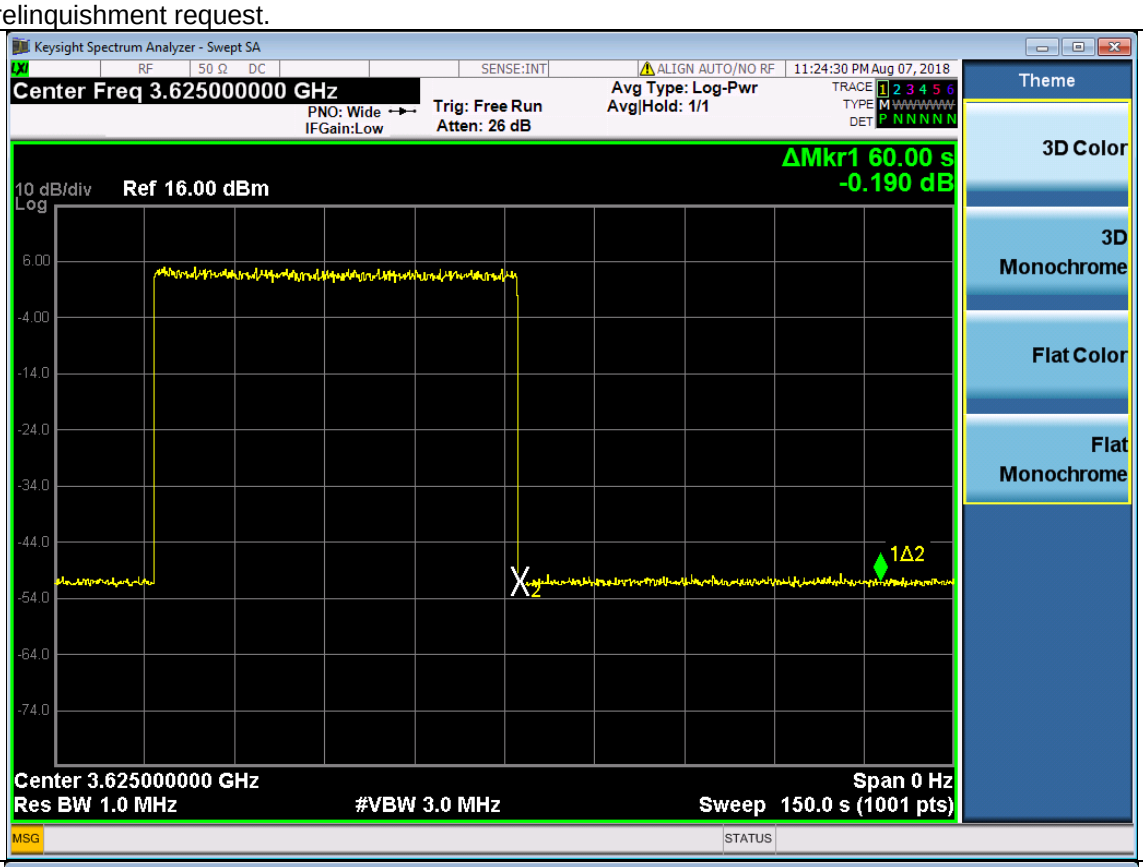
4.6.4.3.1 Unsuccessful Relinquishment, responseCode=103

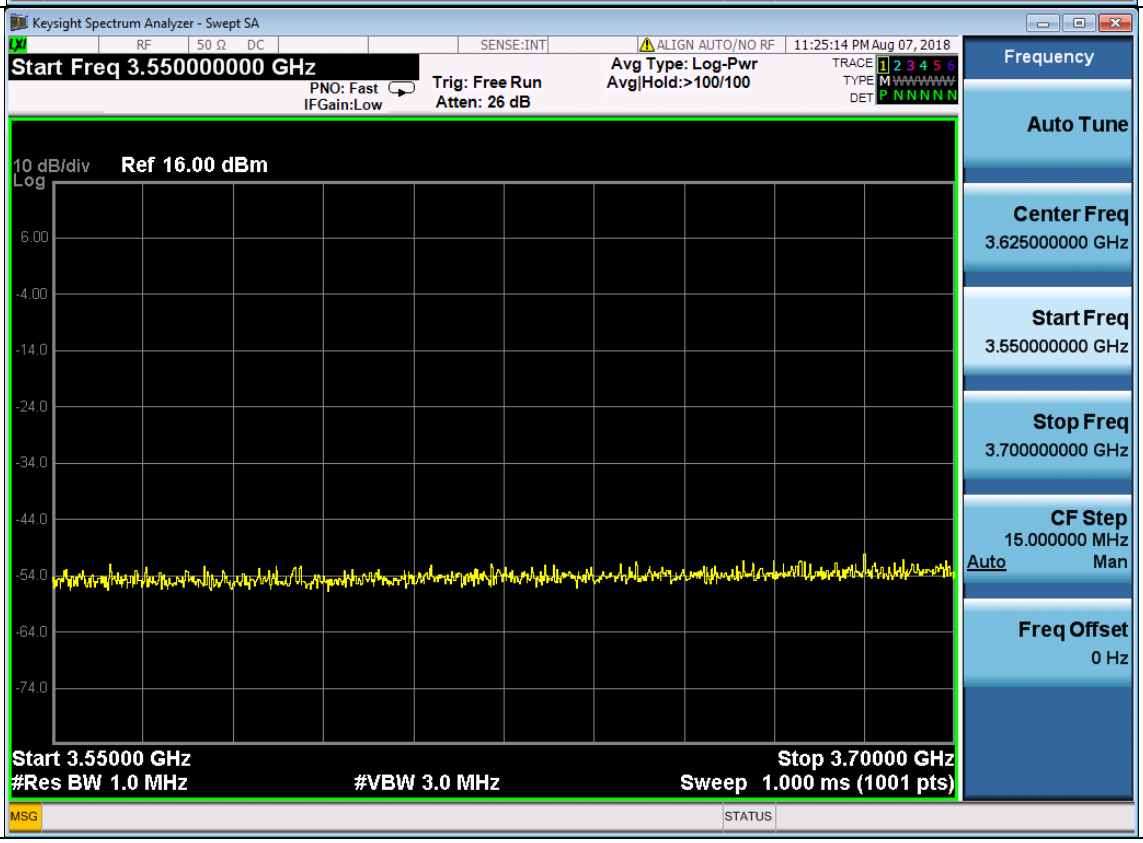
■Test Case ID : WINNF.FT.C.RLQ.5 □NA

#	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 *cbsdId*=C ● UUT has received a valid grant with *grantId* = 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: ● *cbsdId* = C ● *grantId* = G	--	--
3	SAS Test Harness shall send a Relinquishment Response message with parameters: ● *cbsdId* = C ● No grantId ● responseCode = R	--	--
4	After completion of step 3, SAS Test Harness will not provide any positive response (*responseCode*=103 and *responseData* = “grantId”) 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	□ FAIL

RF measurement plot for Test Case :

- UUT stopped RF transmission at any time between triggering the relinquishment and UUT sending the relinquishment request.





4.6.4.3.2 Domain Proxy Unsuccessful Relinquishment, responseCode=103

☐Test Case ID : WINNF.FT.D.RLQ.6 ■NA

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: ● DP has successfully completed SAS Discovery and Authentication with SAS Test Harness ● DP has successfully registered 2 CBSD with SAS Test Harness, each with *cbsdId*=Ci, i={1,2} ● DP has received a valid grant with *grantId* = Gi, i={1,2} for each CBSD ● Both CBSD are in Grant State AUTHORIZED and actively transmitting within the bounds of their grants. Invoke trigger on UUT to Relinquish Grant from the SAS Test Harness	--	--
2	DP with two CBSDs sends Relinquishment Request with two objects to the SAS Test Harness. This may occur in a separate message per CBSD, or together in a single message with array of 2. Verify DP sends a Relinquishment Request message for each CBSD. This may occur in a separate message per CBSD, or together in a single message with array of 2. Verify Relinquishment Request message contains all required parameters properly formatted for each CBSD, specifically, for CBSDi: ● *cbsdId* = Ci ● *grantId* = Gi	--	--
3	If a separate Relinquishment Request message was sent for each CBSD by the DP, the SAS Test Harness shall respond to each request message with a separate response message. If a single Relinquishment Request message was sent by the DP containing a 2-object array (one per CBSD), the SAS Test Harness shall respond with a single Response message containing a 2-object array. Parameters for each CBSD within the Relinquishment Response Message shall be as follows: ● *cbsdId* = Ci ● No grantId ● responseCode = Ri	--	--
4	After completion of step 3, SAS Test Harness will not provide any positive response (responseCode (Ri) = 103 and responseData = “grantId” for each CBSD) to further request messages from the UUT.	--	--
5	Monitor the RF output of each UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify: B. UUT stopped RF transmission at any time between triggering the relinquishment and UUT sending the relinquishment request	☐ PASS	☐ FAIL

4.6.5 CBSD Deregistration Process

4.6.5.1 Successful Deregistration Request (responseCode 0)

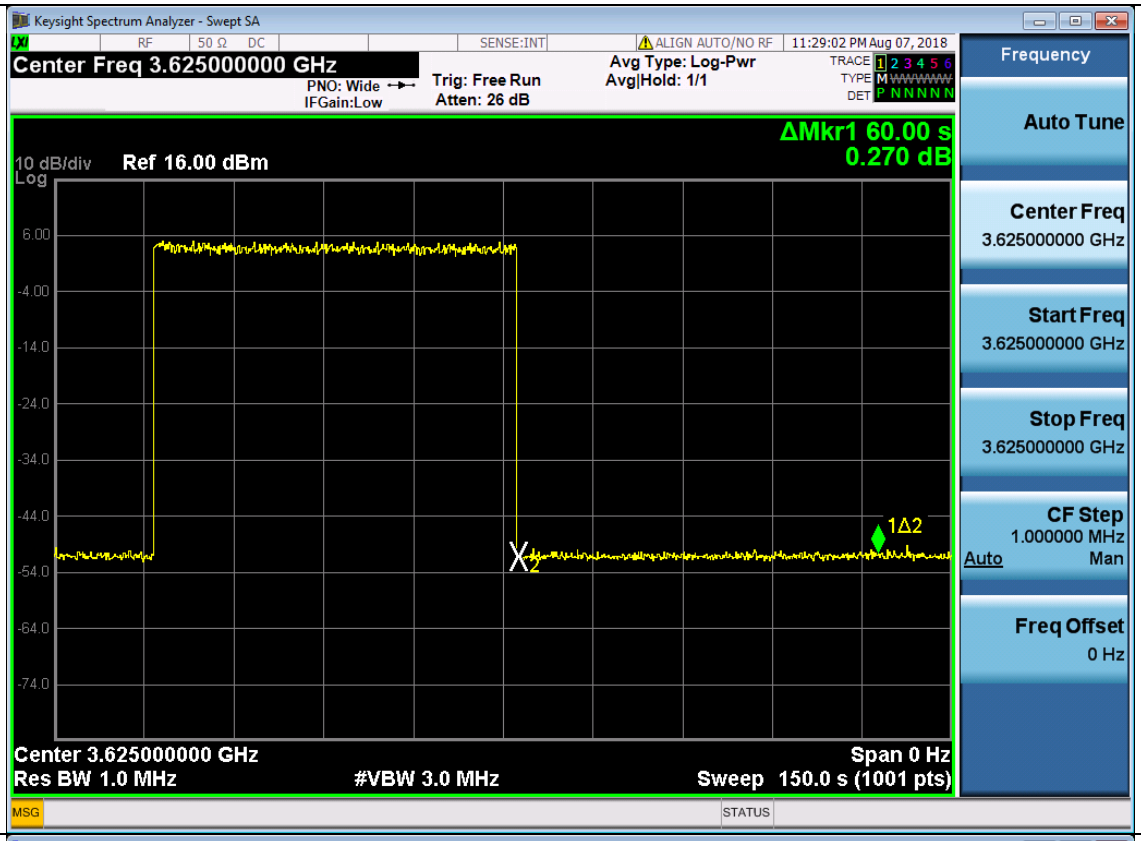
4.6.5.1.1 Successful Deregistration

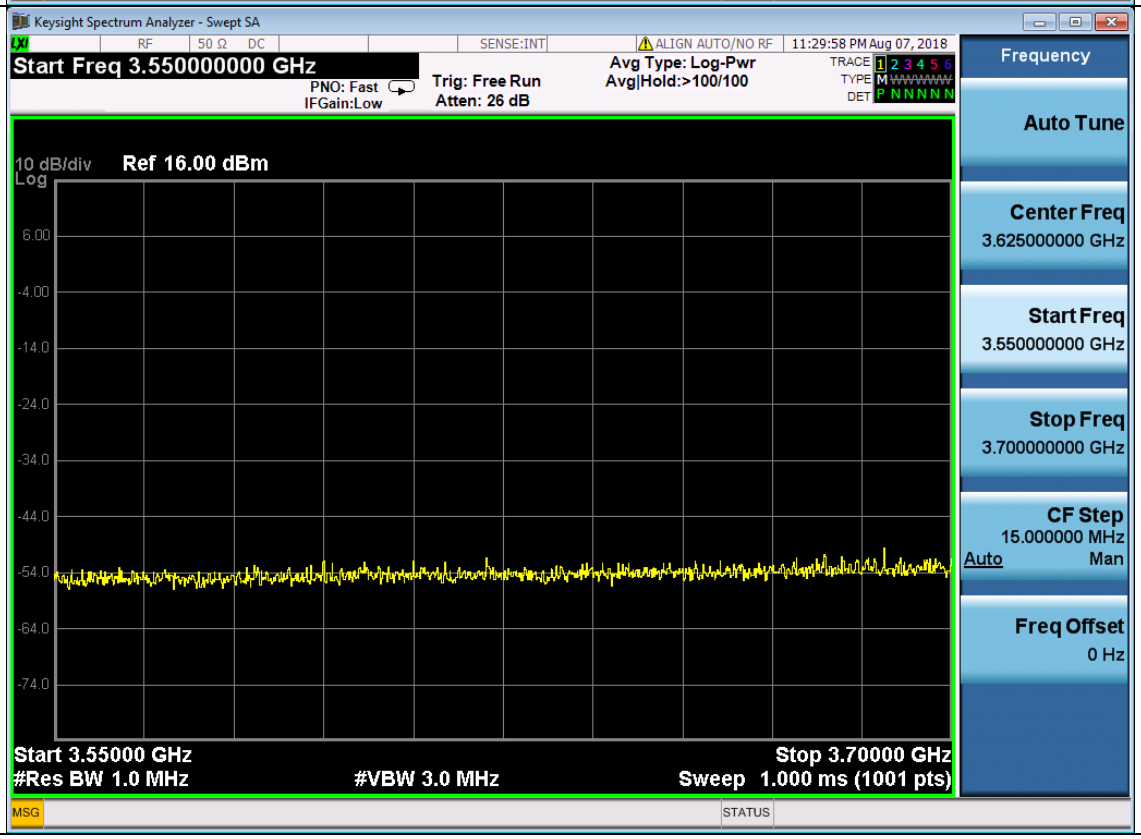
■Test Case ID : WINNF.FT.C.DRG.1 □NA

#	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 *cbsdId*=C ● UUT has received a valid grant with *grantId* = 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 *responseCode*=0	--	--
3	UUT sends Deregistration Request to SAS Test Harness with *cbsdId* = C.	■ PASS	□ FAIL
4	SAS Test Harness shall approve the request with a Deregistration Response message with parameters: ● *cbsdId* = C ● *responseCode* = 0	--	--
5	After completion of step 3, SAS Test Harness will not provide any additional positive response (*responseCode*=0) to further request messages from the UUT.	--	--
6	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	□ FAIL

RF measurement plot for Test Case :

- UUT stopped RF transmission at any time between triggering the deregistration and either A OR B occurs.





4.6.5.1.2 Domain Proxy Successful Deregistration

☐Test Case ID : WINNF.FT.D.DRG.2 ■NA

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: ● Each UUT has successfully registered with SAS Test Harness ● Each UUT is in the authorized state ● DP has successfully completed SAS Discovery and Authentication with SAS Test Harness ● DP has successfully registered 2 CBSD with SAS Test Harness, each with *cbsdId*=Ci, i={1,2} ● DP has received a valid grant with *grantId* = Gi, i={1,2} for each CBSD ● Both CBSD are in Grant State AUTHORIZED and actively transmitting within the bounds of their grants. Invoke trigger to deregister each UUT from the SAS Test Harness	--	--
2	UUT sends a Relinquishment request and receives Relinquishment response with *responseCode*=0	--	--
3	Verify DP sends a Deregistration Request message for each CBSD. This may occur in a separate message per CBSD, or together in a single message with array of 2. Verify Deregistration Request message contains all required parameters properly formatted for each CBSD, specifically, for CBSDi: ● *cbsdId* = Ci	☐ PASS	☐ FAIL
4	If a separate Deregistration Request message was sent for each CBSD by the DP, the SAS Test Harness shall respond to each request message with a separate response message. If a single Deregistration Request message was sent by the DP containing a 2-object array (one per CBSD), the SAS Test Harness shall respond with a single Response message containing a 2-object array. Parameters for each CBSD within the Deregistration Response shall be as follows: ● *cbsdId* = Ci ● *responseCode* = 0	--	--
5	After completion of step 4, SAS Test Harness will not provide any positive response (*responseCode*=0) to further request messages from the UUT.	--	--
6	Monitor the RF output of each UUT from start of test until 60 seconds after Step 4 is complete. This is the end of the test. Verify: ● 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	☐ FAIL

4.6.5.2 Missing Parameter (responseCode 102)

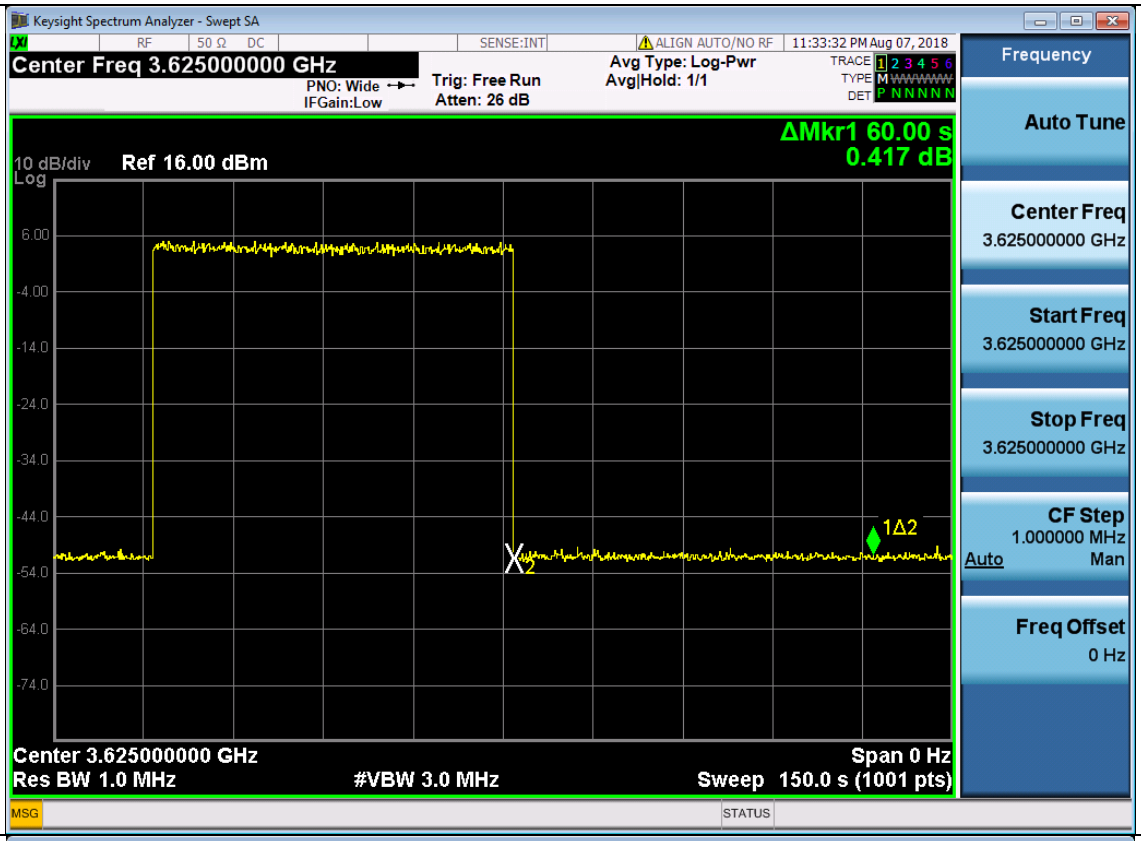
4.6.5.2.1 Deregistration responseCode=102

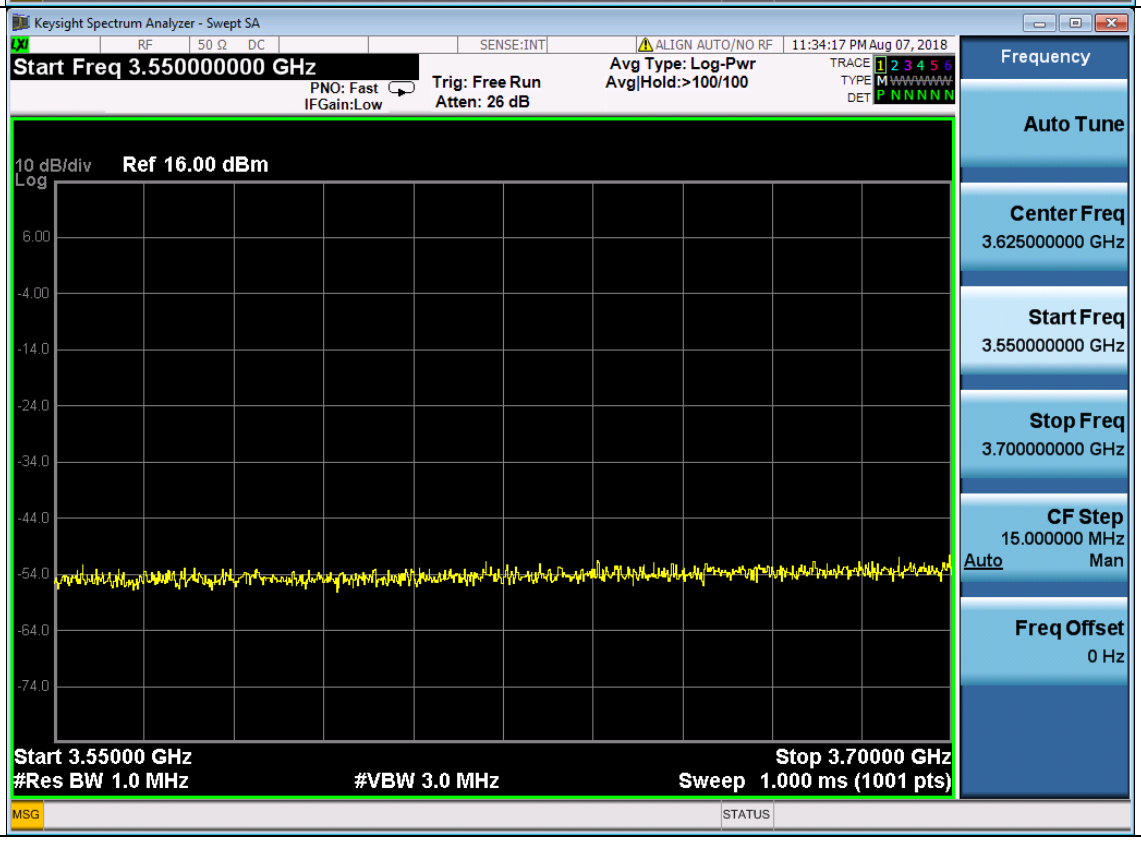
■Test Case ID : WINNF.FT.C.DRG.3 □NA

#	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 *cbsdId*=C ● UUT has received a valid grant with *grantId* = 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 *responseCode*=0	--	--
3	UUT sends Deregistration Request to SAS Test Harness with *cbsdId* = C	--	--
4	The SAS Test Harness sends the Deregistration Response Message to UUT with: ● No cbsdId ● *responseCode* = 102	--	--
5	After completion of step 3, SAS Test Harness will not provide any positive response (*responseCode*=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	□ FAIL

RF measurement plot for Test Case :

- UUT stopped RF transmission at any time between triggering the deregistration and either A OR B occurs.





4.6.5.2.2 Domain Proxy Deregistration responseCode=102

☐Test Case ID : WINNF.FT.D.DRG.4 ■NA

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: ● DP has successfully completed SAS Discovery and Authentication with SAS Test Harness ● DP has successfully registered 2 CBSD with SAS Test Harness, each with *cbsdId*=Ci, i={1,2} ● DP has received a valid grant with *grantId* = Gi, i={1,2} for each CBSD ● Both CBSD are in Grant State AUTHORIZED and actively transmitting within the bounds of their grants. Invoke trigger to deregister each UUT from the SAS Test Harness	--	--
2	UUT sends a Relinquishment request and receives Relinquishment response with *responseCode*=0 for each CBSD	--	--
3	Verify DP sends a Deregistration Request message for each CBSD. This may occur in a separate message per CBSD, or together in a single message with array of 2. Verify Deregistration Request message contains all required parameters properly formatted for each CBSD, specifically, for CBSDi: ● *cbsdId* = Ci	--	--
4	If a separate Deregistration Request message was sent for each CBSD by the DP, the SAS Test Harness shall respond to each request message with a separate response message. If a single Deregistration Request message was sent by the DP containing a 2-object array (one per CBSD), the SAS Test Harness shall respond with a single Response message containing a 2-object array. Parameters for each CBSD within the Deregistration Response Message shall be as follows: ● No cbsdId in either response ● responseCode = Ri	--	--
5	After completion of step 3, SAS Test Harness will not provide any positive response (*responseCode*=0) to further request messages from the UUT.	--	--
6	Monitor the RF output of each UUT from start of test until 60 seconds after Step 4 is complete. This is the end of the test. Verify: ● 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	☐ FAIL

4.6.5.3 Invalid Parameter (responseCode 103)

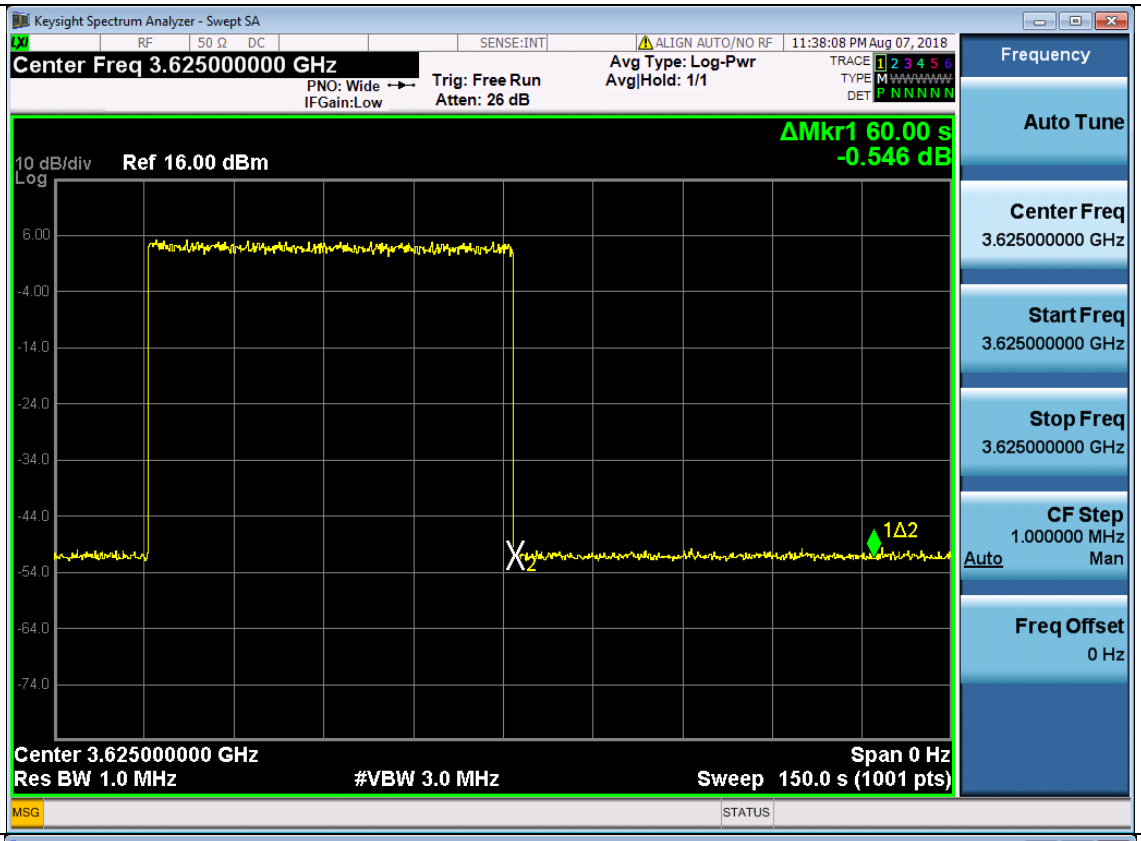
4.6.5.3.1 Deregistration responseCode=103

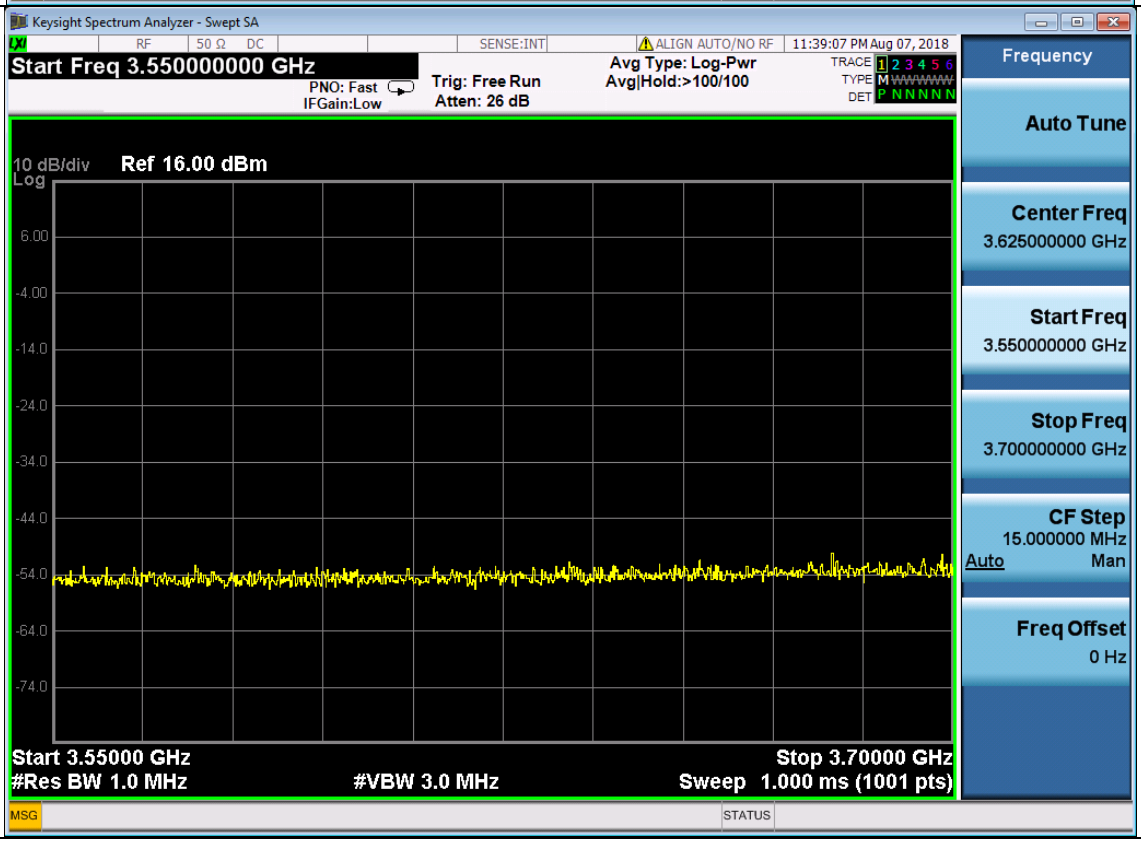
■Test Case ID : WINNF.FT.C.DRG.5 □NA

#	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 *cbsdId*=C ● UUT has received a valid grant with *grantId* = 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 *responseCode*=0	--	--
3	UUT sends Deregistration Request to SAS Test Harness with *cbsdId* = C	--	--
4	The SAS Test Harness sends the Deregistration Response Message to UUT with: ● No cbsdId ● *responseCode* = 102	--	--
5	After completion of step 3, SAS Test Harness will not provide any positive response (*responseCode*=103 and *responseData* = “cbsdId”.) 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	□ FAIL

RF measurement plot for Test Case :

- UUT stopped RF transmission at any time between triggering the deregistration and either A OR B occurs.





4.6.6 CBSD Security Validation

4.6.6.1 Successful TLS connection

4.6.6.1.1 Successful TLS connection between UUT and SAS Test Harness

■Test Case ID : WINNF.FT.C.SCS.1 □NA

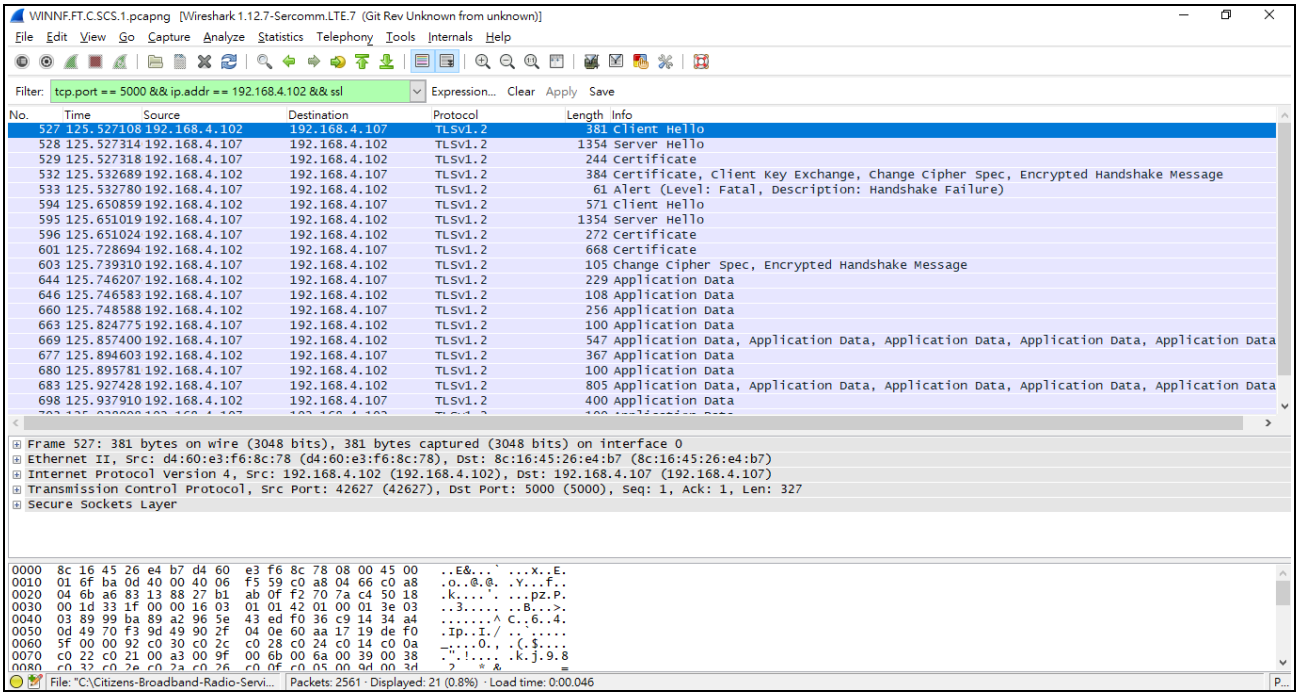
#	Test Execution Steps	Results	
1	● UUT shall start CBSD-SAS communication with the security procedure ● The UUT shall establish a TLS handshake with the SAS Test Harness using configured certificate. ● Configure the SAS Test Harness to accept the security procedure and establish the connection	■ PASS	□ FAIL

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	□ FAIL

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 *responseCode* = 0 and *cbsdId*.	■ PASS	□ FAIL
4	Monitor the RF output of the UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify: ● UUT shall not transmit RF	■ PASS	□ FAIL

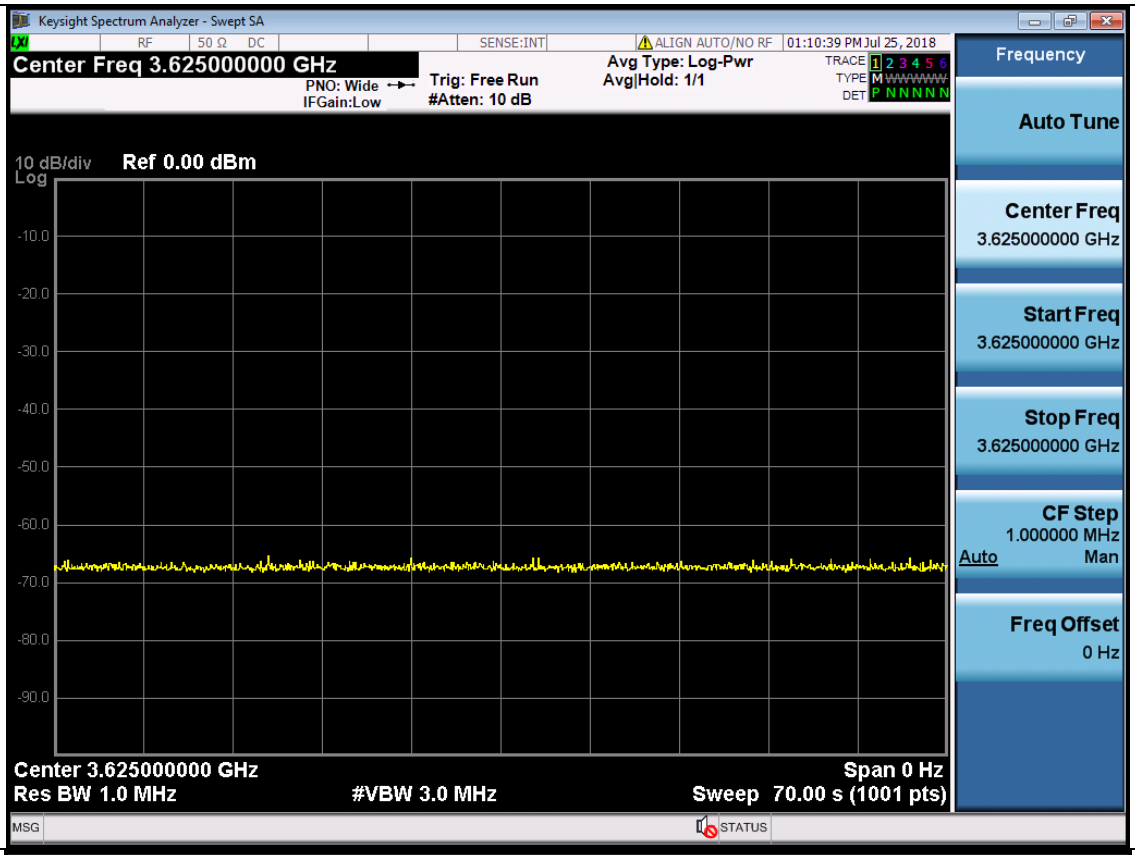
Wireshark Capture Example for Test Case :

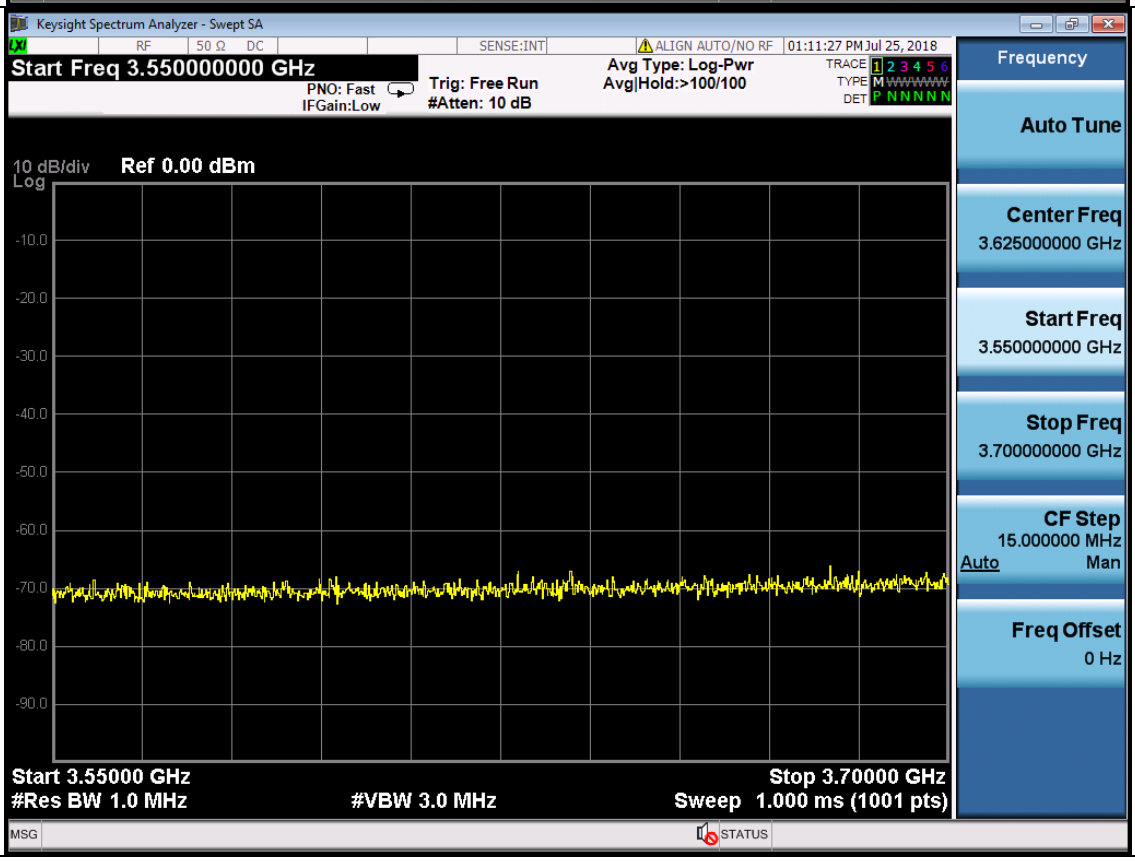
● Make sure that UUT uses TLS v1.2



RF measurement plot for Test Case :

- UUT shall not transmit RF.





4.6.6.2 Unsuccessful TLS connection

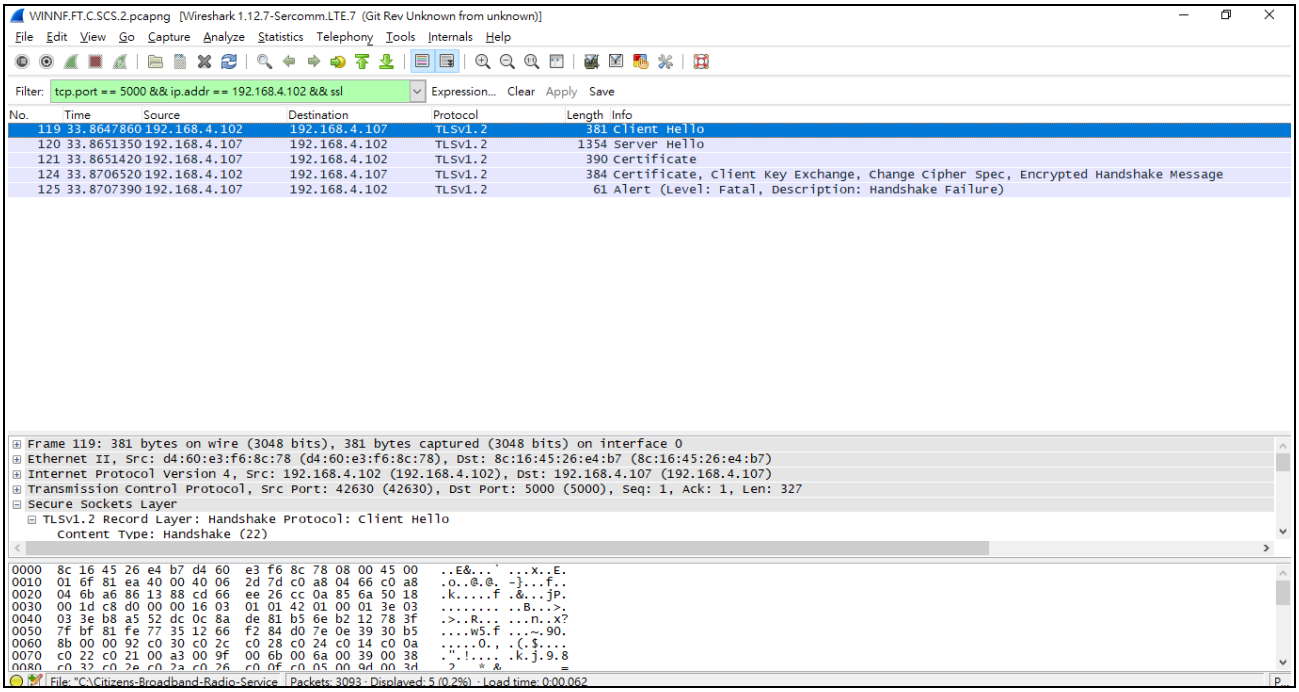
4.6.6.2.1 TLS failure due to revoked certificate

■Test Case ID : WINNF.FT.C.SCS.2 □NA

#	Test Execution Steps	Results	
1	● UUT shall start CBSD-SAS communication with the security procedures	■ PASS	□ FAIL
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	□ FAIL
3	UUT may retry for the security procedure which shall fail.	■ PASS	□ FAIL
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	□ FAIL

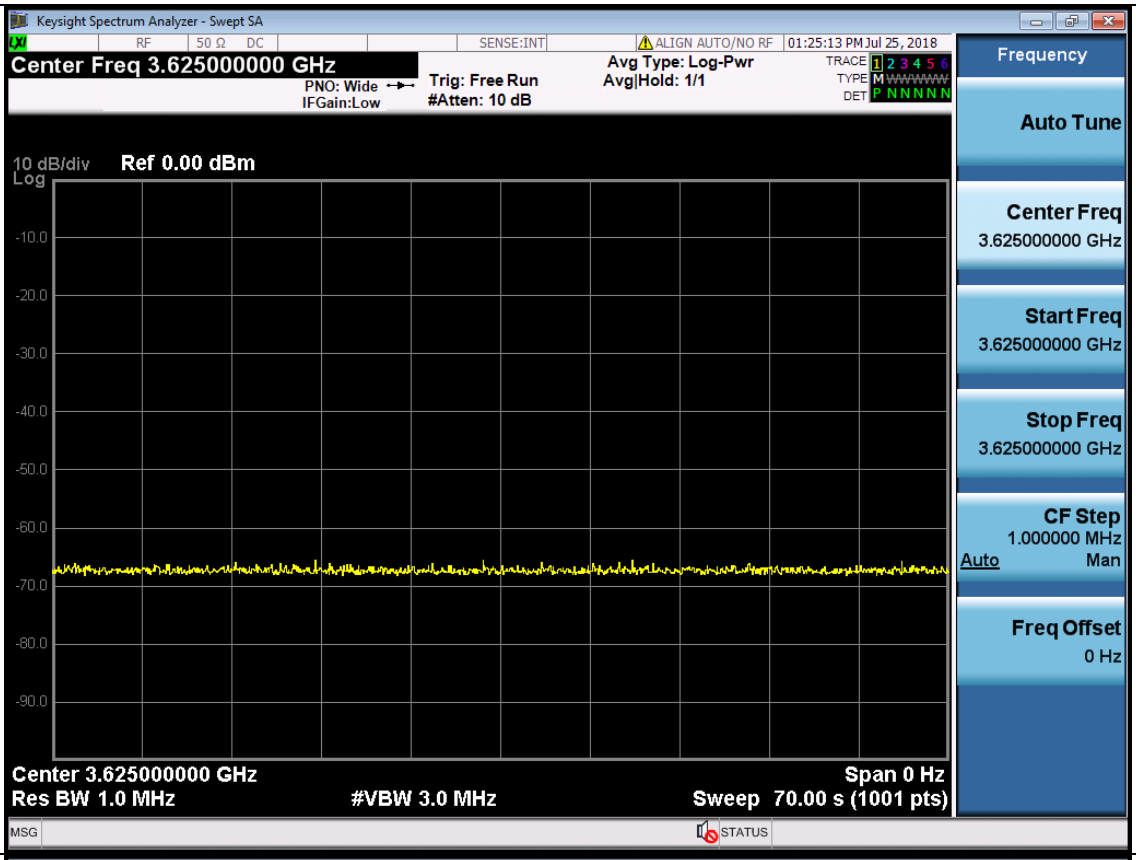
Wireshark Capture Example for Test Case :

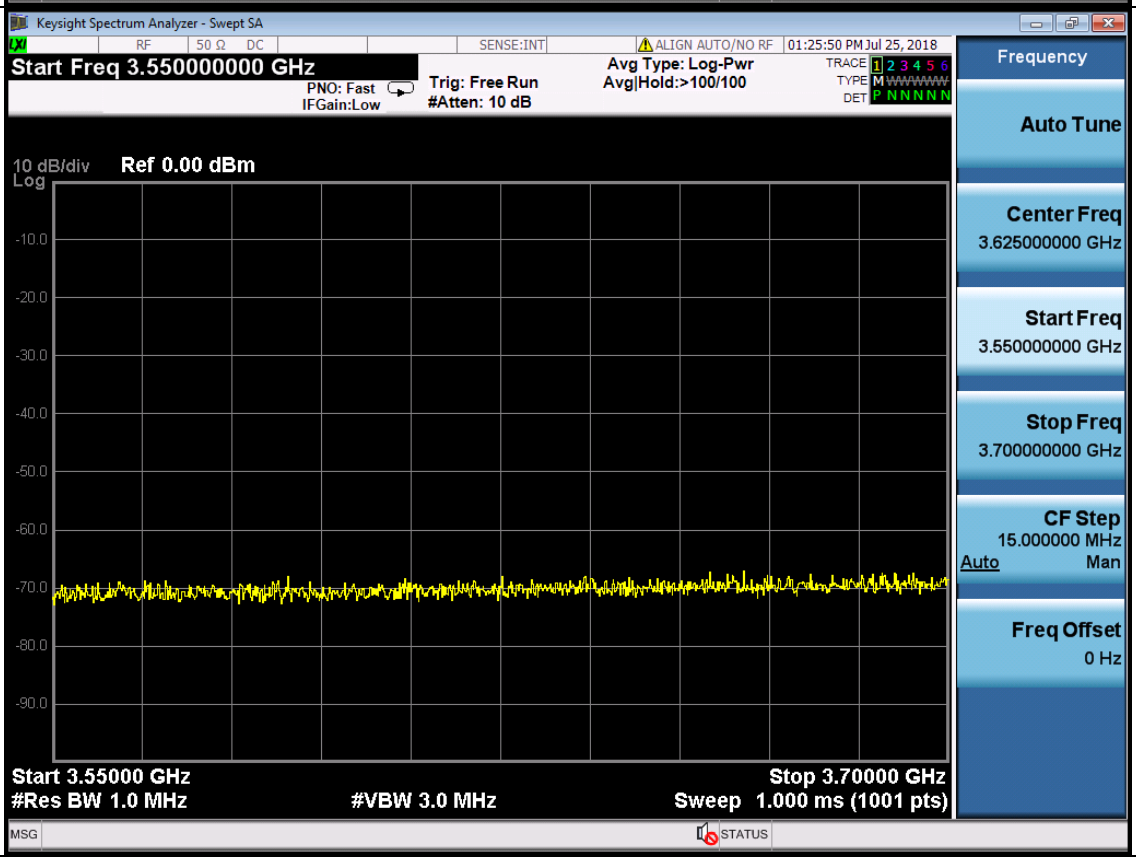
● Make sure that UUT uses TLS v1.2



RF measurement plot for Test Case :

- UUT shall not transmit RF.





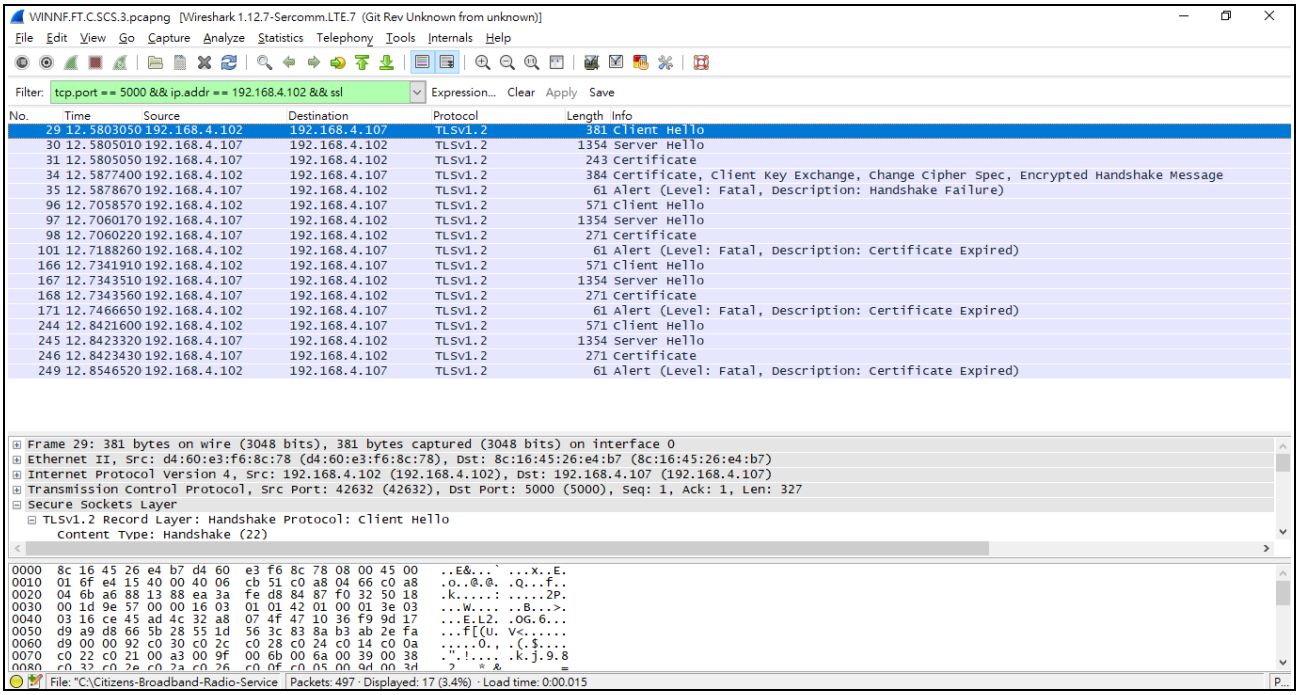
4.6.6.2.2 TLS failure due to expired server certificate

■Test Case ID : WINNF.FT.C.SCS.3 □NA

#	Test Execution Steps	Results	
1	● UUT shall start CBSD-SAS communication with the security procedures	■ PASS	□ FAIL
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	□ FAIL
3	UUT may retry for the security procedure which shall fail.	■ PASS	□ FAIL
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	□ FAIL

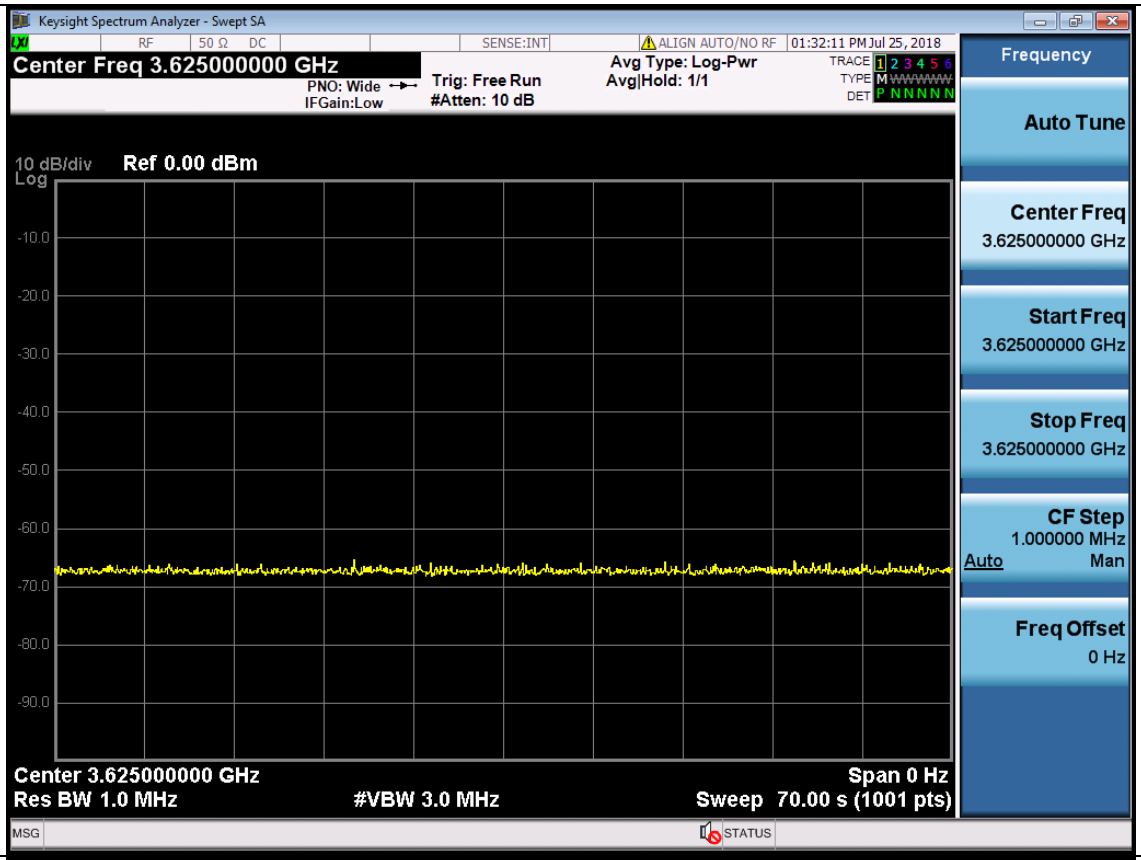
Wireshark Capture Example for Test Case :

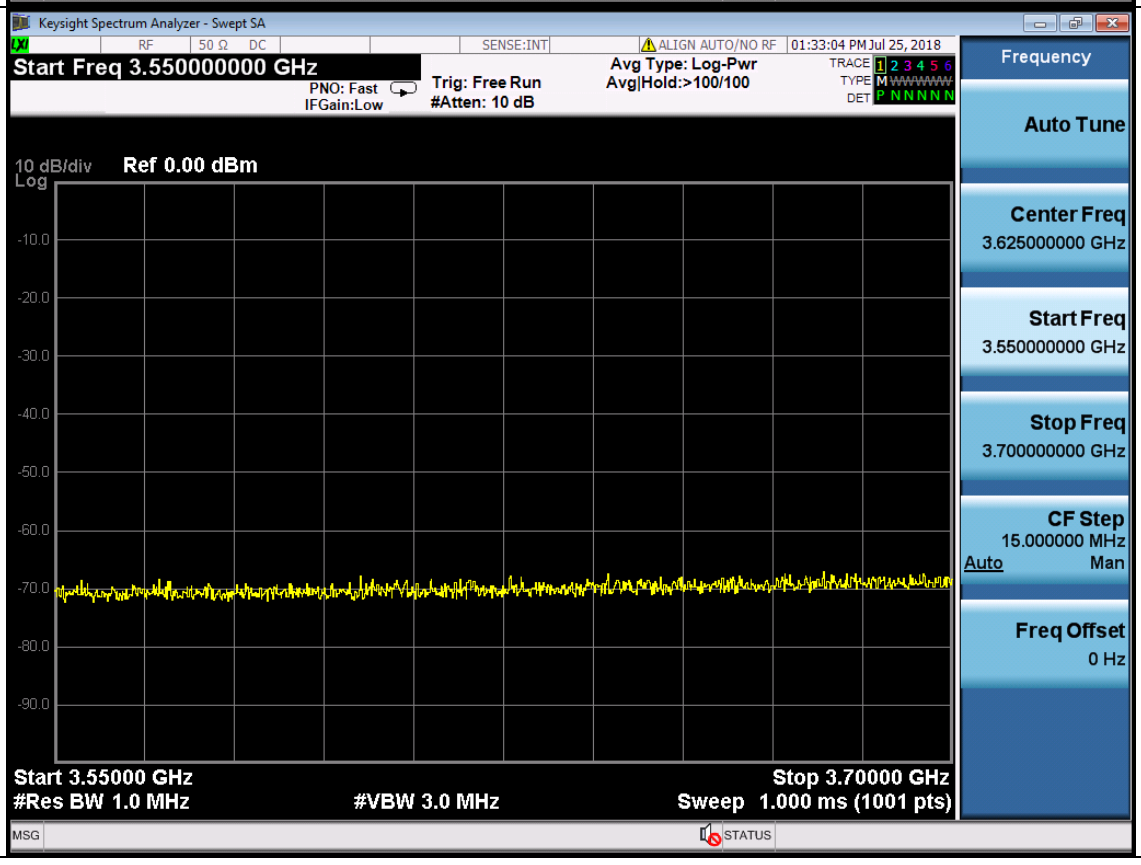
● Make sure that UUT uses TLS v1.2



RF measurement plot for Test Case :

- UUT shall not transmit RF.





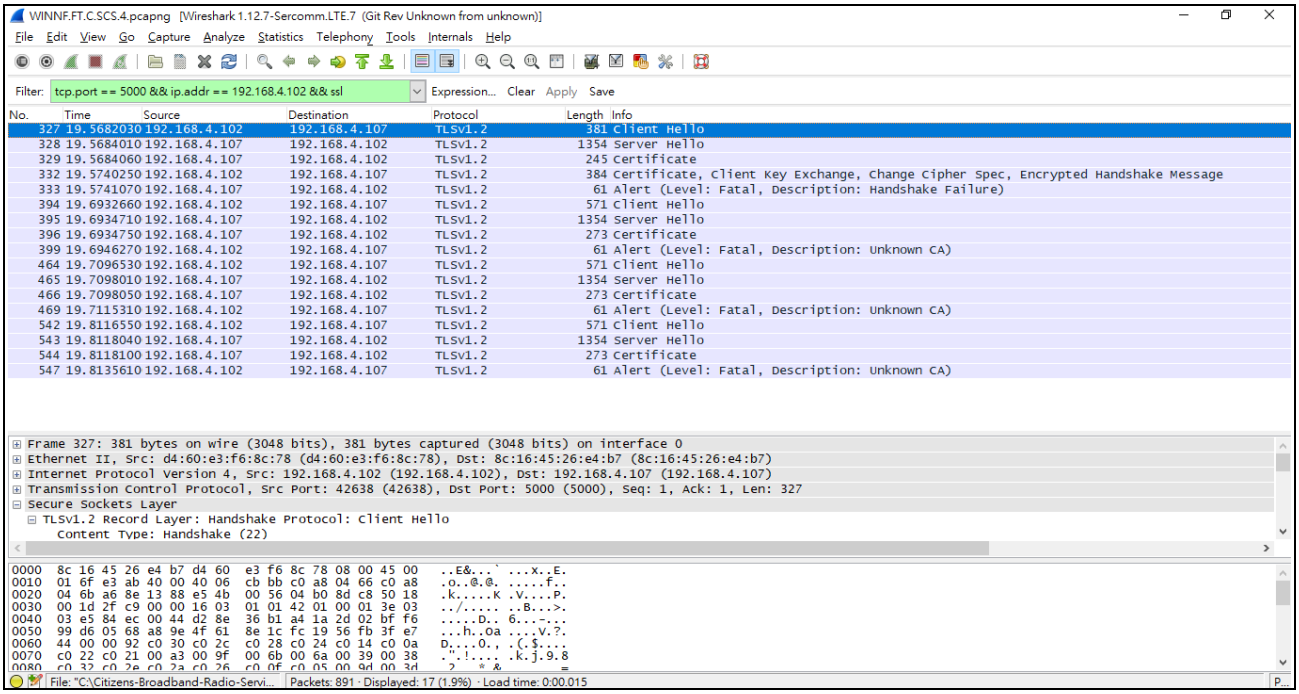
4.6.6.2.3 TLS failure when SAS Test Harness certificate is issued by an unknown CA

■Test Case ID : WINNF.FT.C.SCS.4 □NA

#	Test Execution Steps	Results	
1	● UUT shall start CBSD-SAS communication with the security procedures	■ PASS	□ FAIL
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	□ FAIL
3	UUT may retry for the security procedure which shall fail.	■ PASS	□ FAIL
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	□ FAIL

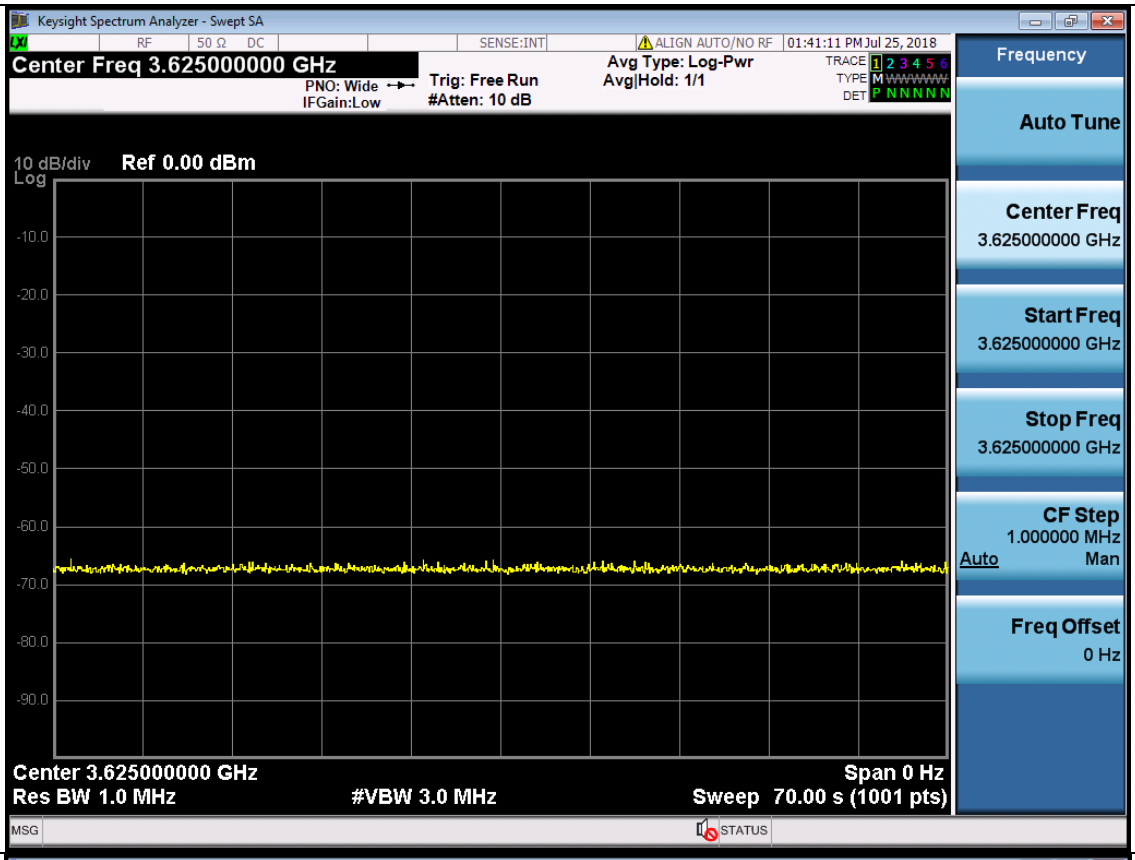
Wireshark Capture Example for Test Case :

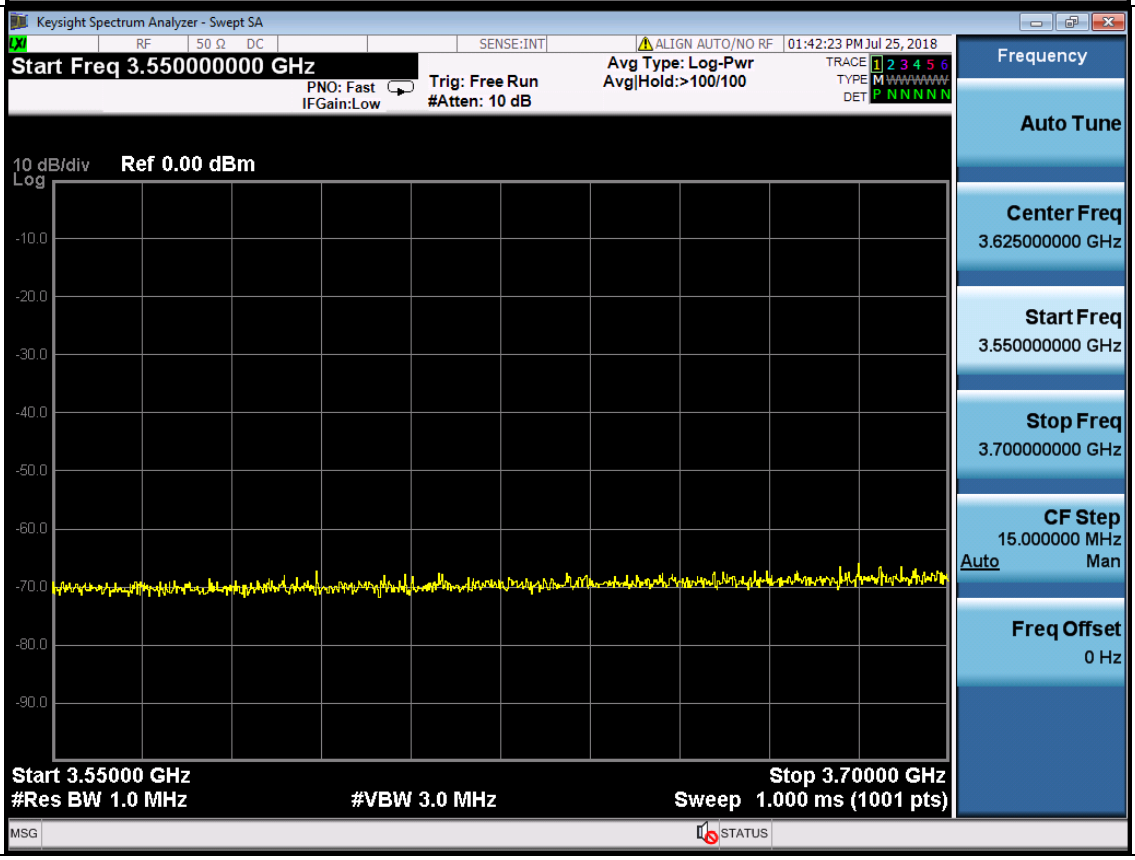
● Make sure that UUT uses TLS v1.2



RF measurement plot for Test Case :

- UUT shall not transmit RF.





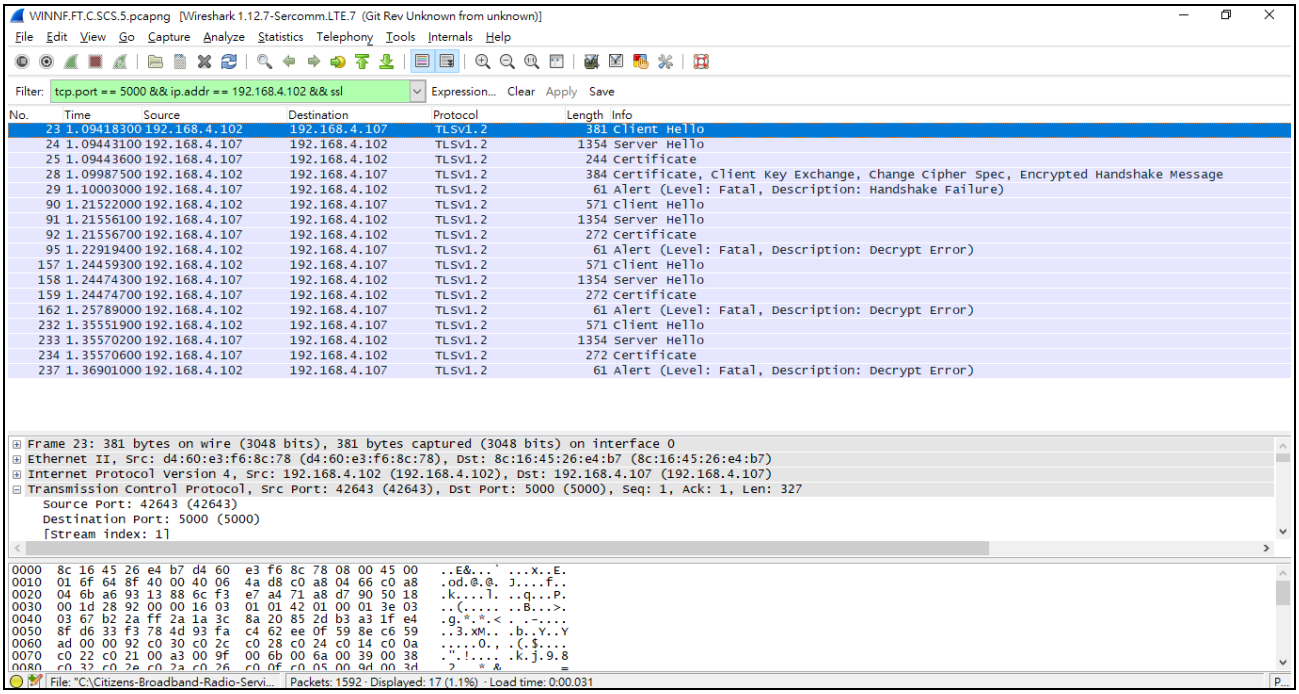
4.6.6.2.4 TLS failure when certificate at the SAS Test Harness is corrupted

■Test Case ID : WINNF.FT.C.SCS.5 □NA

#	Test Execution Steps	Results	
1	● UUT shall start CBSD-SAS communication with the security procedures	■ PASS	□ FAIL
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	□ FAIL
3	UUT may retry for the security procedure which shall fail.	■ PASS	□ FAIL
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	□ FAIL

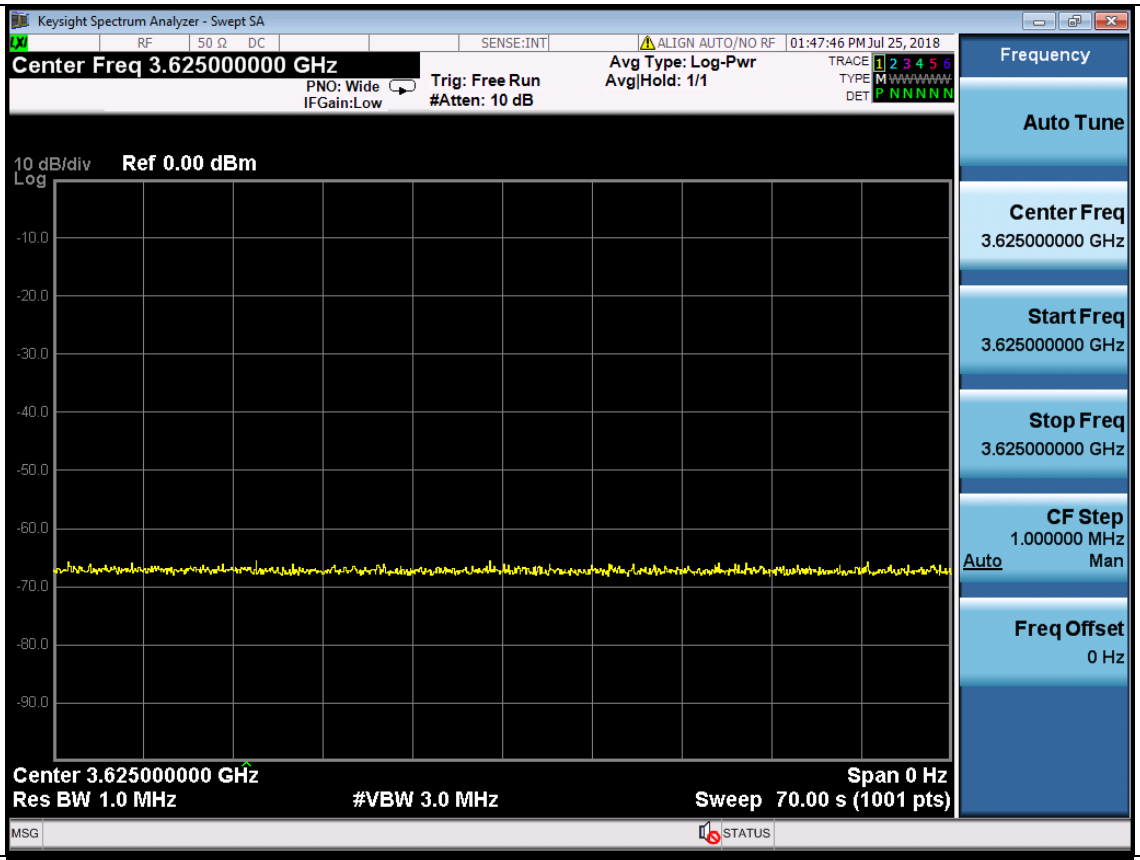
Wireshark Capture Example for Test Case :

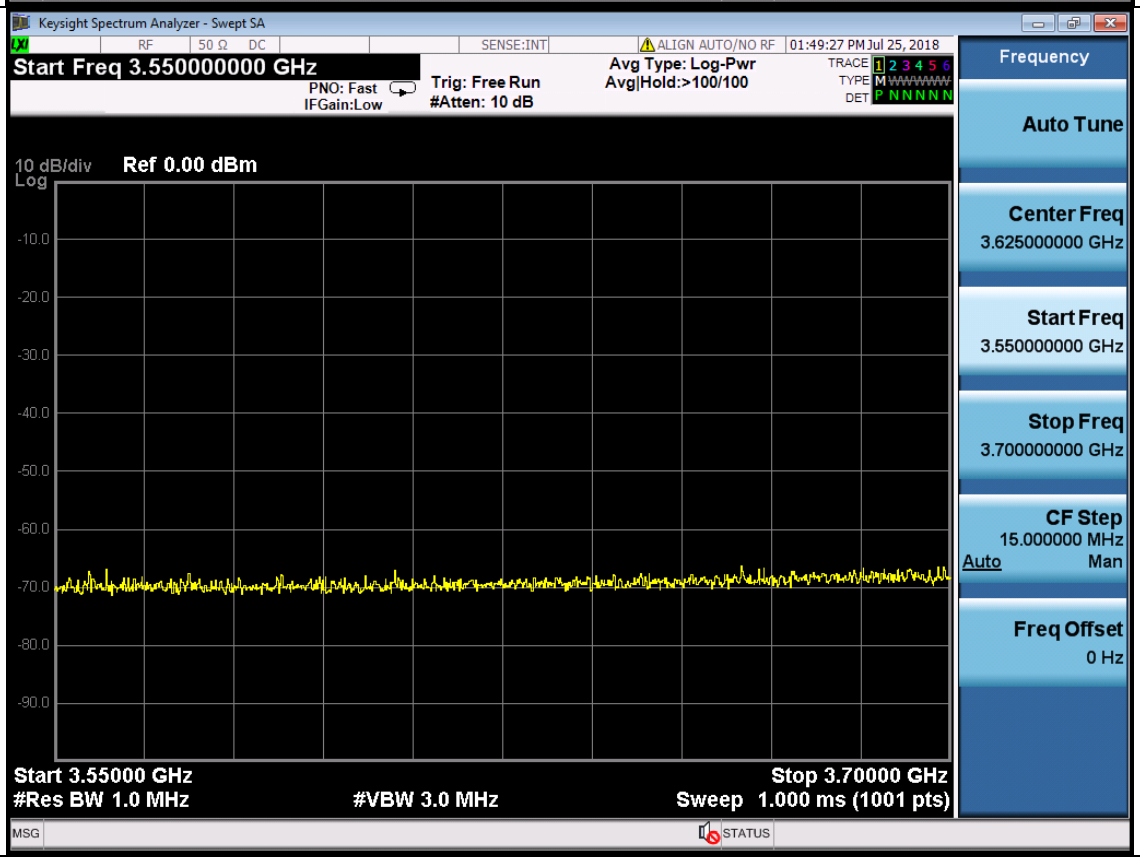
● Make sure that UUT uses TLS v1.2



RF measurement plot for Test Case :

- UUT shall not transmit RF.





4.6.7 CBSD RF Power Measurement

4.6.7.1 UUT RF Transmit Power Measurement Performance Test Case

4.6.7.1.1 UUT RF Transmit Power Measurement

■Test Case ID : WINNF.PT.C.HBT.1 □NA

#	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 CBSD ID = C ● UUT has a single valid grant G with parameters {lowFrequency = FL, highFrequency = FH, maxEirp = Pi}, with grant in AUTHORIZED state, and grantExpireTime set to a value far past the duration of this test case *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*	--	--
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: ○ *cbsdId* = C ○ *grantId* = G ● SAS Test Harness responds with Heartbeat Response, including: o *cbsdId* = C ○ grantId = G ○ *transmitExpireTime* = current UTC time + 200 seconds ○ *responseCode* = 0	--	--
3	Tester performs power measurement on RF interface(s) of UUT, and verifies it complies with the maxEirp setting, Pi. The RF measurement method is out of scope of this document, but may include additional configuration of the UUT, as required, to fulfill the requirements of the power measurement method. *Note: it may be required for the vendor to provide a method or configuration to bring the UUT to a mode which is required by the measurement methodology. Any such mode is vendor-specific and depends upon UUT behavior and the measurement methodology.*	■ PASS	□ FAIL

RF measurement plot for Test Case :

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

Channel	Freq. (MHz)	20MHz					Limit(dBm)	Pass /Fail
		Conducted Power Density (dBm/MHz)			Gain(dBi)	10.63		
		Chain 0	Chain 1	Total	Power Density		Maximum	
Middle	3625	10.195	13.666	15.279	25.909		30.0	Pass

Note: Directional gain = 7.62dBi + 10log(2) = 10.63dBi

5 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo).

Appendix – Information on the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are FCC recognized accredited test firms and accredited and approved according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

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The address and road map of all our labs can be found in our web site also.

--- END ---