

## CBSD Test Report

**Report No.:** RF190605C17-2

**FCC ID:** QI3BEC-6900R21

**Test Model:** RidgeWave 6900

**Series Model:** BEC 6900 R21 (refer to item 3.1 for more details)

**Received Date:** Jun. 05, 2019

**Test Date:** July 31 ~ Sep. 09, 2019

**Issued Date:** Sep. 09, 2019

**Applicant:** BILLION ELECTRIC CO., LTD.

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**FCC Registration/  
Designation Number:** 788550 / TW0003



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### Release Control Record

Issue No.	Description	Date Issued
RF190605C17-2	Original release	Sep. 09, 2019

## 1 Certificate of Conformity

**Product:** 4G/LTE Outdoor Router

**Brand:** BEC, BILLION

**Test Model:** RidgeWave 6900

**Series Model:** BEC 6900 R21 (refer to item 3.1 for more details)

**Sample Status:** Engineering sample

**Applicant:** BILLION ELECTRIC CO., LTD.

**Test Date:** July 31 ~ Sep. 09, 2019

**Standards:** WINNF-TS-0122 V1.0.0  
CBRSA-TS-9001 V1.1.0

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 RF characteristics under the conditions specified in this report.

**Prepared by :** Celine Chou , **Date:** Sep. 09, 2019  
Celine Chou / Senior Specialist

**Approved by :** Look Huang , **Date:** Sep. 09, 2019  
Look Huang / Supervisor

## 2 Summary of Test Results

WINNF-TS-0122			
Classes	Test Case Items	Pass Items	Pass Rate (%)
FT(CBSD, DP/CBSD)	28	28	100
PT(CBSD, DP/CBSD)	1	1	100
Total	29	29	100

Note:

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

Duration and Duty Cycle		
Period	Limit	Test Result
10-second	1-second	Pass
300-second	10-second	Pass
3600-second	20-second	Pass

Note: Limited in duration and duty cycle to the minimum time necessary to get a grant from the SAS. This time should not exceed 1 second within any 10-second period, 10seconds within any 300-second period, or 20 seconds within any 3600-second period.

## 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	NA
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	Pass
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 (TERMINATED_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	NA
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	Pass
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	NA
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	NA
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	NA
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	NA
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

Note: Section as per WINNF-TS-0122 If the product as tested complies with the specification, the UUT is deemed to comply with the standard and is deemed a "Pass" grade. If not "Fail" grade is issued. Where "NA" is stated this means the test case is not applicable.

## 2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the UUT as specified in CISPR 16-4-2:

Measurement	Frequency	Expanded Uncertainty (k=2) ( $\pm$ )
Conducted Emissions above 1 GHz	1GHz ~ 18GHz	1 dB

## 2.2 Modification Record

Following the FCC KDB 940660 D02 CPE-CBSD Handshake Procedures v01, when running the test cases in WINNF-TS-0122 for CPE-CBSD device type, for the last execution step appearing in WINNF-TS-0122:

1. The Pass/Fail criteria "UUT shall not transmit RF" is replaced by "CPE-CBSD UUT shall not transmit user traffic".
2. The Pass/Fail criteria "UUT shall stop transmission" is replaced by CPE-CBSD UUT shall stop transmitting user traffic"

### 3 General Information

#### 3.1 General Description of EUT

Product	4G/LTE Outdoor Router
Brand	BEC, BILLION
Test Model	RidgeWave 6900
Series Model	BEC 6900 R21
Model Difference	Refer to note
Hardware Version	3.011
Firmware Version	1.04.1.331
Status of EUT	Engineering sample
Accessory Device	PoE
Data Cable Supplied	NA

Note:

1. All models are listed as below. Model RidgeWave 6900 is the representative for final test.

Brand	Model	Difference
BEC, BILLION	RidgeWave 6900	For marketing purpose.
	BEC 6900 R21	

2. The EUT consumes power from the following PoE.

Brand	BEC, BILLION
Model	BP035-560063PAX
Input Power	100-240Vac, 50/60Hz, 0.8A
Output Power	56Vdc, 0.625A

#### **Test Condition:**

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

#### 3.2 General Description of Applied Standards

The UUT is a CPE-CBSD product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

**FCC 47 CFR Part 96**

**KDB 940660 D01 Part 96 CBRS Eqpt v02**

**KDB 940660 D02 CPE-CBSD Handshake Procedures v01**

WINNF-19-IN-00033 V1.0

## 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 CBSD 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 instruments test cases was recorded test results from SAS Test Harness system.

### 4.3 Duration and Duty Cycle Measurement

The CPE-CBSD shall validate and ensure that limited in duration and duty cycle to the minimum time necessary to get a grant from the SAS.

### 4.4 Duration and Duty Cycle Test Procedure

- a. CPE-CBSD as UUT does not receive any RF signal from its "Compatible BTS-CBSD" (FCC ID: P27P208), so CPE-CBSD as UUT does not transmit. UUT shall be UTC time synchronized.
- b. Use the WinnForum SAS Harness #1 for CPE-CBSD as UUT and run test case WINNF.FT.C.GRA.1 for CPE-CBSD as UUT.
- c. CPE-CBSD as UUT starts to receive the RF signal from its "Compatible BTS-CBSD", so CPE-CBSD can start communicating with the WinnForum SAS Harness #1. Make note of the time when RF Test equipment logs the first transmission from CPE-CBSD which is above 23dBm/10MHz – this is the start time of the {X time out of Y time}.
- d. When the test case WINNF.FT.C.GRA.1 finishes and the questions appear on the WinnForum SAS Harness #1 console, do NOT answer the questions. Wait until Y time has passed from step #3. During this Y time, the RF test equipment is logging the amount of time CPE-CBSD as UUT transmitted EIRP above 23dBm/10MHz. The amount of time logged for transmitting EIRP above 23dBm/10MHz is the X time.
- e. Answer the questions on the WinnForum SAS Harness #1 console so the WinnForum SAS Harness #1 is ready for the next test.

### 4.5 Test Environment

Test Harness Version	V1.0.0.3
Operating System	Microsoft Windows 10
TLS Version	1.2
Python	2.7.13

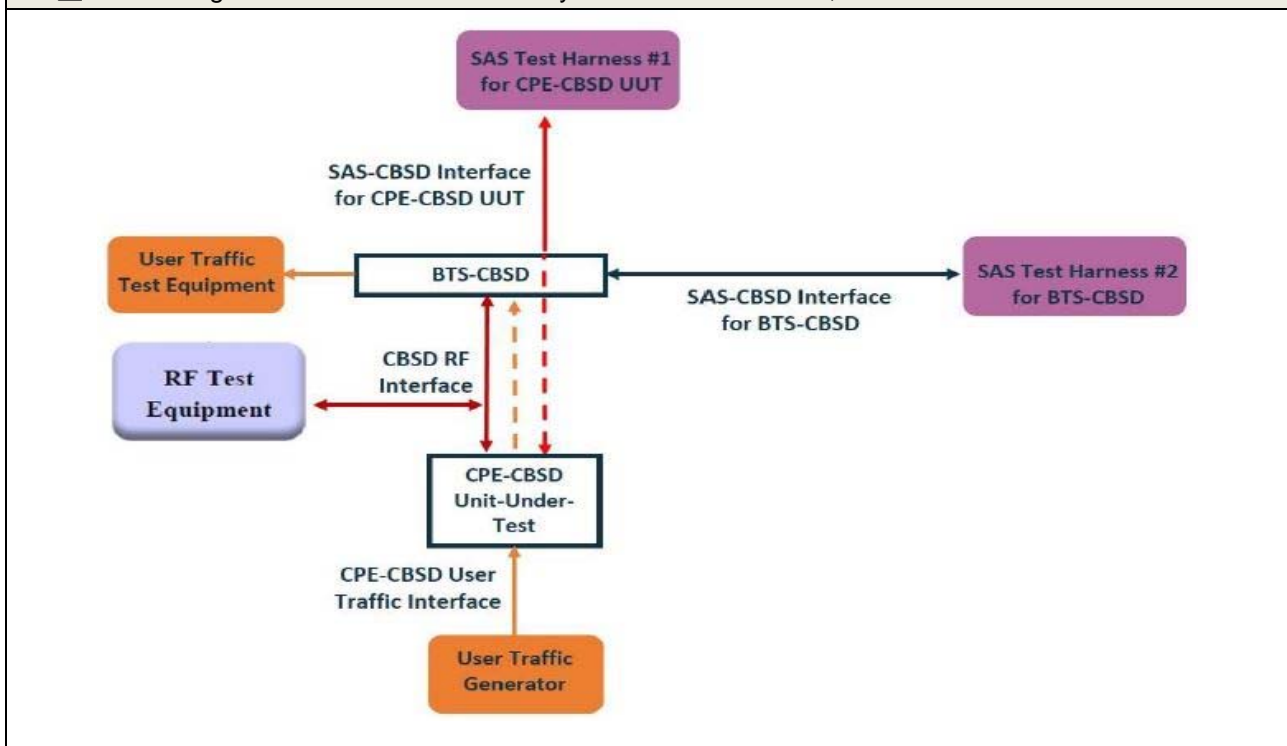
#### 4.6 Test Equipment

Description & Manufacturer	Model no.	Serial No.	Calibrated Date	Calibrated Until
ROHDE & SCHWARZ Signal Analyzer	FSV	E2-010642	May. 28, 2019	May. 27, 2020
Temperature & Humidity Chamber TERCHY	MHU-225AU	920842	May 31, 2019	May 30, 2020
Horn_Antenna SCHWARZBECK	BBHA 9120D	9120D-1170	Nov. 25, 2019	Nov. 24, 2020
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.

#### 4.7 Test Setup

■ Test configuration without Domain Proxy - CPE-CBSD as UUT, BTS-CBSD direct communication



## 4.8 Test Results

### 4.8.1 CBSD Registration Process

#### 4.8.1.1 WINNF.FT.C.REG.1

Test Case ID : WINNF.FT.C.REG.1  NA

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: <ul style="list-style-type: none"> <li>● UUT has successfully completed SAS Discovery and Authentication with the SAS Test Harness</li> <li>● UUT is in the Unregistered state</li> </ul>	--	--
2	CBSD sends correct Registration request information, as specified in [n.5], to the SAS Test Harness: <ul style="list-style-type: none"> <li>● The required <i>userId</i>, <i>fcld</i> and <i>cbsdSerialNumber</i> registration parameters shall be sent from the CBSD and conform to proper format and acceptable ranges.</li> <li>● 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.</li> </ul> Note: It is outside the scope of this document to test the Registration information that is supplied via another means.	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
3	<ul style="list-style-type: none"> <li>● SAS Test Harness sends a CBSD Registration Response as follows:               <ul style="list-style-type: none"> <li>- <i>cbsdId</i> = C</li> <li>- <i>measReportConfig</i> shall not be included</li> <li>- <i>responseCode</i> = 0</li> </ul> </li> </ul>	--	--
4	After completion of step 3, SAS Test Harness will not provide any positive response ( <i>responseCode</i> =0) to further request messages from the UUT.	--	--
5	Monitor the RF output of the UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify: <ul style="list-style-type: none"> <li>● UUT shall not transmit RF</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail

#### 4.8.1.2 WINNF.FT.C.REG.7

Test Case ID : WINNF.FT.C.REG.7  NA

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: <ul style="list-style-type: none"> <li>● UUT has successfully completed SAS Discovery and Authentication with SAS Test Harness</li> </ul>	--	--
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.	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail

#### 4.8.1.3 WINNF.FT.C.REG.8

Test Case ID : WINNF.FT.C.REG.8  NA

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

#### 4.8.1.4 WINNF.FT.C.REG.10

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

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



#### 4.8.1.5 WINNF.FT.C.REG.12

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

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

#### 4.8.1.6 WINNF.FT.C.REG.14

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

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

#### 4.8.1.7 WINNF.FT.C.REG.16

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

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

#### 4.8.1.8 WINNF.FT.C.REG.18

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

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

## 4.8.2 CBSD Spectrum Grant Process

### 4.8.2.1 WINNF.FT.C.GRA.1

Test Case ID : WINNF.FT.C.GRA.1       NA

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

#### 4.8.2.2 WINNF.FT.C.GRA.2

Test Case ID : WINNF.FT.C.GRA.2       NA

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

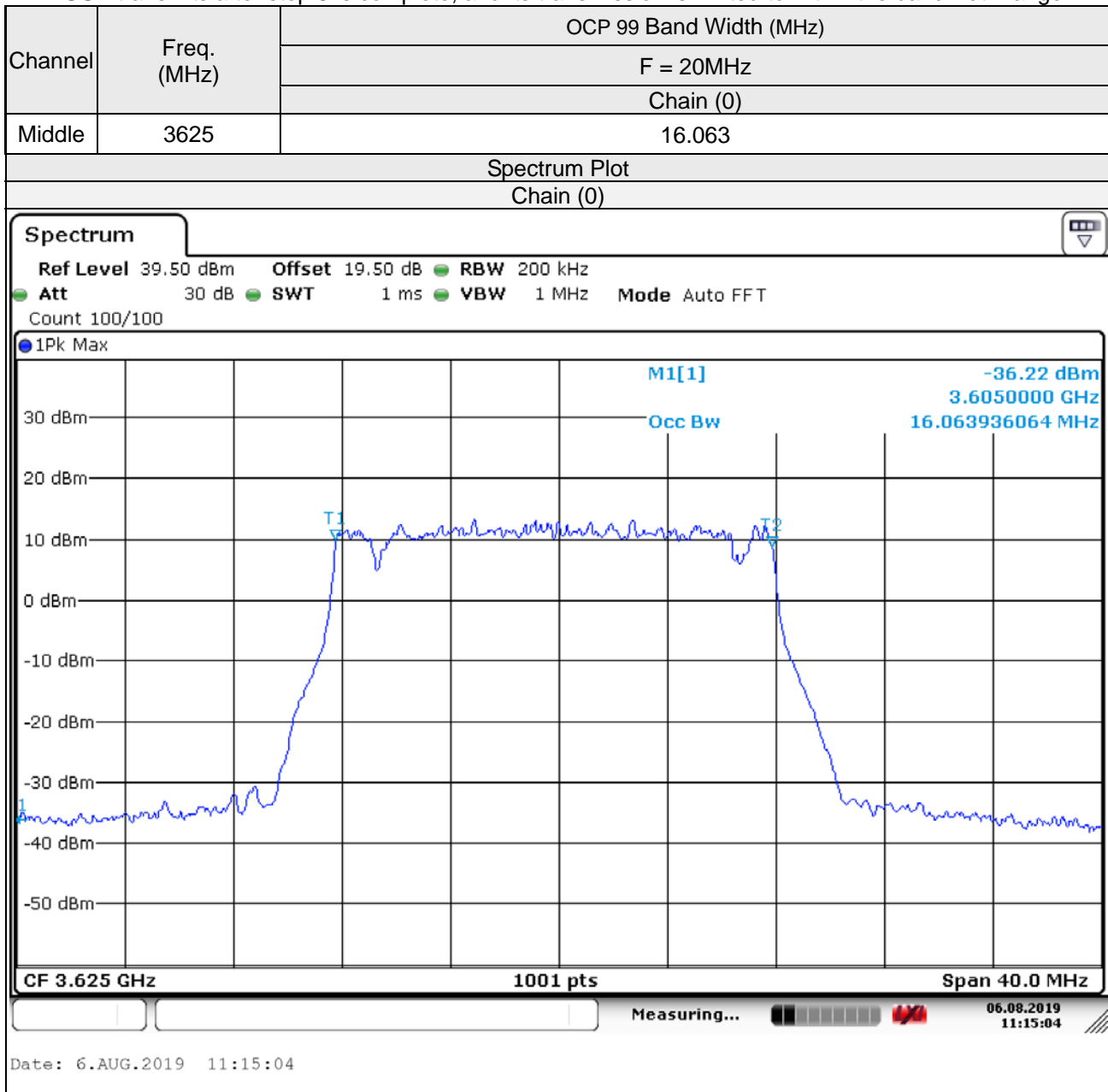
### 4.8.3 CBSD Heart Beat Process

#### 4.8.3.1 WINNF.FT.C.HBT.1

■ 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 <i>cbsdId</i> = C	--	--
2	UUT sends a message: ● If message is type Spectrum Inquiry Request, go to step 3, or ● If message is type Grant Request, go to step 5	--	--
3	UUT sends Spectrum Inquiry Request. Validate: ● <i>cbsdId</i> = C ● List of frequencyRange objects sent by UUT are within the CBRS frequency range	■ Pass	□ Fail
4	SAS Test Harness sends a Spectrum Inquiry Response message, including the following parameters: ● <i>cbsdId</i> = C ● <i>availableChannel</i> is an array of availableChannel objects ● <i>responseCode</i> = 0	--	--
5	UUT sends Grant Request message. Validate: ● <i>cbsdId</i> = C ● <i>maxEIRP</i> is at or below the limit appropriate for CBSD category as defined by Part 96 ● <i>operationFrequencyRange</i> , F, sent by UUT is a valid range within the CBRS band	■ Pass	□ Fail
6	SAS Test Harness sends a Grant Response message, including the parameters: ● <i>cbsdId</i> = C ● <i>grantId</i> = G = a valid grant ID ● <i>grantExpireTime</i> = UTC time greater than duration of the test ● <i>responseCode</i> = 0	--	--
7	UUT sends a first Heartbeat Request message. Verify Heartbeat Request message is formatted correctly, including: ● <i>cbsdId</i> = C ● <i>grantId</i> = G ● <i>operationState</i> = "GRANTED"	■ Pass	□ Fail
8	SAS Test Harness sends a Heartbeat Response message, with the following parameters: ● <i>cbsdId</i> = C ● <i>grantId</i> = G ● <i>transmitExpireTime</i> = current UTC time + 200 seconds ● <i>responseCode</i> = 0	--	--
9	For further Heartbeat Request messages sent from UUT after completion of step 8, validate message is sent within latest specified heartbeatInterval, and: ● <i>cbsdId</i> = C ● <i>grantId</i> = G ● <i>operationState</i> = "AUTHORIZED" and SAS Test Harness responds with a Heartbeat Response message including the following parameters: ● <i>cbsdId</i> = C ● <i>grantId</i> = G ● <i>transmitExpireTime</i> = current UTC time + 200 seconds ● <i>responseCode</i> = 0	■ Pass	□ 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

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





#### 4.8.3.2 WINNF.FT.C.HBT.3

Test Case ID : WINNF.FT.C.HBT.3
  NA

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: <ul style="list-style-type: none"> <li>● UUT has registered successfully with SAS Test Harness</li> <li>● UUT has a valid single grant as follows:               <ul style="list-style-type: none"> <li>○ valid <i>cbsdId</i> = C</li> <li>○ valid <i>grantId</i> = G</li> <li>○ grant is for frequency range F, power P</li> <li>○ <i>grantExpireTime</i> = UTC time greater than duration of the test</li> </ul> </li> <li>● UUT is in AUTHORIZED state and is transmitting within the grant bandwidth F on RF interface</li> </ul>	--	--
2	UUT sends a Heartbeat Request message. Ensure Heartbeat Request message is sent within Heartbeat Interval specified in the latest Heartbeat Response, and formatted correctly, including: <ul style="list-style-type: none"> <li>● <i>cbsdId</i> = C</li> <li>● <i>grantId</i> = G</li> <li>● <i>operationState</i> = "AUTHORIZED"</li> </ul>	--	--
3	SAS Test Harness sends a Heartbeat Response message, including the following parameters: <ul style="list-style-type: none"> <li>● <i>cbsdId</i> = C</li> <li>● <i>grantId</i> = G</li> <li>● <i>transmitExpireTime</i> = T = Current UTC time</li> <li>● <i>responseCode</i> = 105 (DEREGISTER)</li> </ul>	--	--
4	After completion of step 3, SAS Test Harness shall not allow any further grants to the UUT.	--	--
5	Monitor the RF output of the UUT. Verify: <ul style="list-style-type: none"> <li>● UUT shall stop transmission within (T + 60 seconds) of completion of step 3</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail

#### 4.8.3.3 WINNF.FT.C.HBT.4

Test Case ID : WINNF.FT.C.HBT.4
  NA

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

#### 4.8.3.4 WINNF.FT.C.HBT.5

Test Case ID : WINNF.FT.C.HBT.5
  NA

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: <ul style="list-style-type: none"> <li>● UUT has registered successfully with SAS Test Harness</li> <li>● UUT has a valid single grant as follows:               <ul style="list-style-type: none"> <li>○ valid <i>cbsdId</i> = C</li> <li>○ valid <i>grantId</i> = G</li> <li>○ grant is for frequency range F, power P</li> <li>○ <i>grantExpireTime</i> = UTC time greater than duration of the test</li> </ul> </li> <li>● UUT is in GRANTED, but not AUTHORIZED state (i.e. has not performed its first Heartbeat Request)</li> </ul>	--	--
2	UUT sends a Heartbeat Request message. Verify Heartbeat Request message is formatted correctly, including: <ul style="list-style-type: none"> <li>● <i>cbsdId</i> = C</li> <li>● <i>grantId</i> = G</li> <li>● <i>operationState</i> = "GRANTED"</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
3	SAS Test Harness sends a Heartbeat Response message, including the following parameters: <ul style="list-style-type: none"> <li>● <i>cbsdId</i> = C</li> <li>● <i>grantId</i> = G</li> <li>● <i>transmitExpireTime</i> = T = current UTC time</li> <li>? <i>responseCode</i> = 501 (SUSPENDED_GRANT)</li> </ul>	--	--
4	After completion of step 3, SAS Test Harness shall not allow any further grants to the UUT.	--	--
5	Monitor the SAS-CBSD interface. Verify either A OR B occurs: <p>A. UUT sends a Heartbeat Request message. Ensure message is sent within latest specified heartbeatInterval, and is correctly formatted with parameters:</p> <ul style="list-style-type: none"> <li>● <i>cbsdId</i> = C</li> <li>● <i>grantId</i> = G</li> <li>● <i>operationState</i> = "GRANTED"</li> </ul> <p>B. UUT sends a Relinquishment request message. Ensure message is correctly formatted with parameters:</p> <ul style="list-style-type: none"> <li>● <i>cbsdId</i> = C</li> <li>● <i>grantId</i> = G</li> </ul> <p>Monitor the RF output of the UUT. Verify:</p> <ul style="list-style-type: none"> <li>● UUT does not transmit at any time</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail

#### 4.8.3.5 WINNF.FT.C.HBT.6

Test Case ID : WINNF.FT.C.HBT.6
  NA

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: <ul style="list-style-type: none"> <li>● UUT has registered successfully with SAS Test Harness</li> <li>● UUT has a valid single grant as follows:               <ul style="list-style-type: none"> <li>○ valid <i>cbsdId</i> = C</li> <li>○ valid <i>grantId</i> = G</li> <li>○ grant is for frequency range F, power P</li> <li>○ <i>grantExpireTime</i> = UTC time greater than duration of the test</li> </ul> </li> <li>● UUT is in AUTHORIZED state and is transmitting within the grant bandwidth F on RF interface</li> </ul>	--	--
2	UUT sends a Heartbeat Request message. Ensure Heartbeat Request message is sent within latest specified heartbeatInterval, and is formatted correctly, including: <ul style="list-style-type: none"> <li>● <i>cbsdId</i> = C</li> <li>● <i>grantId</i> = G</li> <li>● <i>operationState</i> = "AUTHORIZED"</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
3	SAS Test Harness sends a Heartbeat Response message, including the following parameters: <ul style="list-style-type: none"> <li>● <i>cbsdId</i> = C</li> <li>● <i>grantId</i> = G</li> <li>● <i>transmitExpireTime</i> = T = current UTC time</li> <li>● <i>responseCode</i> = 501 (SUSPENDED_GRANT)</li> </ul>	--	--
4	After completion of step 3, SAS Test Harness shall not allow any further grants to the UUT.	--	--
5	Monitor the SAS-CBSD interface. Verify either A OR B occurs: <p>A. UUT sends a Heartbeat Request message. Ensure message is sent within latest specified heartbeatInterval, and is correctly formatted with parameters:</p> <ul style="list-style-type: none"> <li>● <i>cbsdId</i> = C</li> <li>● <i>grantId</i> = G</li> <li>● <i>operationState</i> = "GRANTED"</li> </ul> <p>B. UUT sends a Relinquishment request message. Ensure message is correctly formatted with parameters:</p> <ul style="list-style-type: none"> <li>● <i>cbsdId</i> = C</li> <li>● <i>grantId</i> = G</li> </ul> <p>Monitor the RF output of the UUT. Verify:</p> <ul style="list-style-type: none"> <li>● UUT shall stop transmission within (T+60) seconds of completion of step 3</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail

#### 4.8.3.6 WINNF.FT.C.HBT.7

Test Case ID : WINNF.FT.C.HBT.7
  NA

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

#### 4.8.3.7 WINNF.FT.C.HBT.9

Test Case ID : WINNF.FT.C.HBT.9
  NA

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: <ul style="list-style-type: none"> <li>● UUT has registered successfully with SAS Test Harness</li> <li>● UUT has a valid single grant as follows:               <ul style="list-style-type: none"> <li>○ valid <i>cbsdId</i> = C</li> <li>○ valid <i>grantId</i> = G</li> <li>○ grant is for frequency range F, power P</li> <li>○ <i>grantExpireTime</i> = UTC time greater than duration of the test</li> </ul> </li> <li>● UUT is in GRANTED, but not AUTHORIZED state(i.e. has not performed its first Heartbeat Request)</li> </ul>	--	--
2	UUT sends a Heartbeat Request message. Ensure Heartbeat Request message is sent within latest specified heartbeatInterval, and is formatted correctly, including: <ul style="list-style-type: none"> <li>● <i>cbsdId</i> = C</li> <li>● <i>grantId</i> = G</li> <li>● <i>operationState</i> = "GRANTED"</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> 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: <ul style="list-style-type: none"> <li>● At any time during the test, UUT shall not transmit on RF interface</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail

#### 4.8.3.8 WINNF.FT.C.HBT.10

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

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

#### 4.8.4 CBSD Measurement Report

##### 4.8.4.1 WINNF.FT.C.MES.1

Test Case ID : WINNF.FT.C.MES.1       NA

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



#### 4.8.4.2 WINNF.FT.C.MES.3

Test Case ID : WINNF.FT.C.MES.3
  NA

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

#### 4.8.4.3 WINNF.FT.C.MES.4

Test Case ID : WINNF.FT.C.MES.4
  NA

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

#### 4.8.5 CBSD Relinquishment Process

##### 4.8.5.1 WINNF.FT.C.RLQ.1

Test Case ID : WINNF.FT.C.RLQ.1       NA

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

#### 4.8.6 CBSD Deregistration Process

##### 4.8.6.1 WINNF.FT.C.DRG.1

Test Case ID : WINNF.FT.C.DRG.1       NA

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

## 4.8.7 CBSD Security Validation

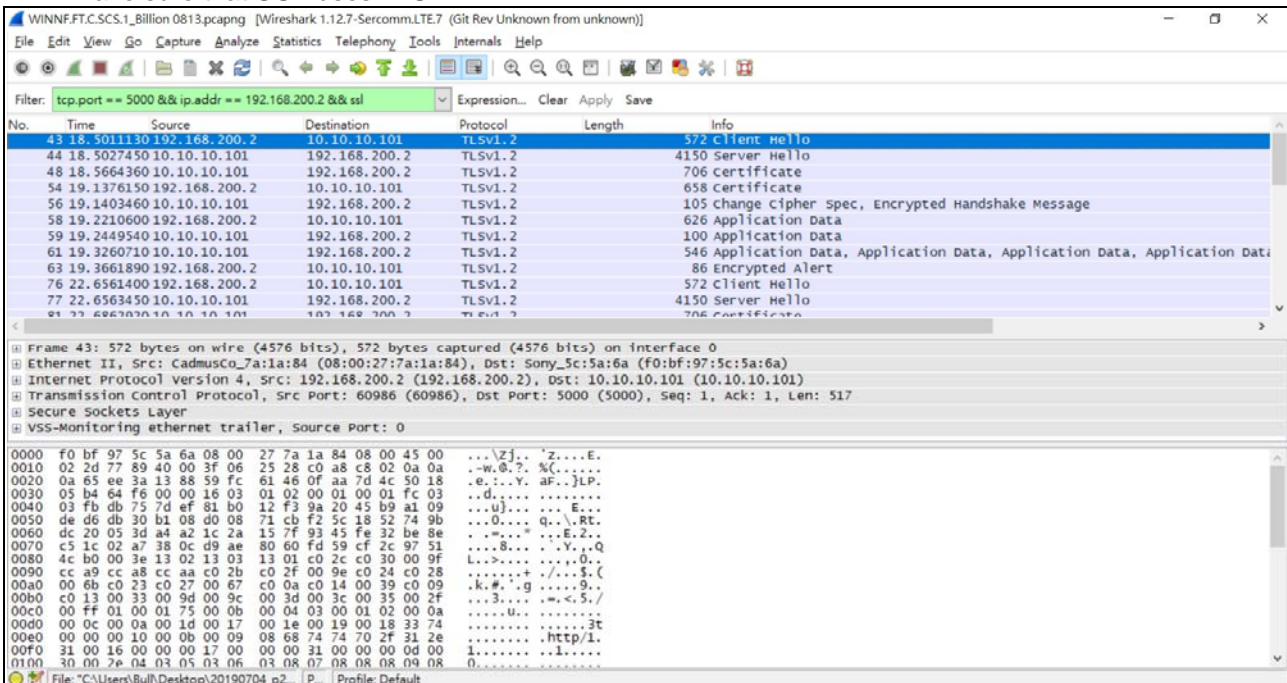
### 4.8.7.1 WINNF.FT.C.SCS.1

Test Case ID : WINNF.FT.C.SCS.1  NA

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

Wireshark Capture Example for Test Case :

- Make sure that UUT uses TLS v1.2



The screenshot shows a Wireshark capture of a TLS handshake. The filter is set to 'tcp.port == 5000 && ip.addr == 192.168.200.2 && ssl'. The packet list shows several frames related to the TLS handshake, including Client Hello, Server Hello, Certificate, Change Cipher Spec, and Application Data. The packet details pane for frame 43 shows the following information:

- Frame 43: 572 bytes on wire (4576 bits), 572 bytes captured (4576 bits) on interface 0
- Ethernet II, Src: CadmusCo.7a:1a:84 (08:00:27:7a:1a:84), Dst: Sony\_5c:5a:6a (f0:bf:97:5c:5a:6a)
- Internet Protocol Version 4, src: 192.168.200.2 (192.168.200.2), dst: 10.10.10.101 (10.10.10.101)
- Transmission control Protocol, src port: 60986 (60986), dst port: 5000 (5000), seq: 1, ack: 1, len: 517
- Secure sockets Layer
- VSS-Monitoring ethernet trailer, Source Port: 0

The packet bytes pane shows the raw data of the frame, including the TLS record structure.

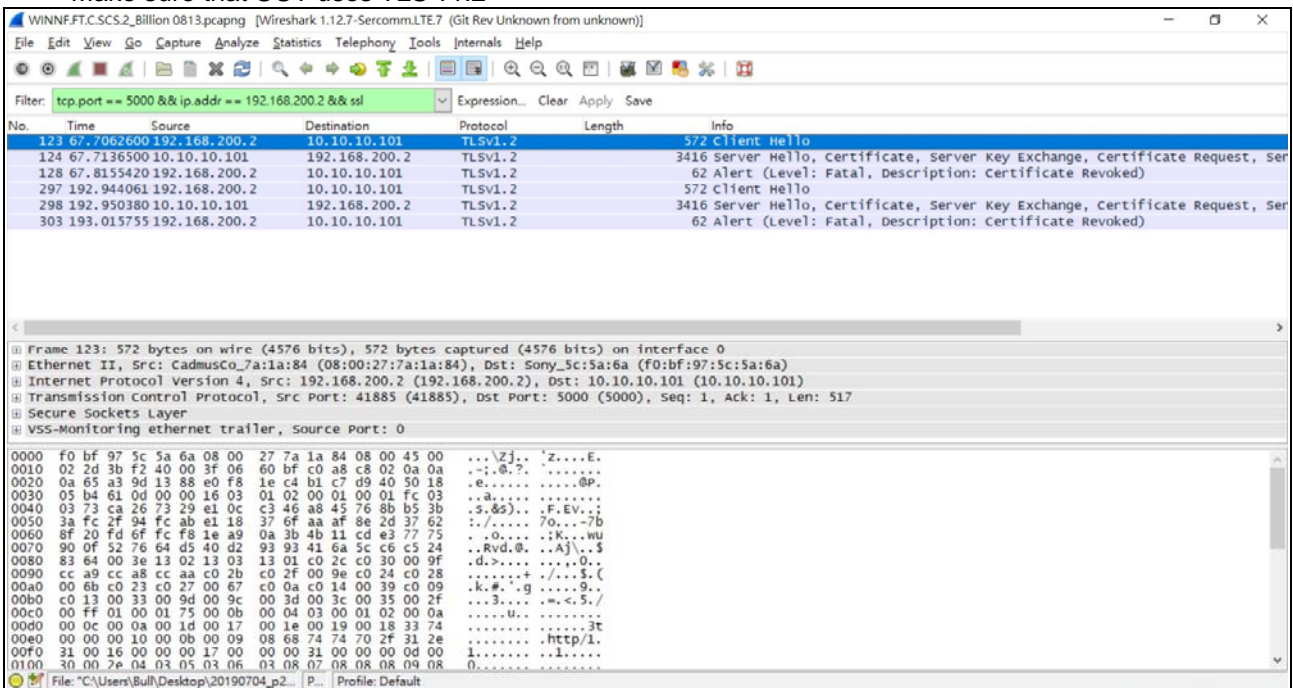
### 4.8.7.2 WINNF.FT.C.SCS.2

Test Case ID : WINNF.FT.C.SCS.2  NA

#	Test Execution Steps	Results	
1	<ul style="list-style-type: none"> <li>UUT shall start CBSD-SAS communication with the security procedures</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
2	<ul style="list-style-type: none"> <li>Make sure that UUT uses TLS v1.2 for security establishment.</li> <li>Make sure UUT selects the correct cipher suite.</li> <li>UUT shall use CRL or OCSP to verify the validity of the server certificate.</li> <li>Make sure that Mutual authentication does not happen between UUT and the SAS Test Harness.</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
3	UUT may retry for the security procedure which shall fail.	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> 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: <ul style="list-style-type: none"> <li>UUT shall not transmit RF</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail

Wireshark Capture Example for Test Case :

- Make sure that UUT uses TLS v1.2





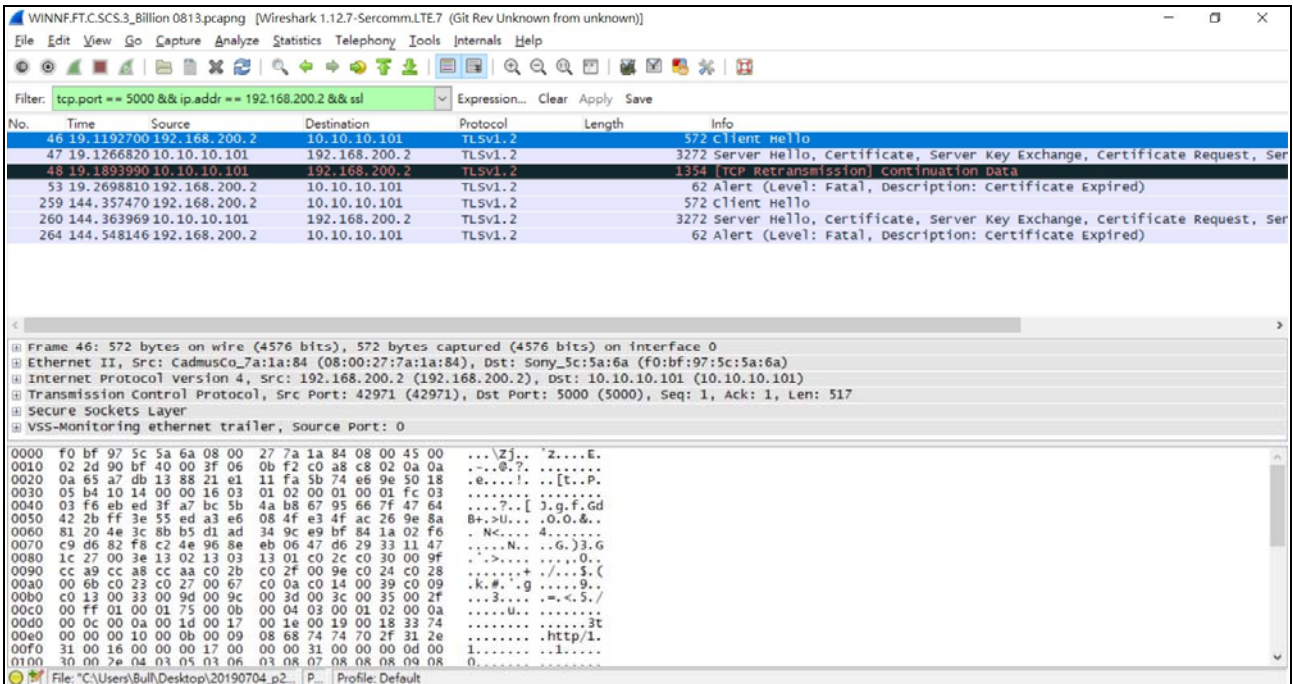
### 4.8.7.3 WINNF.FT.C.SCS.3

Test Case ID : WINNF.FT.C.SCS.3  NA

#	Test Execution Steps	Results
1	<ul style="list-style-type: none"> <li>UUT shall start CBSD-SAS communication with the security procedures</li> </ul>	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail
2	<ul style="list-style-type: none"> <li>Make sure that UUT uses TLS v1.2 for security establishment.</li> <li>Make sure UUT selects the correct cipher suite.</li> <li>UUT shall use CRL or OCSP to verify the validity of the server certificate.</li> <li>Make sure that Mutual authentication does not happen between UUT and the SAS Test Harness.</li> </ul>	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail
3	UUT may retry for the security procedure which shall fail.	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> 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: <ul style="list-style-type: none"> <li>UUT shall not transmit RF</li> </ul>	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail

Wireshark Capture Example for Test Case :

- Make sure that UUT uses TLS v1.2



Filter: tcp.port == 5000 && ip.addr == 192.168.200.2 && ssl

No.	Time	Source	Destination	Protocol	Length	Info
46	19.1192700	192.168.200.2	10.10.10.101	TLSv1.2	572	Client Hello
47	19.1266820	10.10.10.101	192.168.200.2	TLSv1.2	3272	Server Hello, Certificate, Server Key Exchange, Certificate Request, Ser
48	19.1893990	10.10.10.101	192.168.200.2	TLSv1.2	1354	[TCP Retransmission] continuation data
53	19.2698810	192.168.200.2	10.10.10.101	TLSv1.2	62	Alert (Level: Fatal, Description: Certificate Expired)
259	144.357470	192.168.200.2	10.10.10.101	TLSv1.2	572	Client Hello
260	144.363969	10.10.10.101	192.168.200.2	TLSv1.2	3272	Server Hello, Certificate, Server Key Exchange, Certificate Request, Ser
264	144.548146	192.168.200.2	10.10.10.101	TLSv1.2	62	Alert (Level: Fatal, Description: Certificate Expired)

Frame 46: 572 bytes on wire (4576 bits), 572 bytes captured (4576 bits) on interface 0

Ethernet II, Src: CadmusCo\_7a:1a:84 (08:00:27:7a:1a:84), Dst: Sony\_Sc:5a:6a (f0:bf:97:5c:5a:6a)

Internet Protocol version 4, Src: 192.168.200.2 (192.168.200.2), Dst: 10.10.10.101 (10.10.10.101)

Transmission Control Protocol, Src Port: 42971 (42971), Dst Port: 5000 (5000), Seq: 1, Ack: 1, Len: 517

Secure Sockets Layer

VSS-Monitoring ethernet trailer, Source Port: 0

```

0000 f0 bf 97 5c 5a 6a 08 00 27 7a 1a 84 08 00 45 00 ...Zj..`z....E.
0010 02 2d 90 bf 40 00 3f 06 0b f2 c0 a8 c8 02 0a 0a ...@.?. .....
0020 0a 65 a7 db 13 88 21 e1 11 fa 5b 74 e6 9e 50 18 ...e....!..[.P.
0030 05 b4 10 14 00 00 16 03 01 02 00 01 00 01 fc 03 .....
0040 03 f6 eb ed 3f a7 bc 5b 4a b8 67 95 66 7f 47 64 ...?..[ j.g.f.Gd
0050 42 2b ff 3e 55 ed a3 e6 08 4f e3 4f ac 26 9e 8a B+>U... .O.O.&.
0060 81 20 4e 3c 8b b5 d1 ad 34 9c e9 bf 84 1a 02 f6 . Nc.... 4.....
0070 c9 d6 82 f8 c2 4e 96 8e eb 06 47 d6 29 33 11 47 ...N... .G.)3.G
0080 1c 27 00 3e 13 02 13 03 13 01 c0 2c c0 30 00 9f ...>... ..0..
0090 cc a9 cc a8 cc aa c0 2b c0 2f 00 9e c0 24 c0 28 .....+ /...$.{
00a0 00 6b c0 23 c0 27 00 67 c0 0a c0 14 00 39 c0 09 .k.#. .g ....9..
00b0 c0 13 00 33 00 9d 00 9c 00 3d 00 3c 00 35 00 2f ...3.... .<.5./
00c0 00 ff 01 00 01 75 00 0b 00 04 03 00 01 02 00 0a .....U.....
00d0 00 0c 00 0a 00 1d 00 17 00 1e 00 19 00 18 33 74 .....3t
00e0 00 00 00 10 00 0b 00 09 08 68 74 74 70 2f 31 2e .....http/1.
00f0 31 00 16 00 00 00 17 00 00 31 00 00 00 0d 00 1..... .1.....
0100 30 00 7e 04 03 05 03 06 03 08 07 08 08 09 08 0.....
  
```

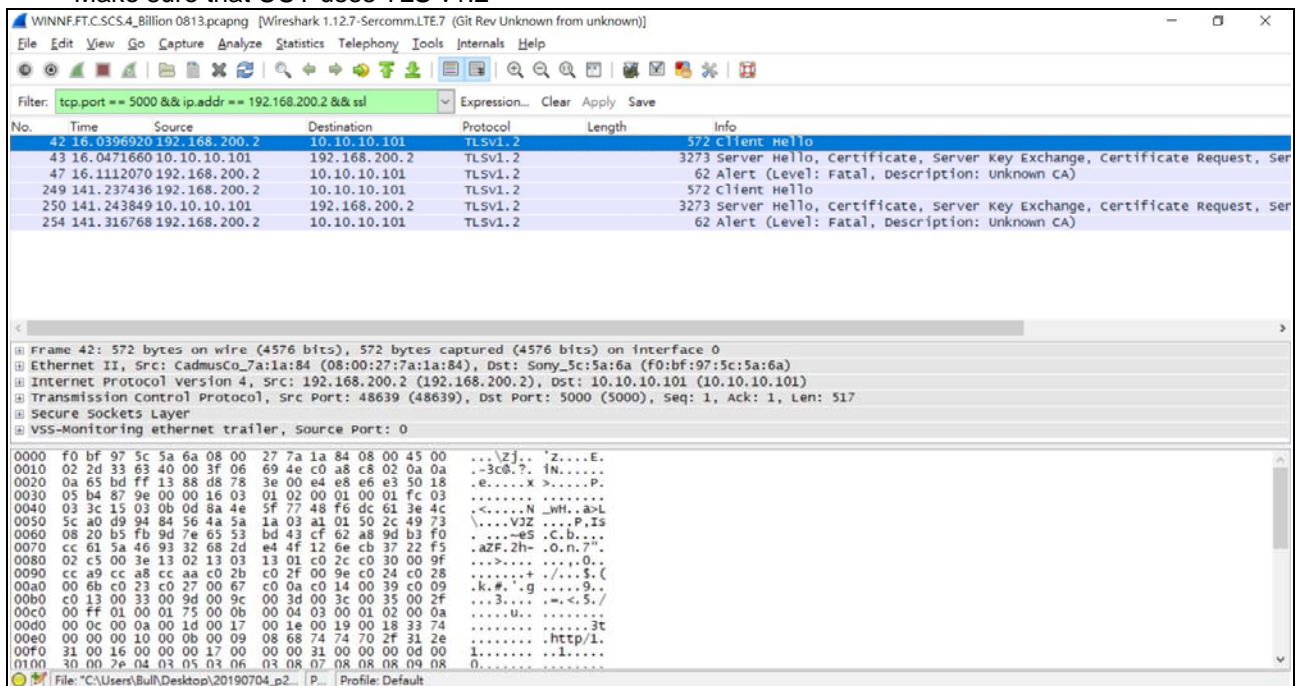
#### 4.8.7.4 WINNF.FT.C.SCS.4

Test Case ID : WINNF.FT.C.SCS.4  NA

#	Test Execution Steps	Results
1	<ul style="list-style-type: none"> <li>UUT shall start CBSD-SAS communication with the security procedures</li> </ul>	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail
2	<ul style="list-style-type: none"> <li>Make sure that UUT uses TLS v1.2 for security establishment.</li> <li>Make sure UUT selects the correct cipher suite.</li> <li>UUT shall use CRL or OCSP to verify the validity of the server certificate</li> <li>Make sure that Mutual authentication does not happen between UUT and the SAS Test Harness.</li> </ul>	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail
3	UUT may retry for the security procedure which shall fail.	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> 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: <ul style="list-style-type: none"> <li>UUT shall not transmit RF</li> </ul>	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail

Wireshark Capture Example for Test Case :

- Make sure that UUT uses TLS v1.2



The screenshot shows a Wireshark capture of a TLS v1.2 handshake. The filter is set to 'tcp.port == 5000 && ip.addr == 192.168.200.2 && ssl'. The packet list shows the following frames:

- 42: 16.0396920 192.168.200.2 to 10.10.10.101, TLSv1.2, 572 bytes, Client Hello
- 43: 16.0471660 10.10.10.101 to 192.168.200.2, TLSv1.2, 3273 bytes, Server Hello, Certificate, Server Key Exchange, Certificate Request, Ser
- 47: 16.1112070 192.168.200.2 to 10.10.10.101, TLSv1.2, 62 bytes, Alert (Level: Fatal, Description: Unknown CA)
- 249: 141.237436 192.168.200.2 to 10.10.10.101, TLSv1.2, 572 bytes, Client Hello
- 250: 141.243849 10.10.10.101 to 192.168.200.2, TLSv1.2, 3273 bytes, Server Hello, certificate, server key Exchange, certificate Request, Ser
- 254: 141.316768 192.168.200.2 to 10.10.10.101, TLSv1.2, 62 bytes, Alert (Level: Fatal, Description: Unknown CA)

The packet details for frame 42 (Client Hello) are expanded, showing the VSS-Monitoring ethernet trailer, Source Port: 0, and the raw bytes of the TLS Client Hello message.



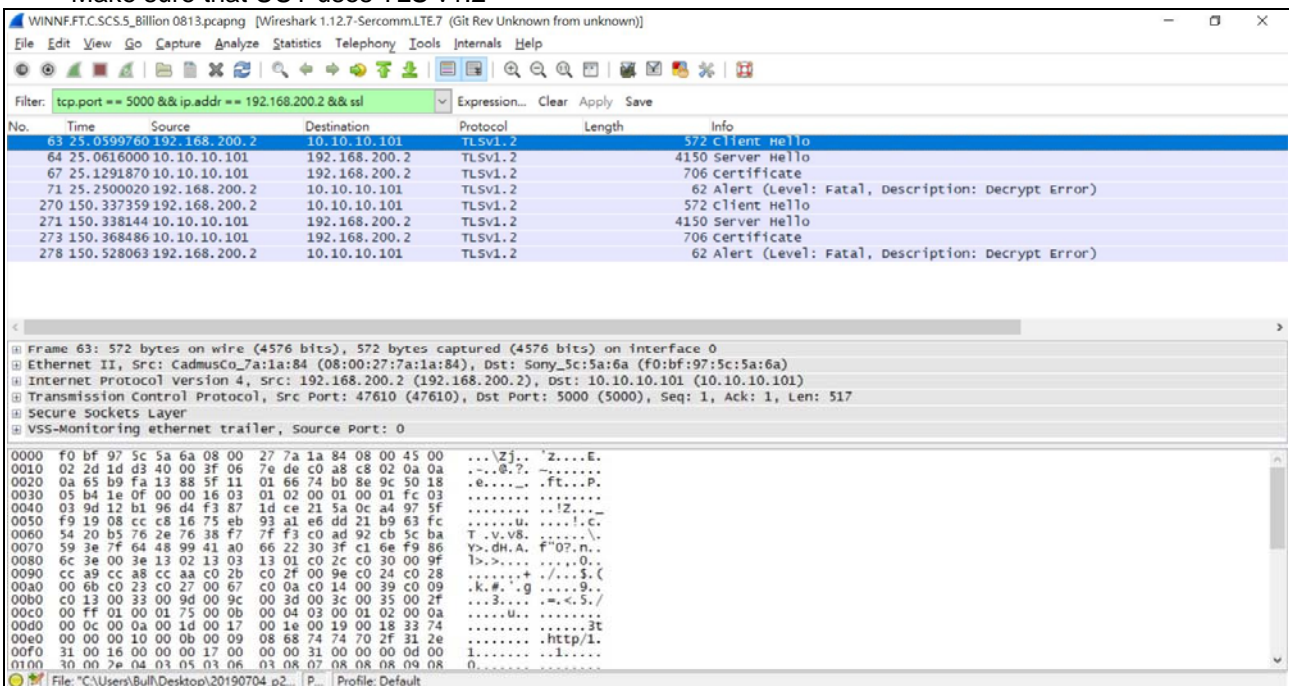
#### 4.8.7.5 WINNF.FT.C.SCS.5

Test Case ID : WINNF.FT.C.SCS.5  NA

#	Test Execution Steps	Results	
1	<ul style="list-style-type: none"> <li>UUT shall start CBSD-SAS communication with the security procedures</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
2	<ul style="list-style-type: none"> <li>Make sure that UUT uses TLS v1.2 for security establishment.</li> <li>Make sure UUT selects the correct cipher suite.</li> <li>UUT shall use CRL or OCSP to verify the validity of the server certificate</li> <li>Make sure that Mutual authentication does not happen between UUT and the SAS Test Harness.</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
3	UUT may retry for the security procedure which shall fail.	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> 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: <ul style="list-style-type: none"> <li>UUT shall not transmit RF</li> </ul>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail

Wireshark Capture Example for Test Case :

- Make sure that UUT uses TLS v1.2



The screenshot shows a Wireshark capture of a TLS v1.2 session. The filter is set to 'tcp.port == 5000 && ip.addr == 192.168.200.2 && ssl'. The packet list shows the following frames:

No.	Time	Source	Destination	Protocol	Length	Info
63	25.0599760	192.168.200.2	10.10.10.101	TLSv1.2	572	Client Hello
64	25.0616000	10.10.10.101	192.168.200.2	TLSv1.2	4150	Server Hello
67	25.1291870	10.10.10.101	192.168.200.2	TLSv1.2	706	certificate
71	25.2500020	192.168.200.2	10.10.10.101	TLSv1.2	62	Alert (Level: Fatal, Description: Decrypt Error)
270	150.337359	192.168.200.2	10.10.10.101	TLSv1.2	572	Client Hello
271	150.338144	10.10.10.101	192.168.200.2	TLSv1.2	4150	Server Hello
273	150.368486	10.10.10.101	192.168.200.2	TLSv1.2	706	certificate
278	150.528063	192.168.200.2	10.10.10.101	TLSv1.2	62	Alert (Level: Fatal, Description: Decrypt Error)

The packet details for frame 63 (Client Hello) are expanded, showing the VSS-Monitoring ethernet trailer and the TLS record structure. The hex dump and ASCII view are visible at the bottom of the window.

#### 4.8.8 CBSD RF Power Measurement

##### 4.8.8.1 WINNF.PT.C.HBT.1

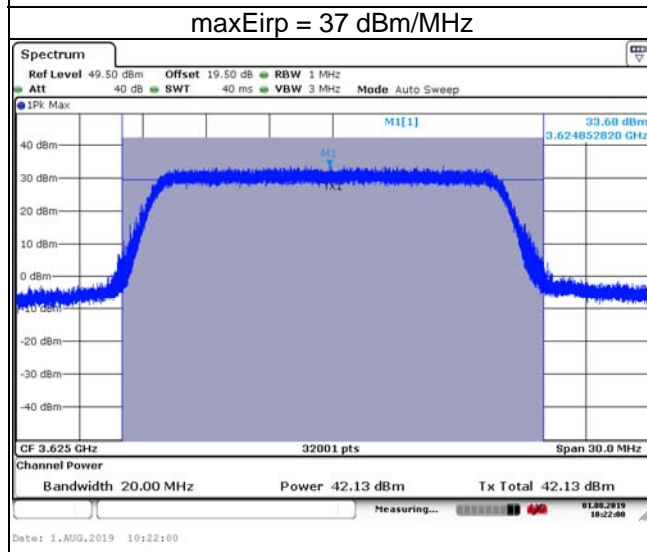
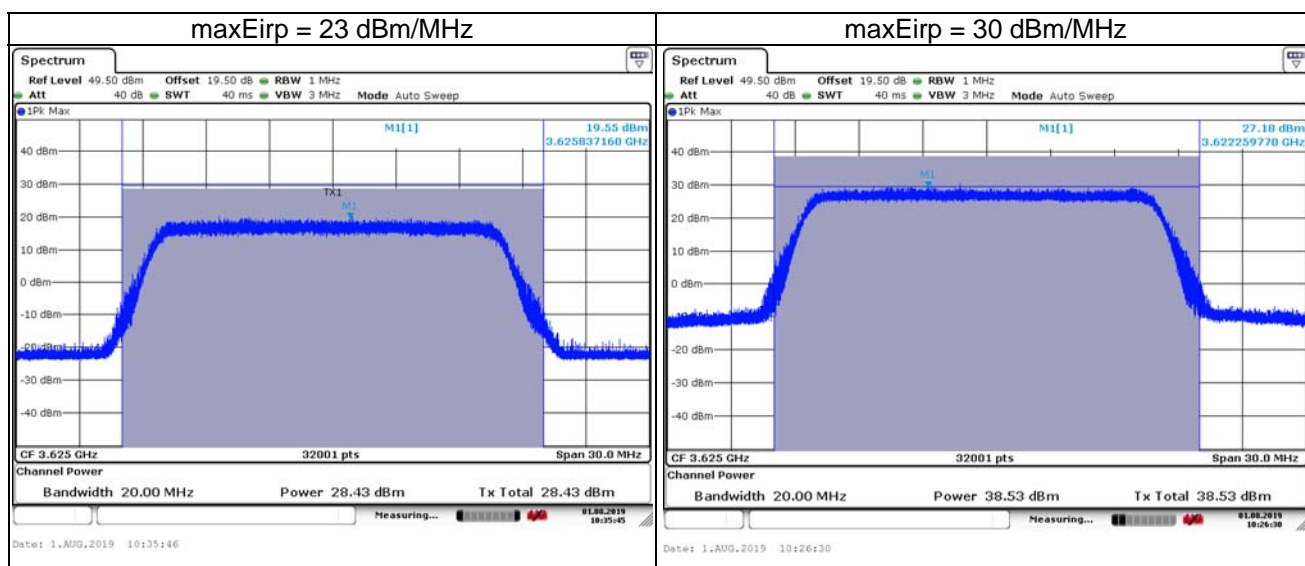
Test Case ID : WINNF.PT.C.HBT.1
  NA

#	Test Execution Steps	Results	
1	<p>Ensure the following conditions are met for test entry:</p> <ul style="list-style-type: none"> <li>● UUT has successfully completed SAS Discovery and Authentication with the SAS Test Harness</li> <li>● UUT has registered with the SAS, with CBSD ID = C</li> <li>● 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</li> </ul> <p><i>Note: in order for the UUT to request a grant with the parameters {lowFrequency, highFrequency, maxEirp}, the SAS Test Harness may need to provide appropriate guidance in the availableChannel object of the spectrumInquiry response message, and the operationParam object of the grant response message. Alternately, the UUT vendor may provide the ability to set those parameters on the UUT so that the UUT will request a grant with those parameters</i></p>	--	--
2	<p>UUT and SAS Test Harness perform a series of Heartbeat Request/Response cycles, which continues until the other test steps are complete. Messaging for each cycle is as follows:</p> <ul style="list-style-type: none"> <li>● UUT sends Heartbeat Request, including:               <ul style="list-style-type: none"> <li>○ cbsdId = C</li> <li>○ grantId = G</li> </ul> </li> <li>● SAS Test Harness responds with Heartbeat Response, including:               <ul style="list-style-type: none"> <li>○ cbsdId = C</li> <li>○ grantId = G</li> <li>○ transmitExpireTime = current UTC time + 200 seconds</li> <li>○ responseCode = 0</li> </ul> </li> </ul>	--	--
3	<p>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.</p> <p><i>Note: it may be required for the vendor to provide a method or configuration to bring the UUT to a mode which is required by the measurement methodology. Any such mode is vendor-specific and depends upon UUT behavior and the measurement methodology.</i></p>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> 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	Pass / Fail
		Conducted Power Density (dBm/MHz)		Gain(dBi)		
		Chain 0	Total	14.5	Power Density	
Middle	3625	4.55	4.55	19.05	23.0	Pass
Middle	3625	12.18	12.18	26.68	30.0	Pass
Middle	3625	18.68	18.68	33.18	37.0	Pass



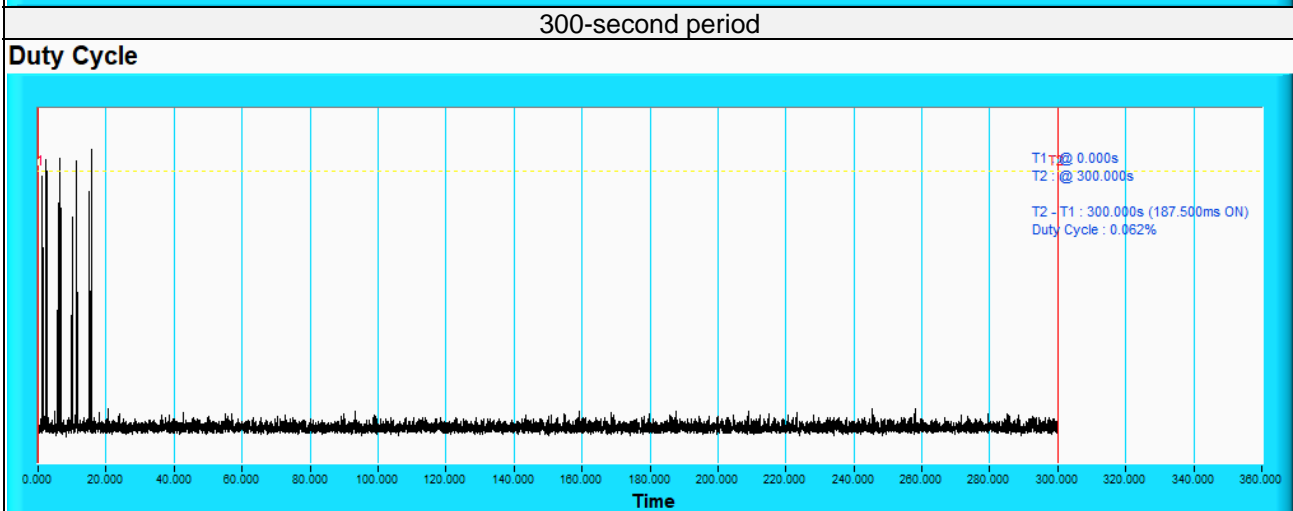
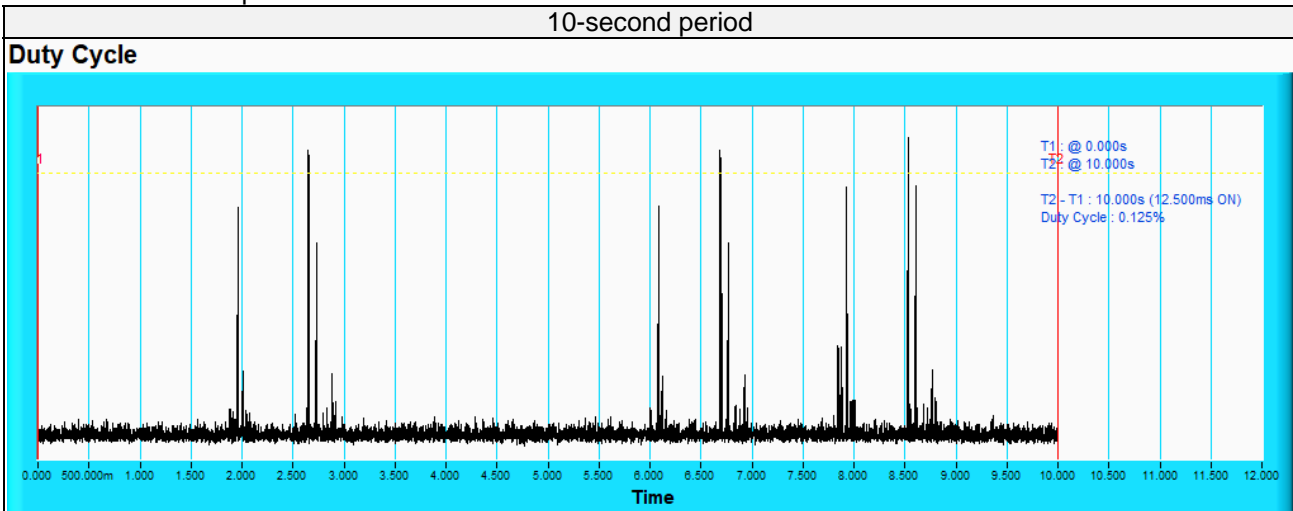
#### 4.8.9 Duration and Duty Cycle

Duration and Duty Cycle			
Period	Minimum Time	Limit	Pass / Fail
10-second	12.5 msec	1-second	Pass
300-second	187.5 msec	10-second	Pass
3600-second	1.35 sec	20-second	Pass

Note:

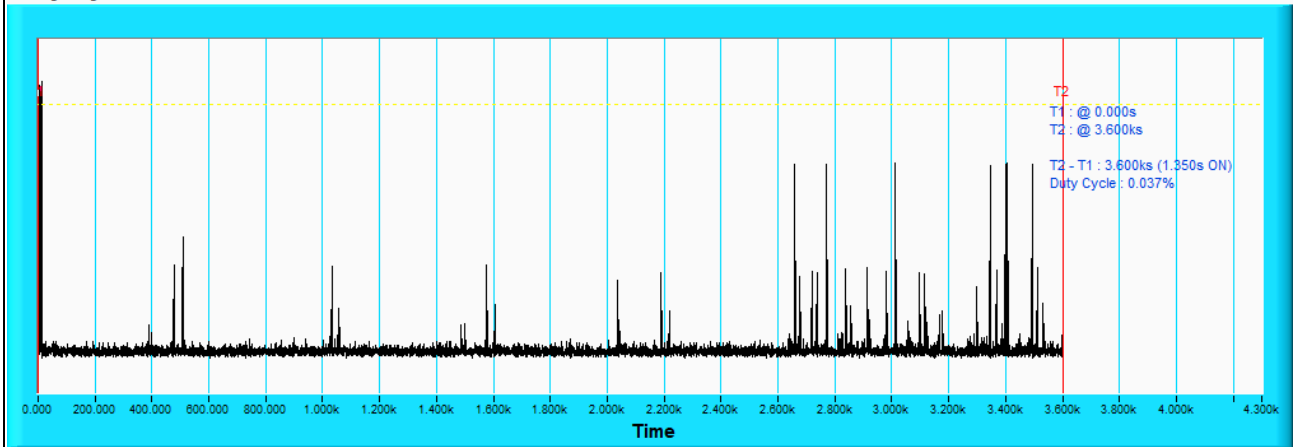
- Limited in duration and duty cycle to the minimum time necessary to get a grant from the SAS. This time should not exceed 1 second within any 10-second period, 10seconds within any 300-second period, or 20 seconds within any 3600-second period.
- Pass = Minimum Time < Limit

● Measurement plot for Test Case :



3600-second period

Duty Cycle

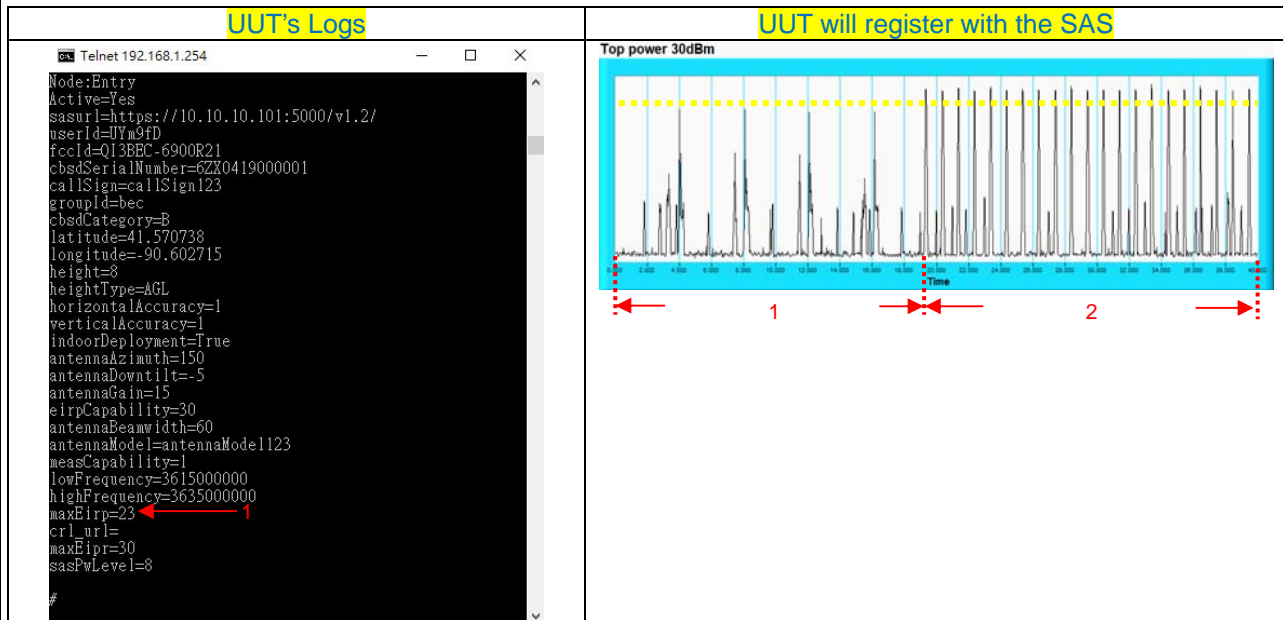


Note: Yellow color line in above plot represent the RF test equipment is logging the amount of time CPE-CBSD as UUT transmitted EIRP above 23 dBm/10MHz

#### 4.8.10 Verify that the device will register with a SAS when operating below 23 dBm

Answer: Verified in test case WINNF.PT.C.HBT.1

Yes, the CPE-CBSD as UUT default EIRP is under 23 dBm and can register success with SAS.  
After granted, the CPE-CBSD UUT will adjust the EIRP by maxEirp.



**Note :**

1. Yellow color line in above plot represent the 23 dBm.
2. Marker 1 : The CPE-CBSD as UUT will register with SAS and adjust the EIRP by maxEirp < 23 dBm.
3. Marker 2 : After granted, the CPE-CBSD as UUT will adjust the EIRP by maxEirp > 23 dBm.

## **5 Pictures of Test Arrangements**

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

## **6 WinnForum Logs**

Please refer to the attached file (Test Logs).

## Appendix – Information of 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 accredited and approved according to ISO/IEC 17025.

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

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