# WINNF-TS-0122 Test Report

| | | |
|---|---|---|
| **FCC ID** | : | **PKRISGFW2000** |
| **Equipment** | : | **5G CPE Wireless Solution** |
| **Brand Name** | : | **Inseego** |
| **Model Name** | : | **FW2000** |
| **Marketing Name** | : | **FW2000,FW2000e** |
| **Applicant** | : | **Inseego Corp.**<br>**9710 Scranton Road Suite 200, San Diego, CA 92121** |
| **Manufacturer** | : | **Inseego Corp.**<br>**9710 Scranton Road Suite 200, San Diego, CA 92121** |
| **Standard** | : | **WINNF-TS-0122 Version V1.0.2** |

**The product was received on Sep. 03, 2020 and testing was started from Feb. 08, 2021 and completed on Mar. 08, 2021. We, Sporton International Inc. EMC & Wireless Communications Laboratory, would like to declare that the tested sample has been evaluated in accordance with the test procedures given in WINNF-TS-0122 Version V1.0.2 and has been in compliance with the applicable technical standards.**

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

Jones Tsai

**Approved by: Jones Tsai**

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# Table of Contents

**Revision History ---- 4**

**1. Administration Data ---- 5**

1.1 Testing Laboratory---- 5

**2. General Information ---- 6**

2.1 Description of Equipment Under Test (EUT) ---- 6

2.2 Protocol Test Summary ---- 7

2.3 Time test for getting Grant Summary ---- 8

2.4 Support Equipment---- 8

2.5 Test Equipment List ---- 8

**3. Measurement Environment ---- 9**

3.1 Test configuration without Domain Proxy ----10

3.2 Standards ----11

3.3 Protocol test procedure ----11

3.4 Time test for getting Grant Procedure ----11

**4. Protocol Test Results ----12**

4.1 [WINNF.FT.C.REG.1] Multi-Step registration ----12

4.2 [WINNF.FT.C.REG.5] Single-Step registration for CBSD with CPI signed data ----13

4.3 [WINNF.FT.C.REG.8] Missing Required parameters (responseCode 102) ----14

4.4 [WINNF.FT.C.REG.10] Pending registration (responseCode 200) ----15

4.5 [WINNF.FT.C.REG.12] Invalid parameter (responseCode 103)----16

4.6 [WINNF.FT.C.REG.14] Blacklisted CBSD (responseCode 101) ----17

4.7 [WINNF.FT.C.REG.16] Unsupported SAS protocol version (responseCode 100) ----18

4.8 [WINNF.FT.C.REG.18] Group Error (responseCode 201) ----19

4.9 [WINNF.FT.C.GRA.1] Unsuccessful Grant responseCode=400 (INTERFERENCE) ----20

4.10 [WINNF.FT.C.GRA.2] Unsuccessful Grant responseCode=401 (GRANT_CONFLICT)----21

4.11 [WINNF.FT.C.HBT.1] Heartbeat Success Case (first Heartbeat Response) ----22

4.12 [WINNF.FT.C.HBT.3] Heartbeat responseCode=105 (DEREGISTER) ----24

4.13 [WINNF.FT.C.HBT.4] Heartbeat responseCode=500 (TERMINATED_GRANT) ----25

4.14 [WINNF.FT.C.HBT.5] Heartbeat responseCode=501 (SUSPENDED_GRANT) in First Heartbeat Response ----26

4.15 [WINNF.FT.C.HBT.6] Heartbeat responseCode=501 (SUSPENDED_GRANT) in Subsequent Heartbeat Response ----27

4.16 [WINNF.FT.C.HBT.7] Heartbeat responseCode=502 (UNSYNC_OP_PARAM)----29

4.17 [WINNF.FT.C.HBT.9] Heartbeat Response Absent (First Heartbeat) ----30

4.18 [WINNF.FT.C.HBT.10] Heartbeat Response Absent (Subsequent Heartbeat)----31

4.19 [WINNF.FT.C.RLQ.1] Successful Relinquishment----------32
4.20 [WINNF.FT.C.DRG.1] Successful Deregistration ----------33
4.21 [WINNF.FT.C.SCS.1] Successful TLS connection between UUT and SAS Test Harness ----------34
4.22 [WINNF.FT.C.SCS.2] TLS failure due to revoked certificate ----------35
4.23 [WINNF.FT.C.SCS.3] TLS failure due to expired server certificate----------36
4.24 [WINNF.FT.C.SCS.4] TLS failure when SAS Test Harness certificate is issued by an unknown CA37
4.25 [WINNF.FT.C.SCS.5] TLS failure when certificate at the SAS Test Harness is corrupted ----------38
4.26 [WINNF.PT.C.HBT] UUT RF Transmit Power Measurement----------39
**5. Result of Time test for getting Grant----------41**
5.1 1 second within any 10-second period ----------41
5.2 10 seconds within any 300-second period ----------42
5.3 20 seconds within any 3600-second period----------43
**6. UUT registers with the SAS irrespective of power levels ----------44**
6.1 Test Procedure ----------44
6.2 Result----------44
**Appendix A. Setup Plot**
**Appendix B. RF measurement plots**

# Revision History

| Report No. | Version | Description | Issued Date |
|---|---|---|---|
| FG082512F | 01 | Initial issue of report | Mar. 10, 2021 |
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| **Declaration of Conformity:** |
|---|
| The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers. |
| **Comments and Explanations:** |
| The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification. |

**Reviewed by: Louis Wu**

**Report Producer: Dara Chiu**

# 1. Administration Data

## 1.1 Testing Laboratory

| | |
|---|---|
| **Test Site** | Sporton International Inc. EMC & Wireless Communications Laboratory |
| **Test Site Location** | No.52, Huaya 1st Rd., Guishan Dist.,<br>Taoyuan City 333, Taiwan (R.O.C.)<br>TEL: +886-3-327-3456<br>FAX: +886-3-328-4978 |
| **Test Site No.** | Sporton Site No. |
| | DFS02-HY |
| **Test Engineer** | Thomas Chen |
| **Temperature** | 21 ~ 23 ℃ |
| **Relative Humidity** | 51 ~ 58 % |

FCC Designation No.: TW1190

# 2. General Information

## 2.1 Description of Equipment Under Test (EUT)

| Product Feature & Specification | |
|---|---|
| **Professional Installation** | ☒ Yes<br>☐ No |
| **Unit Under Test Category** | ☐ Category A<br>☒ Category B<br>☒ CPE-CBSD Product |
| **Domain Proxy support** | ☐ UUT with Domain Proxy<br>☒ UUT without Domain Proxy |
| **UUT Antenna Type** | Fixed Internal Antenna |
| **UUT Antenna Gain** | 11.7 dBi |
| **UUT HW Version** | 3 |
| **UUT FW Version** | 2.11 |
| **UUT SW Version** | 2.284 |
| **UUT Serial Number** | FL010620D20043 |
| **Device Power Class** | LTE Band 48: Power Class 3 |

**Remark:** The above EUT's information was declared by manufacturer. Please refer to Comments and Explanations in report summary.

## 2.2 Protocol Test Summary

| Section | Test Case ID | Test Case Title | Test Result |
|---|---|---|---|
| 6.1.4.1.1 | WINNF.FT.C.REG.1 | Multi-Step registration | PASS |
| 6.1.4.1.5 | WINNF.FT.C.REG.5 | Single-Step registration for CBSD with CPI signed data | PASS |
| 6.1.4.2.1 | WINNF.FT.C.REG.8 | Missing Required parameters (responseCode 102) | PASS |
| 6.1.4.2.3 | WINNF.FT.C.REG.10 | Pending registration (responseCode 200) | PASS |
| 6.1.4.2.5 | WINNF.FT.C.REG.12 | Invalid parameter (responseCode 103) | PASS |
| 6.1.4.2.7 | WINNF.FT.C.REG.14 | Blacklisted CBSD (responseCode 101) | PASS |
| 6.1.4.2.9 | WINNF.FT.C.REG.16 | Unsupported SAS protocol version (responseCode 100) | PASS |
| 6.1.4.2.11 | WINNF.FT.C.REG.18 | Group Error (responseCode 201) | PASS |
| 6.3.4.2.1 | WINNF.FT.C.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 |
| 6.4.4.2.1 | 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 |
| 6.4.4.3.1 | 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 |
| 6.6.4.1.1 | WINNF.FT.C.RLQ.1 | Successful Relinquishment | PASS |
| 6.7.4.1.1 | WINNF.FT.C.DRG.1 | Successful Deregistration | 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 |

## 2.3 Time test for getting Grant Summary

| Trail | Time limit | Monitoring time | Measured result | Verdict |
|---|---|---|---|---|
| 1 | 1 second | 10 seconds | 3.9ms | PASS |
| 2 | 10 seconds | 300 seconds | 12ms | PASS |
| 3 | 20 seconds | 3600 seconds | 144ms | PASS |

## 2.4 Support Equipment

| Name | Manufacturer | Type/Model | Serial Number | FCC ID |
|---|---|---|---|---|
| Q710 | Ruckus | P01-Q710-US02 | 991929000175 | S9GQ710US02 |

## 2.5 Test Equipment List

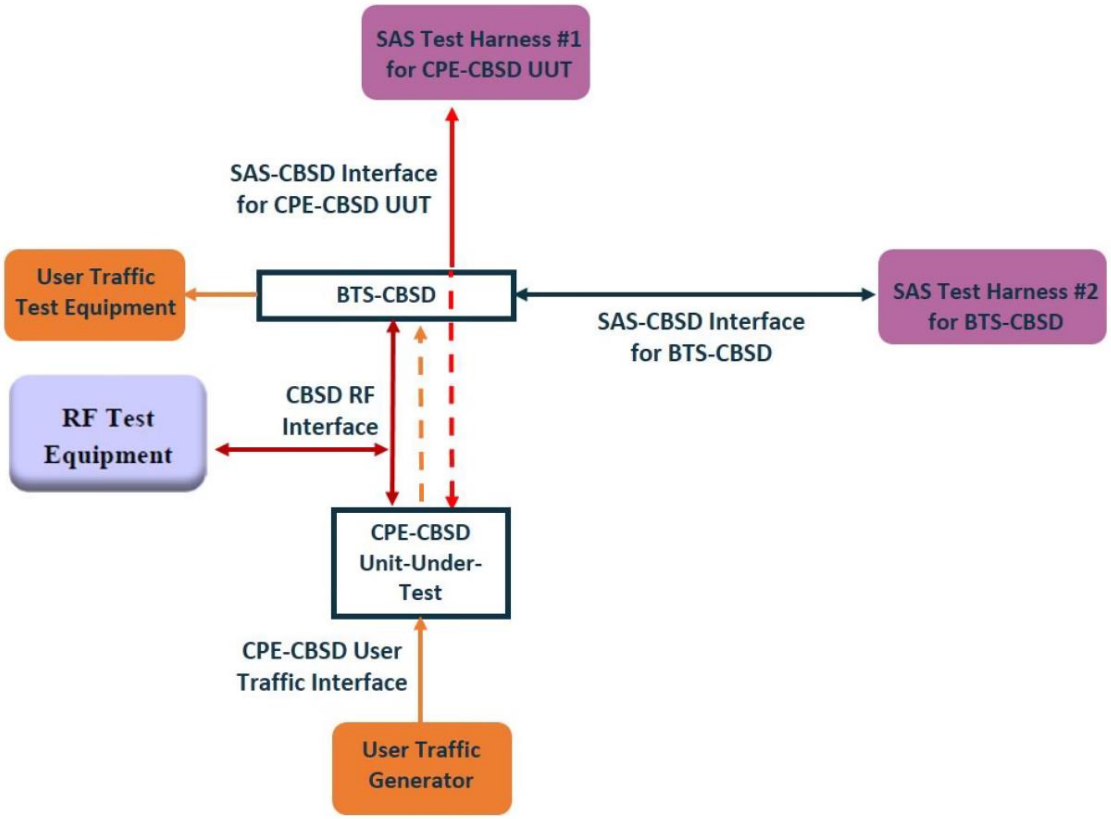
| Name | Manufacturer | Type/Model | Serial Number | Calibration | |
|---|---|---|---|---|---|
| | | | | Last Cal. | Due Date |
| Spectrum Analyzer | Rohde & Schwarz | FSV3044 | 101048 | Apr. 29, 2020 | Apr. 28, 2021 |
| Spectrum Analyzer | Keysight | N9010A | MY57120184 | Nov. 17, 2020 | Nov. 16, 2021 |

# 3. Measurement Environment

| Measurement Environment Information | |
|---|---|
| **SAS Test Harness version** | 1.0.0.3 |
| **Operating System** | Windows 10 |
| **TLS version** | V 1.2 |
| **Python version** | V 2.7 |

| Conditional Test Case | | |
|---|---|---|
| **Support (Yes / No)** | **Condition** | **Definition** |
| **Yes** | **C1** | Mandatory for UUT which supports multi-step registration message |
| **No** | **C2** | Mandatory for UUT which supports single-step registration with no CPI-signed data in the registration message. By definition, this is a subset of Category A devices which determine all registration information, including location, without CPI intervention. |
| **Yes** | **C3** | Mandatory for UUT which supports single-step registration containing CPIsigned data in the registration message. |
| **No** | **C4** | Mandatory for UUT which supports RECEIVED_POWER_WITHOUT_GRANT measurement report type |
| **No** | **C5** | Mandatory for UUT which supports RECEIVED_POWER_WITH_GRANT measurement report type. |
| **No** | **C6** | Mandatory for UUT which supports parameter change being made at the UUT and prior to sending a deregistration. |

## 3.1 Test configuration without Domain Proxy




CPE-CBSD as UUT, BTS-CBSD direct communication.

## 3.2 Standards

[n.1]. FCC KDB 940660 D02 CPE-CBSD Handshake Procedures v02, 22 October 2019

[n.2]. WINNF-TS-0122 Version 1.0.2, “Conformance and Performance Test Technical Specification; CBSD/DP as Unit Under Test (UUT)”, 25 November 2020

[n.3]. WINNF-TS-0016 Version 1.2.6, “SAS to CBSD Technical Specification”, 25 November 2020

## 3.3 Protocol test procedure

The test cases for SAS<->CBSD protocol in [n.2] apply for CPE-CBSD device type. Following the [n.1], when running the test cases in [n.2] for CPE-CBSD device type, verify that:

1. CPE-CBSD can begin transmitting its RF only after receiving radio signal from its compatible BTS-CBSD.
2. For all CPE-CBSD RF transmissions, the CPE-CBSD UUT radio frequency range and bandwidth are less or equal to the frequency range and bandwidth of its compatible BTS-CBSD.
3. Judging the last execution step appearing in [n.2] with “User data traffics” instead of “RF transmission.”

## 3.4 Time test for getting Grant Procedure

Use the WinnForum SAS Harness run test case WINNF.FT.C.GRA.1. Without answering the last question in WINNF.FT.C.GRA.1 will keep UUT’s grant request being rejected, then measure the time.

# 4. Protocol Test Results

## 4.1 [WINNF.FT.C.REG.1] Multi-Step registration

| # | Test Execution Steps | Results |
|---|---|---|
| 1 | Ensure the following conditions are met for test entry:<br>• UUT has successfully completed SAS Discovery and Authentication with the SAS Test Harness<br>• UUT is in the Unregistered state | -- |
| 2 | CBSD sends correct Registration request information, as specified in [n.5], to the SAS Test Harness:<br>• The required userId, fccId and cbsdSerialNumber registration parameters shall be sent from the CBSD and conform to proper format and acceptable ranges.<br>• 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.<br>Note: It is outside the scope of this document to test the Registration information that is supplied via another means. | PASS |
| 3 | • SAS Test Harness sends a CBSD Registration Response as follows:<br>– *cbsdId* = C<br>– *measReportConfig* shall not be included<br>– *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:<br>• UUT shall not transmit RF | PASS |

## 4.2 [WINNF.FT.C.REG.5] Single-Step registration for CBSD with CPI signed data

| # | Test Execution Steps | Results |
|---|---|---|
| 1 | Ensure the following conditions are met for test entry:<br>• UUT has successfully completed SAS Discovery and Authentication with SAS Test Harness<br>• UUT is in the Unregistered state<br>• 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:<br>• 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. | PASS |
| | • 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. | |
| 3 | • SAS Test Harness sends a CBSD Registration Response as follows:<br>– *cbsdId* = C<br>– *measReportConfig* shall not be included.<br>– *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:<br>• UUT shall not transmit RF | PASS |

## 4.3 [WINNF.FT.C.REG.8] Missing Required parameters (responseCode 102)

| # | Test Execution Steps | Results |
|---|---|---|
| 1 | Ensure the following conditions are met for test entry:<br>• UUT has successfully completed SAS Discovery and Authentication with SAS Test Harness<br>• 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:<br>– SAS response does not include *cbsdId*<br>– *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:<br>• UUT shall not transmit RF | PASS |

## 4.4 [WINNF.FT.C.REG.10] Pending registration (responseCode 200)

| # | Test Execution Steps | Results |
|---|---|---|
| 1 | Ensure the following conditions are met for test entry:<br>• UUT has successfully completed SAS Discovery and Authentication with SAS Test Harness<br>• 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:<br>– SAS response does not include *cbsdId*<br>– *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:<br>• UUT shall not transmit RF | PASS |

## 4.5 [WINNF.FT.C.REG.12] Invalid parameter (responseCode 103)

| # | Test Execution Steps | Results |
|---|---|---|
| 1 | Ensure the following conditions are met for test entry:<br>• UUT has successfully completed SAS Discovery and Authentication with SAS Test Harness<br>• 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:<br>– SAS response does not include *cbsdId*<br>– *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:<br>• UUT shall not transmit RF | PASS |

## 4.6 [WINNF.FT.C.REG.14] Blacklisted CBSD (responseCode 101)

| # | Test Execution Steps | Results |
|---|---|---|
| 1 | Ensure the following conditions are met for test entry:<br>• UUT has successfully completed SAS Discovery and Authentication with SAS Test Harness<br>• 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:<br>– SAS response does not include *cbsdId*<br>– *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:<br>• UUT shall not transmit RF | PASS |

## 4.7 [WINNF.FT.C.REG.16] Unsupported SAS protocol version (responseCode 100)

| # | Test Execution Steps | Results |
|---|---|---|
| 1 | Ensure the following conditions are met for test entry:<br>• UUT has successfully completed SAS Discovery and Authentication with SAS Test Harness<br>• 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:<br>– SAS response does not include *cbsdId*<br>– *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:<br>• UUT shall not transmit RF | PASS |

## 4.8 [WINNF.FT.C.REG.18] Group Error (responseCode 201)

| # | Test Execution Steps | Results |
|---|---|---|
| 1 | Ensure the following conditions are met for test entry:<br>• UUT has successfully completed SAS Discovery and Authentication with SAS Test Harness<br>• 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:<br>– SAS response does not include *cbsdId*<br>– *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:<br>• UUT shall not transmit RF | PASS |

## 4.9 [WINNF.FT.C.GRA.1] Unsuccessful Grant responseCode=400 (INTERFERENCE)

| # | Test Execution Steps | Results |
|---|---|---|
| 1 | Ensure the following conditions are met for test entry:<br>• 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<br>• *cbsdId*=C<br>• *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:<br>• UUT shall not transmit RF | PASS |

## 4.10 [WINNF.FT.C.GRA.2] Unsuccessful Grant responseCode=401 (GRANT_CONFLICT)

| # | Test Execution Steps | Results |
|---|---|---|
| 1 | Ensure the following conditions are met for test entry:<br>• 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<br>• *cbsdId*=C<br>• *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:<br>• UUT shall not transmit RF | PASS |

## 4.11 [WINNF.FT.C.HBT.1] Heartbeat Success Case (first Heartbeat Response)

| # | Test Execution Steps | Results |
|---|---|---|
| 1 | Ensure the following conditions are met for test entry:<br>• UUT has registered successfully with SAS Test Harness, with *cbsdId* = C | -- |
| 2 | UUT sends a message:<br>• If message is type Spectrum Inquiry Request, go to step 3, or<br>• If message is type Grant Request, go to step 5 | -- |
| 3 | UUT sends Spectrum Inquiry Request. Validate:<br>• *cbsdId* = C<br>• List of frequencyRange objects sent by UUT are within the CBRS frequency range | PASS |
| 4 | SAS Test Harness sends a Spectrum Inquiry Response message, including the following parameters:<br>• *cbsdId* = C<br>• availableChannel is an array of availableChannel objects<br>• *responseCode* = 0 | -- |
| 5 | UUT sends Grant Request message. Validate:<br>• *cbsdId* = C<br>• maxEIRP is at or below the limit appropriate for CBSD category as defined by Part 96<br>• operationFrequencyRange, F, sent by UUT is a valid range within the CBRS band | PASS |
| 6 | SAS Test Harness sends a Grant Response message, including the parameters:<br>• *cbsdId* = C<br>• *grantId* = G = a valid grant ID<br>• grantExpireTime = UTC time greater than duration of the test<br>• *responseCode* = 0 | -- |
| 7 | UUT sends a first Heartbeat Request message.<br>Verify Heartbeat Request message is formatted correctly, including:<br>• *cbsdId* = C<br>• *grantId* = G<br>• *operationState* = “GRANTED” | PASS |

| | | |
|---|---|---|
| 8 | SAS Test Harness sends a Heartbeat Response message, with the following parameters:<br>• *cbsdId* = C<br>• *grantId* = G<br>• *transmitExpireTime* = current UTC time + 200 seconds<br>• *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:<br>• *cbsdId* = C<br>• *grantId* = G<br>• *operationState* = "AUTHORIZED"<br>and SAS Test Harness responds with a Heartbeat Response message including the following parameters:<br>• *cbsdId* = C<br>• *grantId* = G<br>• *transmitExpireTime* = current UTC time + 200 seconds<br>• *responseCode* = 0 | PASS |
| 10 | Monitor the RF output of the UUT from start of test until UUT transmission commences. Verify:<br>• UUT does not transmit at any time prior to completion of the first heartbeat response<br>• UUT transmits after step 8 is complete, and its transmission is limited to within the bandwidth range F. | PASS |

## 4.12 [WINNF.FT.C.HBT.3] Heartbeat responseCode=105 (DEREGISTER)

| # | Test Execution Steps | Results |
|---|---|---|
| 1 | Ensure the following conditions are met for test entry:<br>• UUT has registered successfully with SAS Test Harness<br>• UUT has a valid single grant as follows:<br>○ valid *cbsdId* = C<br>○ valid *grantId* = G<br>○ grant is for frequency range F, power P<br>○ *grantExpireTime* = UTC time greater than duration of the test<br>• UUT is in AUTHORIZED state and is transmitting within the grant bandwidth F on RF interface | -- |
| 2 | UUT sends a Heartbeat Request message.<br>Ensure Heartbeat Request message is sent within Heartbeat Interval specified in the latest Heartbeat Response, and formatted correctly, including:<br>• *cbsdId* = C<br>• *grantId* = G<br>• *operationState* = "AUTHORIZED" | PASS |
| 3 | SAS Test Harness sends a Heartbeat Response message, including the following parameters:<br>• *cbsdId* = C<br>• *grantId* = G<br>• *transmitExpireTime = T = Current UTC time*<br>• *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:<br>• UUT shall stop transmission within (T + 60 seconds) of completion of step 3 | PASS |

## 4.13 [WINNF.FT.C.HBT.4] Heartbeat responseCode=500 (TERMINATED_GRANT)

| # | Test Execution Steps | Results |
|---|---|---|
| 1 | Ensure the following conditions are met for test entry:<br>• UUT has registered successfully with SAS Test Harness<br>• UUT has a valid single grant as follows:<br>○ valid *cbsdId* = C<br>○ valid *grantId* = G<br>○ grant is for frequency range F, power P<br>○ *grantExpireTime* = UTC time greater than duration of the test<br>• UUT is in AUTHORIZED state and is transmitting within the grant bandwidth F on RF interface | -- |
| 2 | UUT sends a Heartbeat Request message.<br>Ensure Heartbeat Request message is sent within latest specified heartbeatInterval, and is formatted correctly, including:<br>• *cbsdId* = C<br>• *grantId* = G<br>• *operationState* = "AUTHORIZED" | PASS |
| 3 | SAS Test Harness sends a Heartbeat Response message, including the following parameters:<br>• *cbsdId* = C<br>• *grantId* = G<br>• *transmitExpireTime* = T = current UTC time<br>• *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:<br>• UUT shall stop transmission within (T + 60 seconds) of completion of step 3 | PASS |

## 4.14 [WINNF.FT.C.HBT.5] Heartbeat responseCode=501 (SUSPENDED_GRANT) in First Heartbeat Response

| # | Test Execution Steps | Results |
|---|---|---|
| 1 | Ensure the following conditions are met for test entry:<br>• UUT has registered successfully with SAS Test Harness<br>• UUT has a valid single grant as follows:<br>○ valid *cbsdId* = C<br>○ valid *grantId* = G<br>○ grant is for frequency range F, power P<br>○ *grantExpireTime* = UTC time greater than duration of the test<br>• UUT is in GRANTED, but not AUTHORIZED state (i.e. has not performed its first Heartbeat Request) | -- |
| 2 | UUT sends a Heartbeat Request message.<br>Verify Heartbeat Request message is formatted correctly, including:<br>• *cbsdId* = C<br>• *grantId* = G<br>• *operationState* = "GRANTED" | PASS |
| 3 | SAS Test Harness sends a Heartbeat Response message, including the following parameters:<br>• *cbsdId* = C<br>• *grantId* = G<br>• *transmitExpireTime* = T = current UTC time<br>• *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:<br>A. UUT sends a Heartbeat Request message. Ensure message is sent within latest specified heartbeatInterval, and is correctly formatted with parameters:<br>• *cbsdId* = C<br>• *grantId* = G<br>• *operationState* = "GRANTED"<br>B. UUT sends a Relinquishment request message. Ensure message is correctly formatted with parameters:<br>• *cbdsId* = C<br>• *grantId* = G<br>Monitor the RF output of the UUT. Verify:<br>• UUT does not transmit at any time | PASS |

## 4.15 [WINNF.FT.C.HBT.6] Heartbeat responseCode=501 (SUSPENDED_GRANT) in Subsequent Heartbeat Response

| # | Test Execution Steps | Results |
|---|---|---|
| 1 | Ensure the following conditions are met for test entry:<br>• UUT has registered successfully with SAS Test Harness<br>• UUT has a valid single grant as follows:<br>○ valid *cbsdId* = C<br>○ valid *grantId* = G<br>○ grant is for frequency range F, power P<br>○ *grantExpireTime* = UTC time greater than duration of the test<br>• UUT is in AUTHORIZED state and is transmitting within the grant bandwidth F on RF interface | -- |
| 2 | UUT sends a Heartbeat Request message.<br>Verify Heartbeat Request message is sent within latest specified heartbeatInterval, and is formatted correctly, including:<br>• *cbsdId* = C<br>• *grantId* = G<br>• *operationState* = “AUTHORIZED” | PASS |
| 3 | SAS Test Harness sends a Heartbeat Response message, including the following parameters:<br>• *cbsdId* = C<br>• *grantId* = G<br>• *transmitExpireTime* = T = current UTC time<br>• *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:<br>A. UUT sends a Heartbeat Request message. Ensure message is sent within latest specified heartbeatInterval, and is correctly formatted with parameters:<br>• *cbsdId* = C<br>• *grantId* = G<br>• *operationState* = "GRANTED"<br>B. UUT sends a Relinquishment Request message. Ensure message is correctly formatted with parameters:<br>• *cbdsId* = C<br>• *grantId* = G<br>Monitor the RF output of the UUT. Verify:<br>• UUT shall stop transmission within (*T* + 60 seconds) of completion of step 3 | PASS |

## 4.16 [WINNF.FT.C.HBT.7] Heartbeat responseCode=502 (UNSYNC_OP_PARAM)

| # | Test Execution Steps | Results |
|---|---|---|
| 1 | Ensure the following conditions are met for test entry:<br>• UUT has registered successfully with SAS Test Harness<br>• UUT has a valid single grant as follows:<br>○ valid *cbsdId* = C<br>○ valid *grantId* = G<br>○ grant is for frequency range F, power P<br>○ *grantExpireTime* = UTC time greater than duration of the test<br>• UUT is in AUTHORIZED state and is transmitting within the grant bandwidth F on RF interface | -- |
| 2 | UUT sends a Heartbeat Request message.<br>Verify Heartbeat Request message is sent within latest specified *heartbeatInterval*,and is formatted correctly, including:<br>• *cbsdId* = C<br>• *grantId* = G<br>• *operationState* = “AUTHORIZED” | PASS |
| 3 | SAS Test Harness sends a Heartbeat Response message, including the following parameters:<br>• *cbsdId* = C<br>• *grantId* = G<br>• *transmitExpireTime* = T = Current UTC Time<br>• *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:<br>• UUT sends a Grant Relinquishment Request message. Verify message is correctly formatted with parameters:<br>○ *cbdsId* = C<br>○ *grantId* = G<br>Monitor the RF output of the UUT. Verify:<br>• UUT shall stop transmission within (T+60) seconds of completion of step 3. | PASS |

## 4.17 [WINNF.FT.C.HBT.9] Heartbeat Response Absent (First Heartbeat)

| # | Test Execution Steps | Results |
|---|---|---|
| 1 | Ensure the following conditions are met for test entry:<br>• UUT has registered successfully with SAS Test Harness<br>• UUT has a valid single grant as follows:<br>○ valid *cbsdId* = C<br>○ valid *grantId* = G<br>○ grant is for frequency range F, power P<br>○ *grantExpireTime* = UTC time greater than duration of the test<br>• UUT is in GRANTED, but not AUTHORIZED state (i.e. has not performed its first Heartbeat Request) | -- |
| 2 | UUT sends a Heartbeat Request message.<br>Ensure Heartbeat Request message is sent within latest specified *heartbeatInterval*, and is formatted correctly, including:<br>• *cbsdId* = C<br>• *grantId* = G<br>• *operationState* = “GRANTED” | PASS |
| 3 | After completion of Step 2, SAS Test Harness does not respond to any further messages from UUT to simulate loss of network connection | -- |
| 4 | Monitor the RF output of the UUT from start of test to 60 seconds after step 3.<br>Verify:<br>• At any time during the test, UUT shall not transmit on RF interface | PASS |

## 4.18 [WINNF.FT.C.HBT.10] Heartbeat Response Absent (Subsequent Heartbeat)

| # | Test Execution Steps | Results |
|---|---|---|
| 1 | Ensure the following conditions are met for test entry:<br>• UUT has registered successfully with SAS Test Harness<br>• UUT has a valid single grant as follows:<br>○ valid *cbsdId* = C<br>○ valid *grantId* = G<br>○ grant is for frequency range F, power P<br>○ *grantExpireTime* = UTC time greater than duration of the test<br>• UUT is in AUTHORIZED state and is transmitting within the grant bandwidth F on RF interface | -- |
| 2 | UUT sends a Heartbeat Request message.<br>Verify Heartbeat Request message issent within the latest specified *heartbeatInterval*, and is formatted correctly, including:<br>• *cbsdId* = C<br>• *grantId* = G<br>• *operationState* = “AUTHORIZED” | PASS |
| 3 | SAS Test Harness sends a Heartbeat Response message, with the following parameters:<br>• *cbsdId* = C<br>• *grantId* = G<br>• *transmitExpireTime* = current UTC time + 200 seconds<br>• *responseCode* = 0 | -- |
| 4 | After completion of Step 3, SAS Test Harness does not respond to any further messages from UUT | -- |
| 5 | Monitor the RF output of the UUT. Verify:<br>• UUT shall stop all transmission on RF interface within (*transmitExpireTime* + 60 seconds), using the transmitExpireTime sent in Step 3. | PASS |

## 4.19 [WINNF.FT.C.RLQ.1] Successful Relinquishment

| # | Test Execution Steps | Results |
|---|---|---|
| 1 | Ensure the following conditions are met for test entry:<br>• UUT has successfully completed SAS Discovery and Authentication with SAS Test Harness<br>• UUT has successfully registered with SAS Test Harness, with *cbsdId*=C<br>• UUT has received a valid grant with *grantId* = G<br>• UUT is in Grant State AUTHORIZED and is actively transmitting within the bounds of its grant.<br>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:<br>• *cbsdId* = C<br>• *grantId* = G | PASS |
| 3 | SAS Test Harness shall approve the request with a Relinquishment Response message with parameters:<br>– *cbsdId* = C<br>– *grantId* = G<br>– *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:<br>• UUT shall stop RF transmission at any time between triggering the relinquishment and UUT sending the relinquishment request | PASS |

## 4.20 [WINNF.FT.C.DRG.1] Successful Deregistration

| # | Test Execution Steps | Results |
|---|---|---|
| 1 | Ensure the following conditions are met for test entry:<br>• UUT has successfully completed SAS Discovery and Authentication with SAS Test Harness<br>• UUT has successfully registered with SAS Test Harness, with *cbsdId*=C<br>• UUT has received a valid grant with *grantId* = G<br>• UUT is in Grant State AUTHORIZED and is actively transmitting within the bounds of its grant.<br>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 |
| 4 | SAS Test Harness shall approve the request with a Deregistration Response message with parameters:<br>• *cbsdId* = C<br>• *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:<br>• UUT stopped RF transmission at any time between triggering the deregistration and either A OR B occurs:<br>A. UUT sending a Registration Request message, as this is not mandatory<br>B. UUT sending a Deregistration Request message | PASS |

## 4.21 [WINNF.FT.C.SCS.1] Successful TLS connection between UUT and SAS Test Harness

| # | Test Execution Steps | Results |
|---|---|---|
| 1 | • UUT shall start CBSD-SAS communication with the security procedure<br>• The UUT shall establish a TLS handshake with the SAS Test Harness using configured certificate.<br>• Configure the SAS Test Harness to accept the security procedure and establish the connection | PASS |
| 2 | • Make sure that Mutual authentication happens between UUT and the SAS Test Harness.<br>• Make sure that UUT uses TLS v1.2<br>• Make sure that cipher suites from one of the following is selected,<br>  • TLS_RSA_WITH_AES_128_GCM_SHA256<br>  • TLS_RSA_WITH_AES_256_GCM_SHA384<br>  • TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA2 56<br>  • TLS_ECDHE_ECDSA_WITH_AES_256_GCM_SHA3 84<br>  • TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256 | PASS |
| 3 | A successful registration is accomplished using one of the test cases described in section 6.1.4.1, depending on CBSD capability.<br>• 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 |
| 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:<br>• UUT shall not transmit RF | PASS |

## 4.22 [WINNF.FT.C.SCS.2] TLS failure due to revoked certificate

| # | Test Execution Steps | Results |
|---|---|---|
| 1 | • UUT shall start CBSD-SAS communication with the security procedures | PASS |
| 2 | • Make sure that UUT uses TLS v1.2 for security establishment.<br>• Make sure UUT selects the correct cipher suite.<br>• UUT shall use CRL or OCSP to verify the validity of the server certificate.<br>• Make sure that Mutual authentication does not happen between UUT and the SAS Test Harness. | PASS |
| 3 | UUT may retry for the security procedure which shall fail | PASS |
| 4 | SAS Test-Harness shall not receive any Registration request or any application data. | -- |
| 5 | Monitor the RF output of the UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify:<br>• UUT shall not transmit RF | PASS |

## 4.23 [WINNF.FT.C.SCS.3] TLS failure due to expired server certificate

| # | Test Execution Steps | Results |
|---|---|---|
| 1 | • UUT shall start CBSD-SAS communication with the security procedures | PASS |
| 2 | • Make sure that UUT uses TLS v1.2 for security establishment.<br>• Make sure UUT selects the correct cipher suite.<br>• UUT shall use CRL or OCSP to verify the validity of the server certificate.<br>• Make sure that Mutual authentication does not happen between UUT and the SAS Test Harness. | PASS |
| 3 | UUT may retry for the security procedure which shall fail. | PASS |
| 4 | SAS Test-Harness shall not receive any Registration request or any application data. | -- |
| 5 | Monitor the RF output of the UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify:<br>• UUT shall not transmit RF | PASS |

## 4.24 [WINNF.FT.C.SCS.4] TLS failure when SAS Test Harness certificate is issued by an unknown CA

| # | Test Execution Steps | Results |
|---|---|---|
| 1 | • UUT shall start CBSD-SAS communication with the security procedures | PASS |
| 2 | • Make sure that UUT uses TLS v1.2 for security establishment.<br>• Make sure UUT selects the correct cipher suite.<br>• UUT shall use CRL or OCSP to verify the validity of the server certificate<br>• Make sure that Mutual authentication does not happen between UUT and the SAS Test Harness. | PASS |
| 3 | UUT may retry for the security procedure which shall fail. | PASS |
| 4 | SAS Test-Harness shall not receive any Registration request or any application data. | -- |
| 5 | Monitor the RF output of the UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify:<br>• UUT shall not transmit RF | PASS |

## 4.25 [WINNF.FT.C.SCS.5] TLS failure when certificate at the SAS Test Harness is corrupted

| # | Test Execution Steps | Results |
|---|---|---|
| 1 | • UUT shall start CBSD-SAS communication withthe security procedures | PASS |
| 2 | • Make sure that UUT uses TLS v1.2 for security establishment.<br>• Make sure UUT selects the correct cipher suite.<br>• UUT shall use CRL or OCSP to verify the validity of the server certificate.<br>• Make sure that Mutual authentication does not happen between UUT and the SAS Test Harness. | PASS |
| 3 | UUT may retry for the security procedure which shall fail. | PASS |
| 4 | SAS Test-Harness shall not receive any Registration request or any application data. | -- |
| 5 | Monitor the RF output of the UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify:<br>• UUT shall not transmit RF | PASS |

## 4.26 [WINNF.PT.C.HBT] UUT RF Transmit Power Measurement

| # | Test Execution Steps | Results |
|---|---|---|
| 1 | Ensure the following conditions are met for test entry:<br>• UUT has successfully completed SAS Discovery and Authentication with the SAS Test Harness<br>• UUT has registered with the SAS, with CBSD ID = C<br>• UUT has a single valid grant G with parameters {lowFrequency = $F_L$, highFrequency = $F_H$, maxEirp = $P_i$}, with grant in AUTHORIZED state, and grantExpireTime set to a value far past the duration of this test case<br><br>*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:<br>• UUT sends Heartbeat Request, including:<br>  ○ *cbsdId* = C<br>  ○ *grantId* = G<br>• SAS Test Harness responds with Heartbeat Response, including:<br>  ○ *cbsdId* = C<br>  ○ *grantId* = G<br>  ○ *transmitExpireTime* = current UTC time + 200 seconds<br>  ○ *responseCode* = 0 | -- |

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

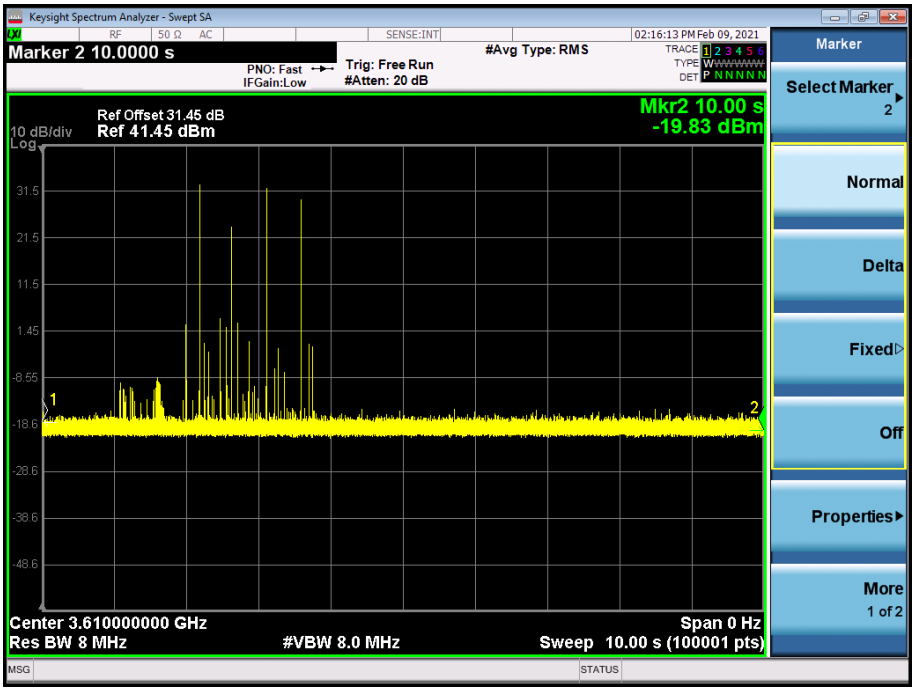
Note: For test 4.26, pleaes find the Appendix B for RF measurement plots.

# 5. Result of Time test for getting Grant

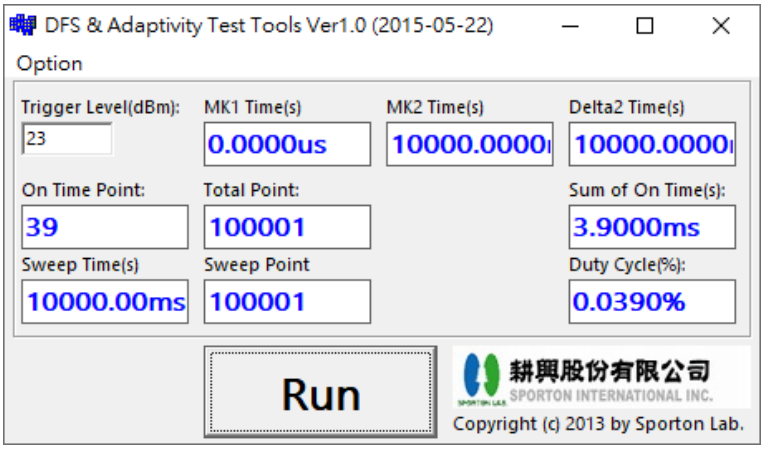
## 5.1 1 second within any 10-second period

**Spectrum Analyzer**

**(The Ref Offset 31.45 dB includes the antenna gain 11.7 dBi and cable path loss 19.75 dB.)**




**Calculated Result**

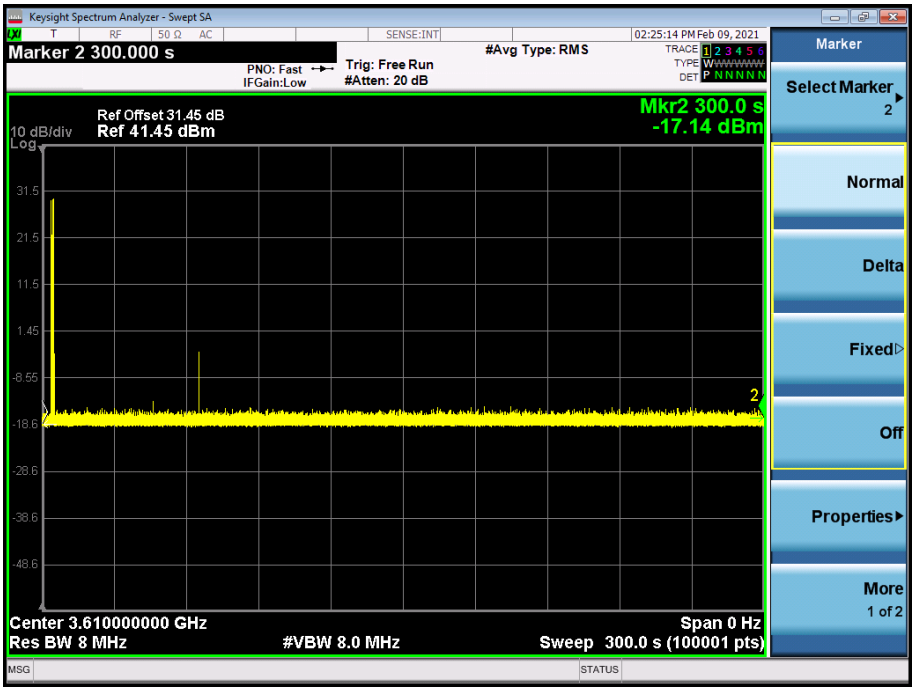



**The sum of On Time (aggregated time from marker 1 to 2): 3.9ms < 1s, Pass.**

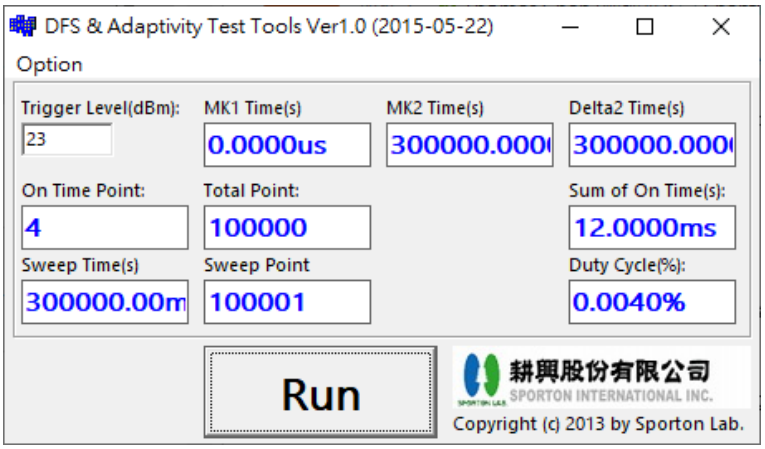
## 5.2 10 seconds within any 300-second period

**Spectrum Analyzer**

**(The Ref Offset 31.45 dB includes the antenna gain 11.7 dBi and cable path loss 19.75 dB.)**




**Calculated Result**

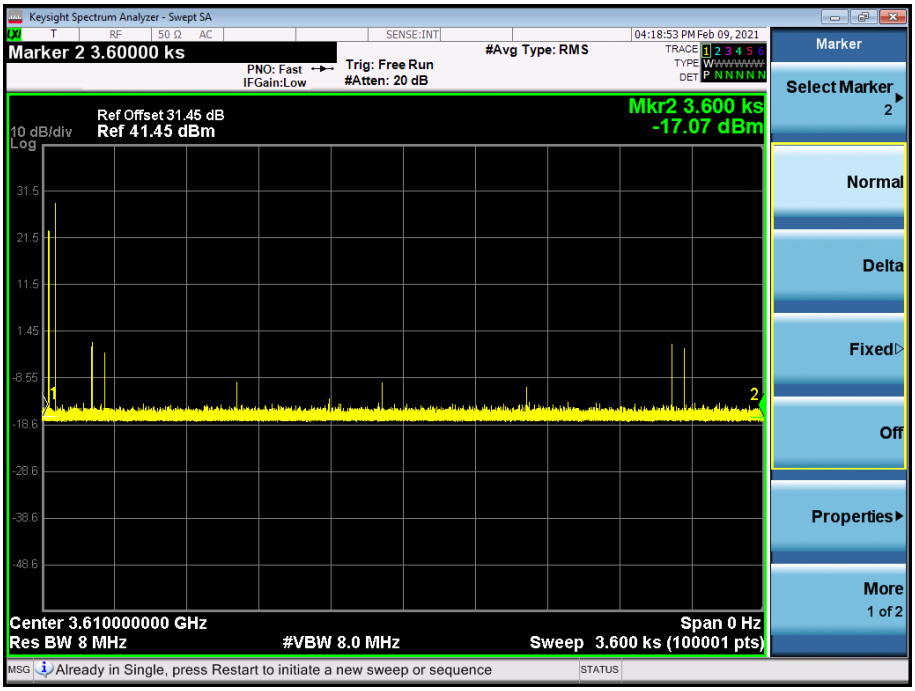



**The sum of On Time (aggregated time from marker 1 to 2): 12ms < 10s, Pass.**

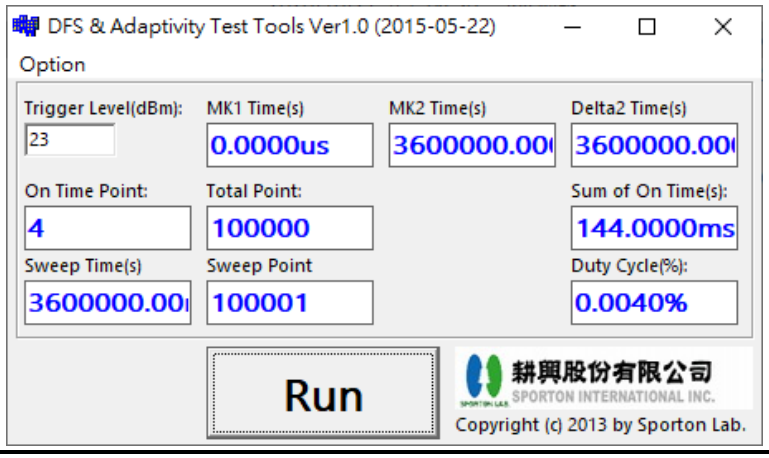
## 5.3 20 seconds within any 3600-second period

**Spectrum Analyzer**

**(The Ref Offset 31.45 dB includes the antenna gain 11.7 dBi and cable path loss 19.75 dB.)**




**Calculated Result**




**The sum of On Time (aggregated time from marker 1 to 2): 144ms < 20s, Pass.**

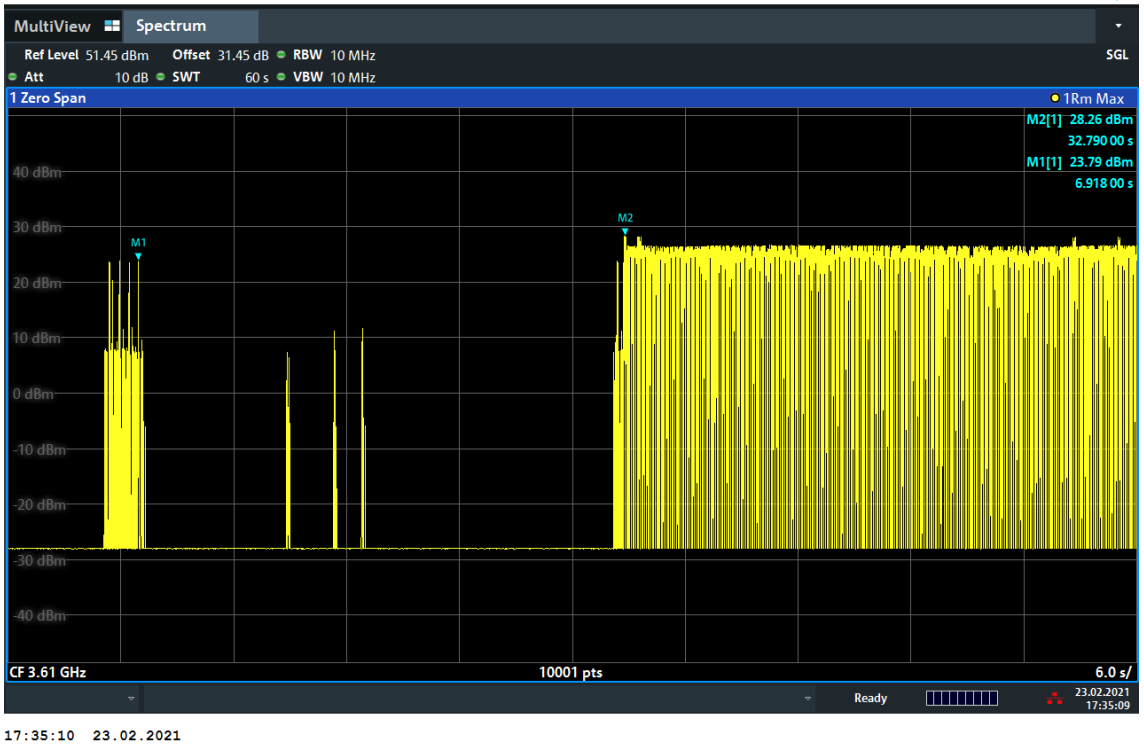
# 6. UUT registers with the SAS irrespective of power levels

## 6.1 Test Procedure

1. Set the SAS test harness to grant UUT with the highest EIRP higier than 23dBm.
2. Check if UUT has successfully registered with SAS Test Harness, when operating EIRP higher than 23 dBm.
3. Set the SAS test harness to grant UUT with EIRP less than 23 dBm, repeatedly.
4. Check if UUT has successfully registered with SAS Test Harness, when operating EIRP less than 23 dBm.

## 6.2 Result

The UUT can register with SAS under above operating conditions to meet the FCC criteria that the UUT will register with the SAS irrespective of power levels at which the device is set to operate – even below 23 dBm.




Marker 1: The UUT successfully registered with SAS Test Harness, when operating 23.79 dBm EIRP.

Marker 2: After the UUT granted/authorized by the SAS, it can transmit with power less than the maxEIRP granted from SAS.

| The UUT successfully registered with SAS Test Harness, when operating EIRP higher than 23 dBm |
|---|
| Test Result: PASS |

Note: The total offset 31.45 dB includes the antenna gain 11.7 dBi and cable path loss 19.75 dB.


Marker 1: The UUT successfully registered with SAS Test Harness, when operating 18.63 dBm EIRP.

# Appendix B. RF measurement plots

## Appendix B.1 [WINNF.PT.C.HBT] UUT RF Transmit Power Measurement

Report Clause 4.26 [WINNF.PT.C.HBT] UUT RF Transmit Power Measurement

| Center Frequency [MHz] | Bandwidth [MHz] | Granted MaxEIRP [dBm/MHz] | Conducted PSD [dBm/MHz] | Antenna Gain [dBi] | UUT MaxEIRP [dBm/MHz] |
|---|---|---|---|---|---|
| 3560 | 20 | 32.1 | 18.47 | 11.7 | 30.17 dBm |
| 3610 | | | 17.43 | | 29.13 dBm |
| 3690 | | | 17.92 | | 29.62 dBm |
| 3555 | 10 | | 19.83 | | 31.53 dBm |
| 3605 | | | 19.89 | | 31.59 dBm |
| 3695 | | | 18.71 | | 30.41 dBm |

Note 1: The total path loss is offset with 19.75 dB. The antenna gain is 11.7 dBi.

Note 2: The MaxEIRP Pi declared by manufactuer only supports one power level step, i.e. 32.1dBm/MHz as MaxEIRP. If any request from SAS to perform power control level change below 32.1dBm/MHz, the UUT would cease transmission immediately on that channel. Please see the results at Appendix B.2.

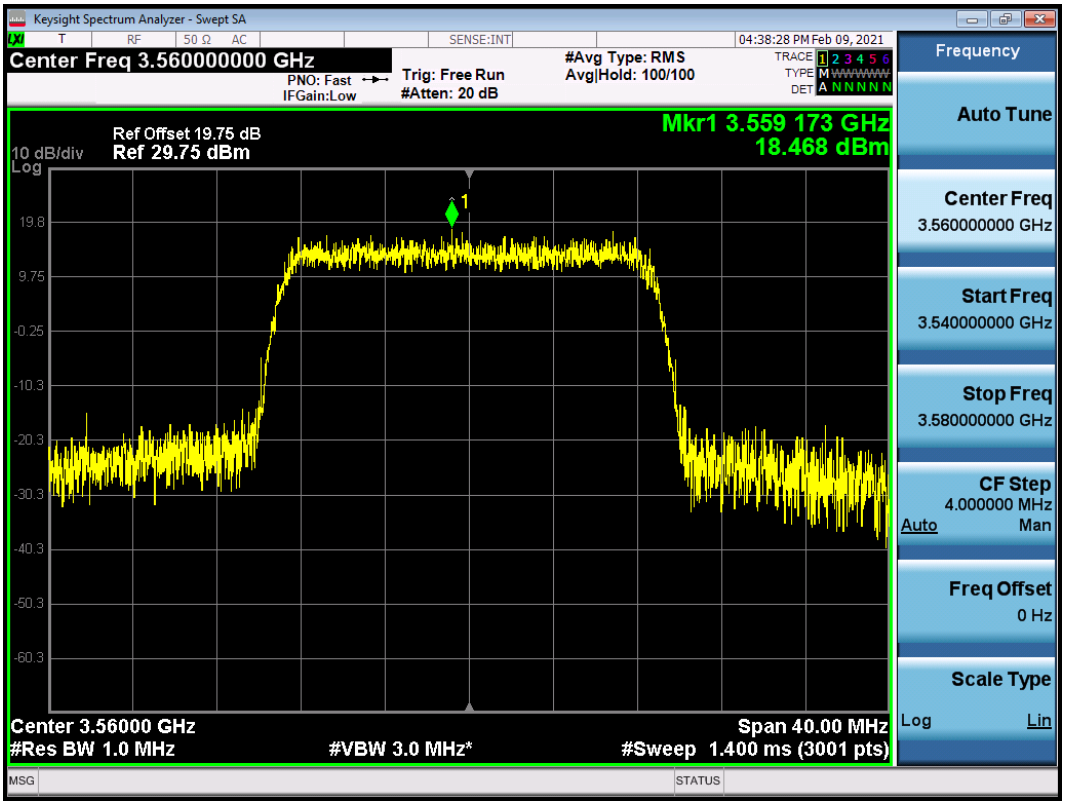
## *Appendix B.1.1 Test Procedure*

[WINNF.PT.C.HBT] UUT RF Transmit Power Measurement defined in clause 4.26 of this test report.

## *Appendix B.1.2 Test Result*

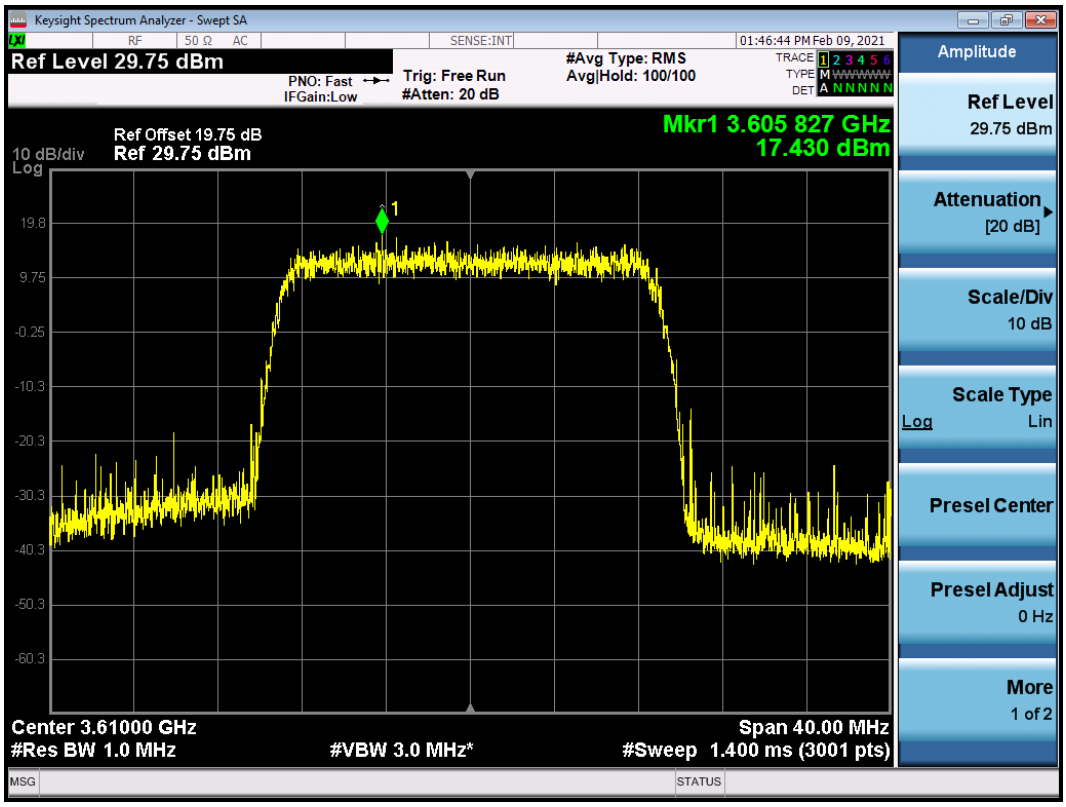
**SAS Granted MaxEIRP 32.1 [dBm/MHz]**

**UUT MaxEIRP 30.17 [dBm/MHz]**



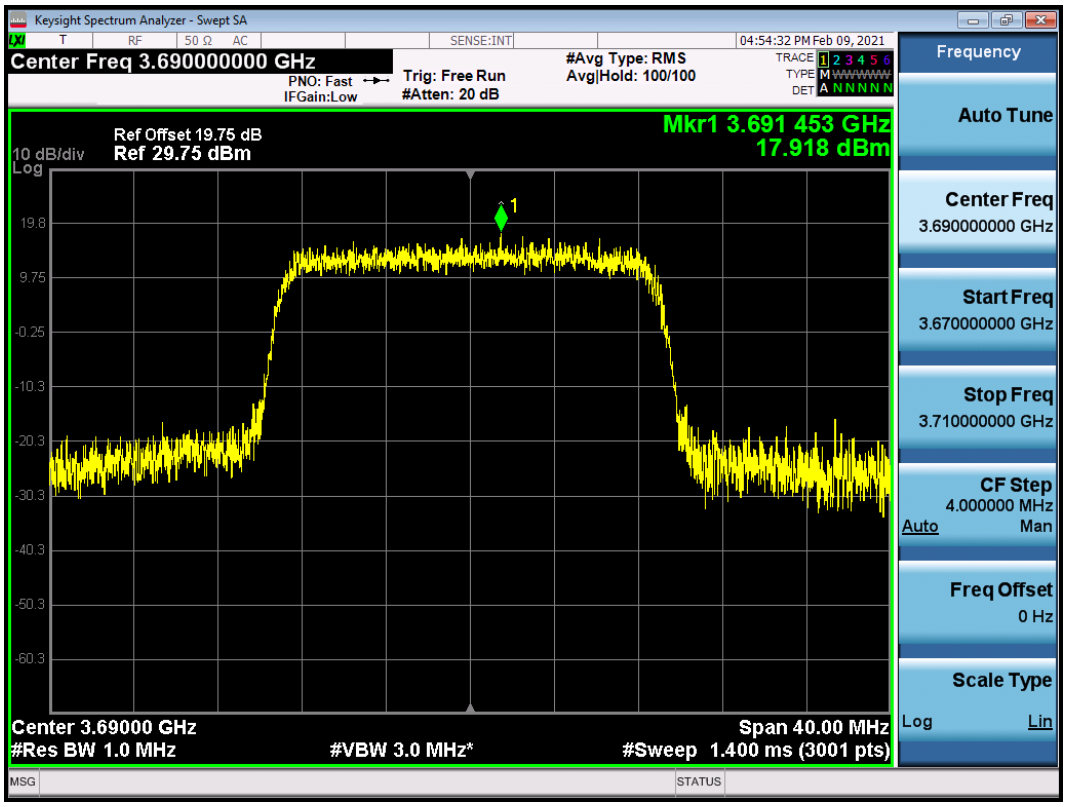
**SAS Granted MaxEIRP 32.1 [dBm/MHz]**

**UUT MaxEIRP 29.13 [dBm/MHz]**



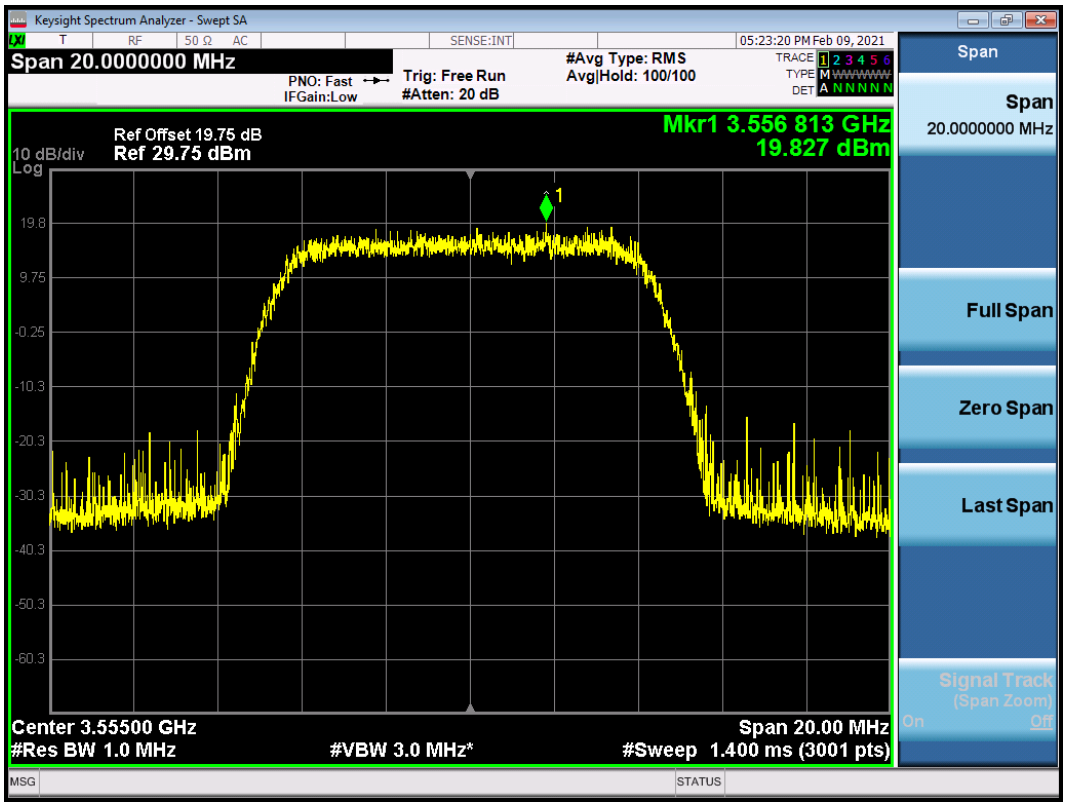
**SAS Granted MaxEIRP 32.1 [dBm/MHz]**

**UUT MaxEIRP 29.62 [dBm/MHz]**



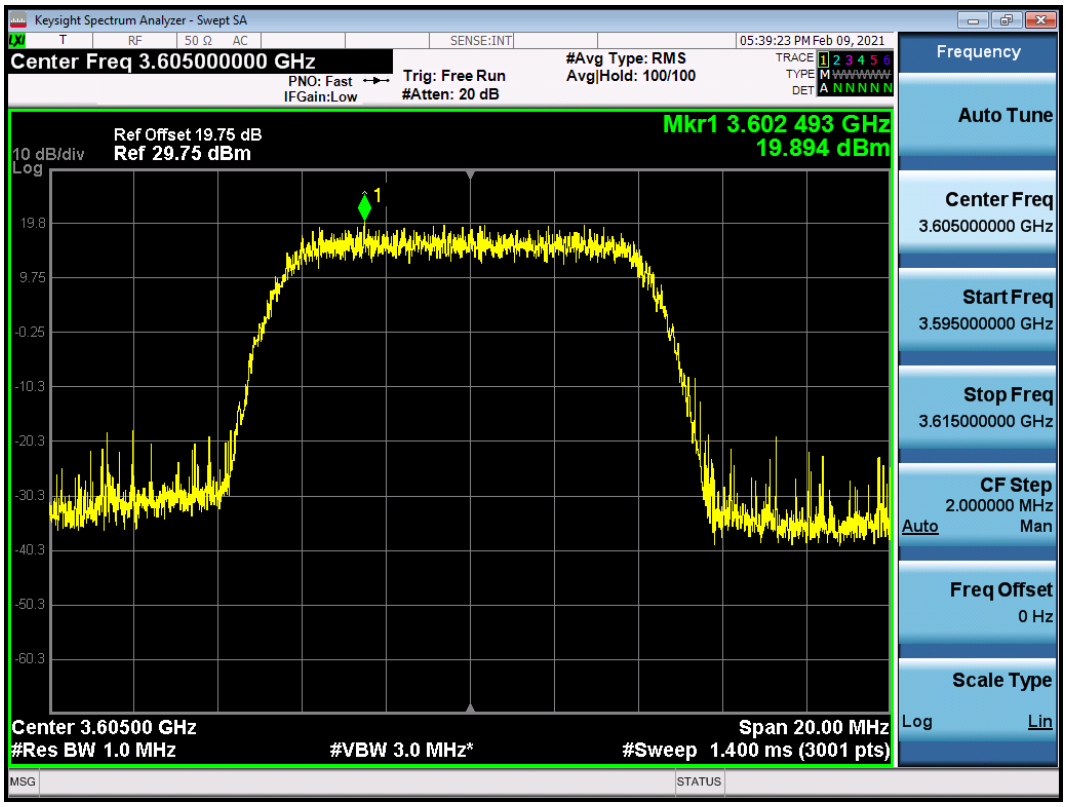
**SAS Granted MaxEIRP 32.1 [dBm/MHz]**

**UUT MaxEIRP 31.53 [dBm/MHz]**



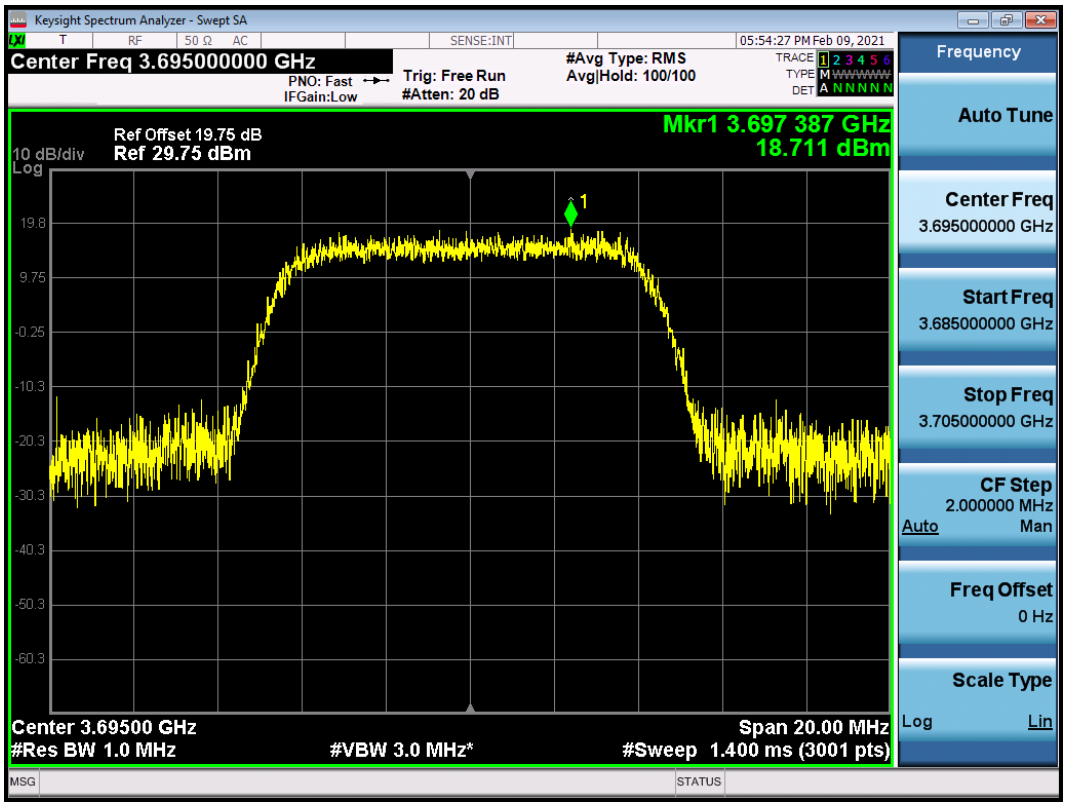
**SAS Granted MaxEIRP 32.1 [dBm/MHz]**

**UUT MaxEIRP 31.59 [dBm/MHz]**



**SAS Granted MaxEIRP 32.1 [dBm/MHz]**

**UUT MaxEIRP 30.41 [dBm/MHz]**



## *Appendix B.2 Unsuccessful responses from the SAS Test Harness*

According to the KDB 940660 D02 CPE-CBSD Handshake Procedures v02, “After the CPE-CBSD is registered and authorized by the SAS, the CPE-CBSD can start data transmission in the CBRS band using the channels and power levels authorized by the SAS.” The result below is provided as a means to ensure that evidence is provided showing compliance to this requirement.

This test is to verify if any request from SAS to perform power control level change below 32.1dBm/MHz, the UUT would cease transmission immediately on the channel.

Unsuccessful responses from the SAS Test Harness by setting SAS granted MaxEIRP below 32.1 dBm/MHz.

| Center Frequency [MHz] | Bandwidth [MHz] | Granted MaxEIRP [dBm/MHz] | Monitor the data transmission of the UUT until 60 seconds after responseCode = 400, received from SAS | Result |
|---|---|---|---|---|
| 3610 | 20 | 32 | CPE-CBSD UUT shall not transmit user traffic | PASS |

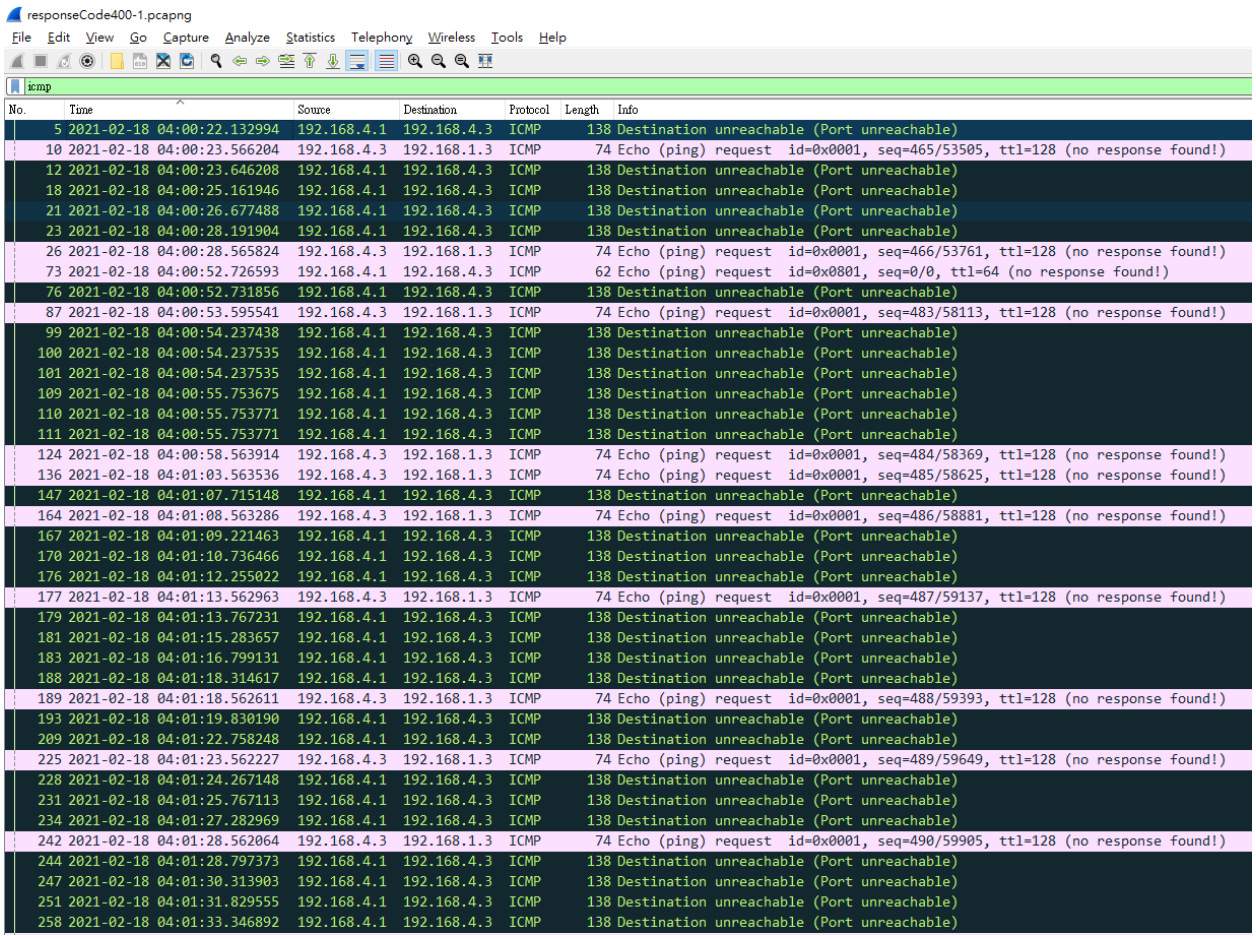
### *B.2.1 Test Procedure*

1. Make SAS test harness to grant UUT power level below 32.1 dBm EIRP.
   Set SAS granted MaxEIRP: 32 dBm/MHz.
2. Ensure the UUT registered successfully with SAS Test Harness, with cbsdId = C.
3. UUT sends valid Grant Request.
4. SAS Test Harness sends a Grant Response message, including:
   cbsdId=C, responseCode = 400,
5. Monitor the data transmission of the UUT from start of test until 60 seconds after Step 4 is complete.

### *B.2.2 Test Result*

CPE-CBSD UUT shall not transmit user traffic.

**Monitor data transmission via the Wireshark**




| No. | Time | Source | Destination | Protocol | Length | Info |
|---|---|---|---|---|---|---|
| 5 | 2021-02-18 04:00:22.132994 | 192.168.4.1 | 192.168.4.3 | ICMP | 138 | Destination unreachable (Port unreachable) |
| 10 | 2021-02-18 04:00:23.566204 | 192.168.4.3 | 192.168.1.3 | ICMP | 74 | Echo (ping) request id=0x0001, seq=465/53505, ttl=128 (no response found!) |
| 12 | 2021-02-18 04:00:23.646208 | 192.168.4.1 | 192.168.4.3 | ICMP | 138 | Destination unreachable (Port unreachable) |
| 18 | 2021-02-18 04:00:25.161946 | 192.168.4.1 | 192.168.4.3 | ICMP | 138 | Destination unreachable (Port unreachable) |
| 21 | 2021-02-18 04:00:26.677488 | 192.168.4.1 | 192.168.4.3 | ICMP | 138 | Destination unreachable (Port unreachable) |
| 23 | 2021-02-18 04:00:28.191904 | 192.168.4.1 | 192.168.4.3 | ICMP | 138 | Destination unreachable (Port unreachable) |
| 26 | 2021-02-18 04:00:28.565824 | 192.168.4.3 | 192.168.1.3 | ICMP | 74 | Echo (ping) request id=0x0001, seq=466/53761, ttl=128 (no response found!) |
| 73 | 2021-02-18 04:00:52.726593 | 192.168.4.1 | 192.168.4.3 | ICMP | 62 | Echo (ping) request id=0x0801, seq=0/0, ttl=64 (no response found!) |
| 76 | 2021-02-18 04:00:52.731856 | 192.168.4.1 | 192.168.4.3 | ICMP | 138 | Destination unreachable (Port unreachable) |
| 87 | 2021-02-18 04:00:53.595541 | 192.168.4.3 | 192.168.1.3 | ICMP | 74 | Echo (ping) request id=0x0001, seq=483/58113, ttl=128 (no response found!) |
| 99 | 2021-02-18 04:00:54.237438 | 192.168.4.1 | 192.168.4.3 | ICMP | 138 | Destination unreachable (Port unreachable) |
| 100 | 2021-02-18 04:00:54.237535 | 192.168.4.1 | 192.168.4.3 | ICMP | 138 | Destination unreachable (Port unreachable) |
| 101 | 2021-02-18 04:00:54.237535 | 192.168.4.1 | 192.168.4.3 | ICMP | 138 | Destination unreachable (Port unreachable) |
| 109 | 2021-02-18 04:00:55.753675 | 192.168.4.1 | 192.168.4.3 | ICMP | 138 | Destination unreachable (Port unreachable) |
| 110 | 2021-02-18 04:00:55.753771 | 192.168.4.1 | 192.168.4.3 | ICMP | 138 | Destination unreachable (Port unreachable) |
| 111 | 2021-02-18 04:00:55.753771 | 192.168.4.1 | 192.168.4.3 | ICMP | 138 | Destination unreachable (Port unreachable) |
| 124 | 2021-02-18 04:00:58.563914 | 192.168.4.3 | 192.168.1.3 | ICMP | 74 | Echo (ping) request id=0x0001, seq=484/58369, ttl=128 (no response found!) |
| 136 | 2021-02-18 04:01:03.563536 | 192.168.4.3 | 192.168.1.3 | ICMP | 74 | Echo (ping) request id=0x0001, seq=485/58625, ttl=128 (no response found!) |
| 147 | 2021-02-18 04:01:07.715148 | 192.168.4.1 | 192.168.4.3 | ICMP | 138 | Destination unreachable (Port unreachable) |
| 164 | 2021-02-18 04:01:08.563286 | 192.168.4.3 | 192.168.1.3 | ICMP | 74 | Echo (ping) request id=0x0001, seq=486/58881, ttl=128 (no response found!) |
| 167 | 2021-02-18 04:01:09.221463 | 192.168.4.1 | 192.168.4.3 | ICMP | 138 | Destination unreachable (Port unreachable) |
| 170 | 2021-02-18 04:01:10.736466 | 192.168.4.1 | 192.168.4.3 | ICMP | 138 | Destination unreachable (Port unreachable) |
| 176 | 2021-02-18 04:01:12.255022 | 192.168.4.1 | 192.168.4.3 | ICMP | 138 | Destination unreachable (Port unreachable) |
| 177 | 2021-02-18 04:01:13.562963 | 192.168.4.3 | 192.168.1.3 | ICMP | 74 | Echo (ping) request id=0x0001, seq=487/59137, ttl=128 (no response found!) |
| 179 | 2021-02-18 04:01:13.767231 | 192.168.4.1 | 192.168.4.3 | ICMP | 138 | Destination unreachable (Port unreachable) |
| 181 | 2021-02-18 04:01:15.283657 | 192.168.4.1 | 192.168.4.3 | ICMP | 138 | Destination unreachable (Port unreachable) |
| 183 | 2021-02-18 04:01:16.799131 | 192.168.4.1 | 192.168.4.3 | ICMP | 138 | Destination unreachable (Port unreachable) |
| 188 | 2021-02-18 04:01:18.314617 | 192.168.4.1 | 192.168.4.3 | ICMP | 138 | Destination unreachable (Port unreachable) |
| 189 | 2021-02-18 04:01:18.562611 | 192.168.4.3 | 192.168.1.3 | ICMP | 74 | Echo (ping) request id=0x0001, seq=488/59393, ttl=128 (no response found!) |
| 193 | 2021-02-18 04:01:19.830190 | 192.168.4.1 | 192.168.4.3 | ICMP | 138 | Destination unreachable (Port unreachable) |
| 209 | 2021-02-18 04:01:22.758248 | 192.168.4.1 | 192.168.4.3 | ICMP | 138 | Destination unreachable (Port unreachable) |
| 225 | 2021-02-18 04:01:23.562227 | 192.168.4.3 | 192.168.1.3 | ICMP | 74 | Echo (ping) request id=0x0001, seq=489/59649, ttl=128 (no response found!) |
| 228 | 2021-02-18 04:01:24.267148 | 192.168.4.1 | 192.168.4.3 | ICMP | 138 | Destination unreachable (Port unreachable) |
| 231 | 2021-02-18 04:01:25.767113 | 192.168.4.1 | 192.168.4.3 | ICMP | 138 | Destination unreachable (Port unreachable) |
| 234 | 2021-02-18 04:01:27.282969 | 192.168.4.1 | 192.168.4.3 | ICMP | 138 | Destination unreachable (Port unreachable) |
| 242 | 2021-02-18 04:01:28.562064 | 192.168.4.3 | 192.168.1.3 | ICMP | 74 | Echo (ping) request id=0x0001, seq=490/59905, ttl=128 (no response found!) |
| 244 | 2021-02-18 04:01:28.797373 | 192.168.4.1 | 192.168.4.3 | ICMP | 138 | Destination unreachable (Port unreachable) |
| 247 | 2021-02-18 04:01:30.313903 | 192.168.4.1 | 192.168.4.3 | ICMP | 138 | Destination unreachable (Port unreachable) |
| 251 | 2021-02-18 04:01:31.829555 | 192.168.4.1 | 192.168.4.3 | ICMP | 138 | Destination unreachable (Port unreachable) |
| 258 | 2021-02-18 04:01:33.346892 | 192.168.4.1 | 192.168.4.3 | ICMP | 138 | Destination unreachable (Port unreachable) |

**CPE-CBSD UUT shall not transmit user traffic**

Test result: PASS

———THE END———