



## ELEMENT WASHINGTON DC LLC

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<http://www.element.com>

### TEST REPORT CBSD-SAS Interoperability

**Applicant Name:**

Samsung Electronics Co., Ltd.  
129, Samsung-ro,  
Yeongtong-gu, Suwon-si  
Gyeonggi-do, 16677, Korea

**Date of Testing:**

2/7/2023 – 2/9/2023

**Test Site/Location:**

Element Lab. Columbia, MD, USA

**Test Report Serial No.:**

1M2302100007-01-R1.A3L

**FCC ID:**

A3LSOG2201

**APPLICANT:**

Samsung Electronics Co., Ltd.

**Application Type:**

Certification

**Model:**

SOG2201-G30

**EUT Type:**

Smallcell

**Frequency Range:**

3550 – 3700 MHz

**FCC Classification:**

Citizens Band Category A and B Devices (CBD)

**FCC Rule Part(s):**

Part 96

**Test Procedure(s):**

KDB 940660 D01 v03, WINNF-TS-0122-V1.0.2, ONGO-TS-9001 V.1.0.0

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in the test procedures listed above. Test results reported herein relate only to the item(s) tested.

Note: This revised Test Report (S/N: 1M2209010101-15-R1.649E) supersedes and replaces the previously issued test report on the same subject device for the same type of testing as indicated. Please discard or destroy the previously issued test report(s) and dispose of it accordingly.

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

**RJ Ortanez**  
Executive Vice President



|                                                   |                                               |                               |                                          |
|---------------------------------------------------|-----------------------------------------------|-------------------------------|------------------------------------------|
| <b>FCC ID:</b> A3LSOG2201                         | <b>MEASUREMENT REPORT<br/>(CERTIFICATION)</b> |                               | <b>Approved by:</b><br>Technical Manager |
| <b>Test Report S/N:</b><br>1M2302100007-01-R1.A3L | <b>Test Dates:</b><br>2/7/2023 – 2/9/2023     | <b>EUT Type:</b><br>Smallcell | Page 1 of 67                             |

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V1.0

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## TABLE OF CONTENTS

|     |                                                                                                       |    |
|-----|-------------------------------------------------------------------------------------------------------|----|
| 1.0 | INTRODUCTION.....                                                                                     | 3  |
| 1.1 | Scope.....                                                                                            | 3  |
| 1.2 | Element Test Location .....                                                                           | 3  |
| 1.3 | Test Facility / Accreditations .....                                                                  | 3  |
| 2.0 | PRODUCT INFORMATION .....                                                                             | 4  |
| 2.1 | Equipment Description.....                                                                            | 4  |
| 2.2 | Device Capabilities .....                                                                             | 4  |
| 2.3 | Test Configuration .....                                                                              | 4  |
| 2.4 | Modifications.....                                                                                    | 4  |
| 3.0 | TEST EQUIPMENT CALIBRATION DATA.....                                                                  | 5  |
| 4.0 | ENVIRONMENTAL CONDITIONS .....                                                                        | 6  |
| 5.0 | EVALUATION PROCEDURE .....                                                                            | 7  |
| 6.0 | TEST Summary.....                                                                                     | 8  |
| 6.1 | Summary .....                                                                                         | 8  |
| 7.0 | CONCLUSION .....                                                                                      | 10 |
|     | APPENDIX A – TEST RESULT AND DATA .....                                                               | 11 |
| A1  | [WINNF.FT.C.REG.1] MULTI-STEP REGISTRATION.....                                                       | 11 |
| A2  | [WINNF.FT.C.REG.8] MISSING REQUIRED PARAMETERS (RESPONSECODE 102) .....                               | 13 |
| A3  | [WINNF.FT.C.REG.10] PENDING REGISTRATION (RESPONSECODE 200).....                                      | 14 |
| A4  | [WINNF.FT.C.REG.12] INVALID PARAMETER (RESPONSECODE 103).....                                         | 15 |
| A5  | [WINNF.FT.C.REG.14] BLACKLISTED CBSD (RESPONSECODE 101).....                                          | 16 |
| A6  | [WINNF.FT.C.REG.16] UNSUPPORTED SAS PROTOCOL VERSION (RESPONSECODE 100).....                          | 17 |
| A7  | [WINNF.FT.C.REG.18] GROUP ERROR (RESPONSECODE 201) .....                                              | 18 |
| A8  | [WINNF.FT.C.GRA.1] UNSUCCESSFUL GRANT RESPONSECODE=400 (INTERFERENCE) .....                           | 19 |
| A9  | [WINNF.FT.C.GRA.2] UNSUCCESSFUL GRANT RESPONSECODE=401 (GRANT_CONFLICT).....                          | 20 |
| A10 | [WINNF.FT.C.HBT.1] HEARTBEAT SUCCESS CASE (FIRST HEARTBEAT RESPONSE).....                             | 21 |
| A11 | [WINNF.FT.C.HBT.3] HEARTBEAT RESPONSECODE=105 (DEREGISTER).....                                       | 24 |
| A12 | [WINNF.FT.C.HBT.4] HEARTBEAT RESPONSECODE=500 (TERMINATED_GRANT) .....                                | 26 |
| A13 | [WINNF.FT.C.HBT.5] HEARTBEAT RESPONSECODE=501 (SUSPENDED_GRANT) IN FIRST HEARTBEAT RESPONSE..         | 28 |
| A14 | [WINNF.FT.C.HBT.6] HEARTBEAT RESPONSECODE=501 (SUSPENDED_GRANT) IN SUBSEQUENT HEARTBEAT RESPONSE..... | 30 |
| A15 | [WINNF.FT.C.HBT.7] HEARTBEAT RESPONSECODE=502 (UNSYNC_OP_PARAM) .....                                 | 32 |
| A16 | [WINNF.FT.C.HBT.9] HEARTBEAT RESPONSE ABSENT (FIRST HEARTBEAT) .....                                  | 34 |
| A17 | [WINNF.FT.C.HBT.10] HEARTBEAT RESPONSE ABSENT (SUBSEQUENT HEARTBEAT).....                             | 36 |
| A18 | [WINNF.FT.C.MES.1] REGISTRATION RESPONSE CONTAINS MEASREPORTCONFIG .....                              | 38 |
| A19 | [WINNF.FT.C.RLQ.1] SUCCESSFUL RELINQUISHMENT .....                                                    | 41 |
| A20 | [WINNF.FT.C.DRG.1] SUCCESSFUL DEREGISTRATION.....                                                     | 43 |
| A21 | [WINNF.FT.C.SCS.1] SUCCESSFUL TLS CONNECTION BETWEEN UUT AND SAS TEST HARNESS .....                   | 45 |
| A22 | [WINNF.FT.C.SCS.2] TLS FAILURE DUE TO REVOKED CERTIFICATE .....                                       | 47 |
| A23 | [WINNF.FT.C.SCS.3] TLS FAILURE DUE TO EXPIRED SERVER CERTIFICATE .....                                | 49 |
| A24 | [WINNF.FT.C.SCS.4] TLS FAILURE WHEN SAS TEST HARNESS CERTIFICATE IS ISSUED BY AN UNKNOWN CA.....      | 50 |
| A25 | [WINNF.FT.C.SCS.5] TLS FAILURE WHEN CERTIFICATE AT THE SAS TEST HARNESS IS CORRUPTED .....            | 51 |
| A26 | [WINNF.PT.C.HBT.1] UUT RF TRANSMIT POWER MEASUREMENT .....                                            | 52 |
|     | APPENDIX B – TEST LOGS .....                                                                          | 66 |
|     | Appendix C – Test Setup.....                                                                          | 67 |

|                                                   |                                               |                               |                                          |
|---------------------------------------------------|-----------------------------------------------|-------------------------------|------------------------------------------|
| <b>FCC ID:</b> A3LSOG2201                         | <b>MEASUREMENT REPORT<br/>(CERTIFICATION)</b> |                               | <b>Approved by:</b><br>Technical Manager |
| <b>Test Report S/N:</b><br>1M2302100007-01-R1.A3L | <b>Test Dates:</b><br>2/7/2023 – 2/9/2023     | <b>EUT Type:</b><br>Smallcell | Page 2 of 67                             |

## 1.0 INTRODUCTION

### 1.1 Scope

Measurement and determination of compliance with the technical rules and regulations of the Federal Communications Commission.

### 1.2 Element Test Location

These measurement tests were conducted at the Element laboratory located at 7185 Oakland Mills Road, Columbia, MD 21046.

### 1.3 Test Facility / Accreditations

**Measurements were performed at Element lab located in Columbia, MD 21046, U.S.A.**

- Element is a CBRS Alliance (OnGo) Approved Test Lab
- Element is a WInnForum Approved Test Lab
- Element is an ISO 17025-2017 accredited test facility under the American Association for Laboratory Accreditation (A2LA) with Certificate number 2041.01 for CBRS Alliance Certification Test Plan and WInnForum Conformance and Performance Test Technical Standard.
- Element is an ISO 17025-2017 accredited test facility under the American Association for Laboratory Accreditation (A2LA) with Certificate number 2041.01 for Specific Absorption Rate (SAR), Hearing Aid Compatibility (HAC) testing, where applicable, and Electromagnetic Compatibility (EMC) testing for FCC and Innovation, Science, and Economic Development Canada rules.
- Element TCB is a Telecommunication Certification Body (TCB) accredited to ISO/IEC 17065-2012 by A2LA (Certificate number 2041.03) in all scopes of FCC Rules and ISSED Standards (RSS).
- Element facility is a registered (2451B) test laboratory with the site description on file with ISSED.
- Element Washington DC LLC is a Recognized U.S. Certification Assessment Body (CAB # US0110) for ISSED Canada as designated by NIST under the U.S. and Canada Mutual Recognition Agreement.

|                                                   |                                               |                               |                                          |
|---------------------------------------------------|-----------------------------------------------|-------------------------------|------------------------------------------|
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## 2.0 PRODUCT INFORMATION

### 2.1 Equipment Description

The Equipment Under Test (EUT) is the **Samsung Electronics Co., Ltd., Smallcell FCC ID: A3LSOG2201**. The test data contained in this report pertains only to CBSD-SAS interoperability. The EUT is a Category B CBSD.

**Test Device Serial Number(s):** 12-Samsung\_Networks

**Test Device Hardware Version:** PCS01

**Test Device Software Version:** 23A

### 2.2 Device Capabilities

This device contains the following capabilities:

NR n48

This device supports the following conditional features:

|           | Conditional Test Case Definitions                                                                                                                                                                                                                                | Supported                           |
|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|
| <b>C1</b> | Mandatory for UUT which supports multi-step registration message                                                                                                                                                                                                 | <input checked="" type="checkbox"/> |
| <b>C2</b> | 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. | <input type="checkbox"/>            |
| <b>C3</b> | Mandatory for UUT which supports single-step registration containing CPI-signed data in the registration message.                                                                                                                                                | <input type="checkbox"/>            |
| <b>C4</b> | Mandatory for UUT which supports RECEIVED_POWER_WITHOUT_GRANT measurement report type.                                                                                                                                                                           | <input checked="" type="checkbox"/> |
| <b>C5</b> | Mandatory for UUT which supports RECEIVED_POWER_WITH_GRANT measurement report type.                                                                                                                                                                              | <input type="checkbox"/>            |
| <b>C6</b> | Mandatory for UUT which supports parameter change being made at the UUT and prior to sending a deregistration                                                                                                                                                    | <input type="checkbox"/>            |

**Table 2-1. Conditional Features**

### 2.3 Test Configuration

The EUT was connected to the SAS Test Harness developed by WINNF WG4-CBSD. The SAS Test Harness (V1.0.0.2) provided by CBRS Alliance was used. The SAS Test Harness is synchronized to UTC time.

### 2.4 Modifications

No modifications were made to EUT during testing.

|                                                   |                                               |                               |                                          |
|---------------------------------------------------|-----------------------------------------------|-------------------------------|------------------------------------------|
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| <b>Test Report S/N:</b><br>1M2302100007-01-R1.A3L | <b>Test Dates:</b><br>2/7/2023 – 2/9/2023     | <b>EUT Type:</b><br>Smallcell | Page 4 of 67                             |

### 3.0 TEST EQUIPMENT CALIBRATION DATA

Test Equipment Calibration is traceable to the National Institute of Standards and Technology (NIST).

| Manufacturer | Model         | Description         | Cal Date | Cal Interval | Cal Due  | Serial Number |
|--------------|---------------|---------------------|----------|--------------|----------|---------------|
| Agilent      | N9020A        | MXA Signal Analyzer | 3/4/2022 | Annual       | 3/4/2023 | US46470561    |
| Dell         | Latitude 5580 | Test Harness Laptop | N/A      | N/A          | N/A      | N/A           |

**Table 3-1 Annual Test Equipment Calibration Schedule**

|                                                   |                                               |                               |                                          |
|---------------------------------------------------|-----------------------------------------------|-------------------------------|------------------------------------------|
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| <b>Test Report S/N:</b><br>1M2302100007-01-R1.A3L | <b>Test Dates:</b><br>2/7/2023 – 2/9/2023     | <b>EUT Type:</b><br>Smallcell | Page 5 of 67                             |

## 4.0 ENVIRONMENTAL CONDITIONS

The temperature is controlled within range of 15°C to 35°C. The relative humidity is controlled within range of 10% to 75%. The atmospheric pressure is monitored within the range 86-106kPa (860-1060mbar).

|                                                   |                                               |                               |                                          |
|---------------------------------------------------|-----------------------------------------------|-------------------------------|------------------------------------------|
| <b>FCC ID:</b> A3LSOG2201                         | <b>MEASUREMENT REPORT<br/>(CERTIFICATION)</b> |                               | <b>Approved by:</b><br>Technical Manager |
| <b>Test Report S/N:</b><br>1M2302100007-01-R1.A3L | <b>Test Dates:</b><br>2/7/2023 – 2/9/2023     | <b>EUT Type:</b><br>Smallcell | Page 6 of 67                             |

## 5.0 EVALUATION PROCEDURE

The measurement procedure described in KDB940660 D01 V03 and WINNF-TS-0122V1.0.2 were used in the measurement of the EUT.

Deviation from measurement procedure.....None

|                                                   |                                               |                               |                                          |
|---------------------------------------------------|-----------------------------------------------|-------------------------------|------------------------------------------|
| <b>FCC ID:</b> A3LSOG2201                         | <b>MEASUREMENT REPORT<br/>(CERTIFICATION)</b> |                               | <b>Approved by:</b><br>Technical Manager |
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## 6.0 TEST SUMMARY

### 6.1 Summary

Company Name: Samsung Electronics Co., Ltd.

FCC ID: A3LSOG2201

**Table 6-1. Summary of Test Results**

| FCC Part Section(s) | KDB940660 D01 Section 3.3 a) | Test Case Description                                                                                                                                                                                                                 | WinnForum Test Case                                                                                                                                                                                       | Test Result |
|---------------------|------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| 96.39 (c)           | 1                            | Confirm that the device will only transmit after it receives authorization from a SAS                                                                                                                                                 | WINNF.FT.C.REG.1<br>WINNF.FT.C.REG.8<br>WINNF.FT.C.REG.10<br>WINNF.FT.C.REG.12<br>WINNF.FT.C.REG.14<br>WINNF.FT.C.REG.16<br>WINNF.FT.C.REG.18<br>WINNF.FT.C.GRA.1<br>WINNF.FT.C.GRA.2<br>WINNF.FT.C.HBT.5 | Pass        |
| 96.39 (c)           | 2                            | Check the device registration and authorization with the SAS – determine if the device behaves appropriately for successful and unsuccessful registrations. The device should not be transmitting without authorization from the SAS. | WINNF.FT.C.REG.1<br>WINNF.FT.C.REG.8<br>WINNF.FT.C.REG.10<br>WINNF.FT.C.REG.12<br>WINNF.FT.C.REG.14<br>WINNF.FT.C.REG.16<br>WINNF.FT.C.REG.18                                                             | Pass        |
| 96.39(c)(1)         | 3                            | Confirm that the device changes its operating power and/or channel in response to a command from the SAS.                                                                                                                             | WINNF.FT.C.HBT.1                                                                                                                                                                                          | Pass        |
| 96.39               | 4                            | Confirm that the device correctly configures based on the different license classes                                                                                                                                                   | N/A                                                                                                                                                                                                       | Pass        |
| 96.39(c)(1)         | 5                            | Confirm that the device transmits at a power level less than or equal to the maximum power level approved by the SAS.                                                                                                                 | WINNF.PT.C.HBT.1                                                                                                                                                                                          | Pass        |
| 96.39(b)(c)         | 6                            | Confirm that the device transmits with a bandwidth less than or equal to the SAS specified bandwidth.                                                                                                                                 | WINNF.FT.C.HBT.1                                                                                                                                                                                          | Pass        |
| 96.39(c)(2)         | 7                            | Confirm that the device transmits on the SAS specified frequency.                                                                                                                                                                     | WINNF.FT.C.HBT.1                                                                                                                                                                                          | Pass        |
| 96.39(c)(2)         | 8                            | Confirm that the device stops transmission in response to a command from the SAS, within a period as required by Part 96.                                                                                                             | WINNF.FT.C.HBT.3<br>WINNF.FT.C.HBT.4<br>WINNF.FT.C.HBT.6<br>WINNF.FT.D.HBT.7<br>WINNF.FT.C.HBT.10<br>WINNF.FT.C.RLQ.1<br>WINNF.FT.C.DRG.1                                                                 | Pass        |

|                                            |                                       |                        |                                   |
|--------------------------------------------|---------------------------------------|------------------------|-----------------------------------|
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| Test Report S/N:<br>1M2302100007-01-R1.A3L | Test Dates:<br>2/7/2023 – 2/9/2023    | EUT Type:<br>Smallcell | Page 8 of 67                      |



**Table 6-2. Summary of Test Results (continued)**

|           |                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                  |      |
|-----------|----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|------|
| 96.39 (c) | 9                          | Confirm that the device sends measurements data in response to the command from the SAS.                                                                                                                                                                                                                                                                                                                                                                                                                                     | WINNF.FT.C.MES.1                                                                                 | Pass |
| 96.39(a)  | 10                         | For devices with geo-location, confirm that it notifies the SAS of a new location when it is beyond the required distance parameter ( $\pm 50$ m) within the required time frame.                                                                                                                                                                                                                                                                                                                                            | N/A                                                                                              | N/A  |
| 96.39 (c) | 11                         | Confirm that the device is capable of reporting the signal level (measurement data) and frequency to SAS.                                                                                                                                                                                                                                                                                                                                                                                                                    | WINNF.FT.C.MES.1                                                                                 | Pass |
|           | 12                         | For a device that operates as a Category A CBSD and then desires to operate as a Category B CBSD (or vice versa), confirm that it re-registers with the SAS for the updated authorization status.                                                                                                                                                                                                                                                                                                                            | N/A                                                                                              | Pass |
| 96 E      | 13                         | When CBSDs communicate through a management system, confirm compliance with all requirements.                                                                                                                                                                                                                                                                                                                                                                                                                                | N/A                                                                                              | Pass |
| 96.39     | 14                         | When communication between the CBSD and SAS is lost:<br>i) Describe how the CBSD would react if the communications between the device and the SAS is lost. Confirm that the CBSD stops transmission once it loses the link to the SAS.<br>ii) Describe the process for re-establishment of the communications and confirm that the CBSD acts accordingly.<br>iii) Confirm power-on restart process for registration (re-registration) occurs as expected.<br>iv) Confirm the process for de-registration occurs as expected. | WINNF.FT.C.HBT.9<br>WINNF.FT.C.HBT.10                                                            | Pass |
| 96.39(f)  | KDB940660<br>D01 Section 4 | SAS and Device Security Requirements                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | WINNF.FT.C.SCS.1<br>WINNF.FT.C.SCS.2<br>WINNF.FT.C.SCS.3<br>WINNF.FT.C.SCS.4<br>WINNF.FT.C.SCS.5 | Pass |

**Notes:**

- Test cases denoted as “N/A” in the table above are not applicable to the EUT and are either Optional or Conditional per Section 6 of WINNF-TS-0122.
- Please see Appendices for test data.

|                                                   |                                               |                               |                                          |
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| <b>Test Report S/N:</b><br>1M2302100007-01-R1.A3L | <b>Test Dates:</b><br>2/7/2023 – 2/9/2023     | <b>EUT Type:</b><br>Smallcell | Page 9 of 67                             |

## 7.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **Samsung Electronics Co., Ltd., Smallcell FCC ID: A3LSOG2201** has been tested to show compliance with Part 96 and WINNF-TS-0122.

|                                                   |                                               |                               |                                          |
|---------------------------------------------------|-----------------------------------------------|-------------------------------|------------------------------------------|
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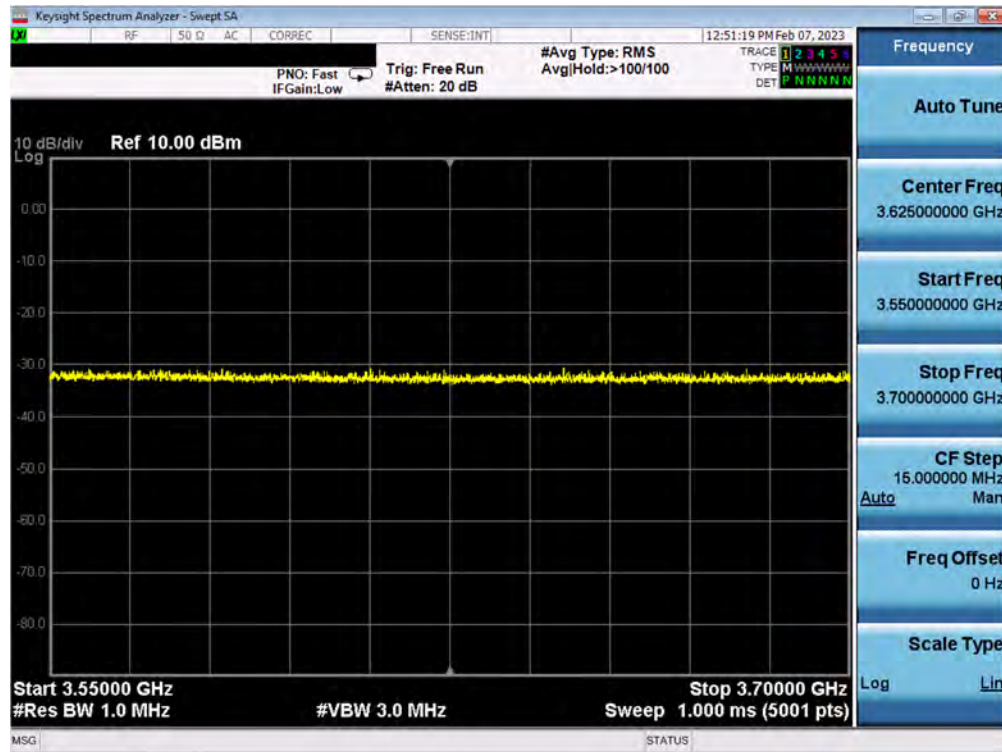
## APPENDIX A – TEST RESULT AND DATA

### A1 [WINNF.FT.C.REG.1] Multi-Step registration

|   | Test Execution Steps                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | PASS                                | FAIL                     |
|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|--------------------------|
| 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 is in the Unregistered state</li> </ul> <p>CBSD sends correct Registration request information, as specified in [n.5], to the SAS Test Harness:</p>                                                                                                                                                                    | --                                  | --                       |
| 2 | <ul style="list-style-type: none"> <li>• The required userId, fcId and cbsdSerialNumber 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> <p>Note: It is outside the scope of this document to test the Registration information that is supplied via another means.</p> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 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>- cbsdId = Ci</li> <li>- measReportConfig shall not be included</li> <li>- responseCode = 0</li> </ul> </li> </ul>                                                                                                                                                                                                                                                                      | --                                  | --                       |
| 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 | <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"/> | <input type="checkbox"/> |

|                                            |                                       |                        |                                   |
|--------------------------------------------|---------------------------------------|------------------------|-----------------------------------|
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| Test Report S/N:<br>1M2302100007-01-R1.A3L | Test Dates:<br>2/7/2023 – 2/9/2023    | EUT Type:<br>Smallcell | Page 11 of 67                     |

## Test Plots:



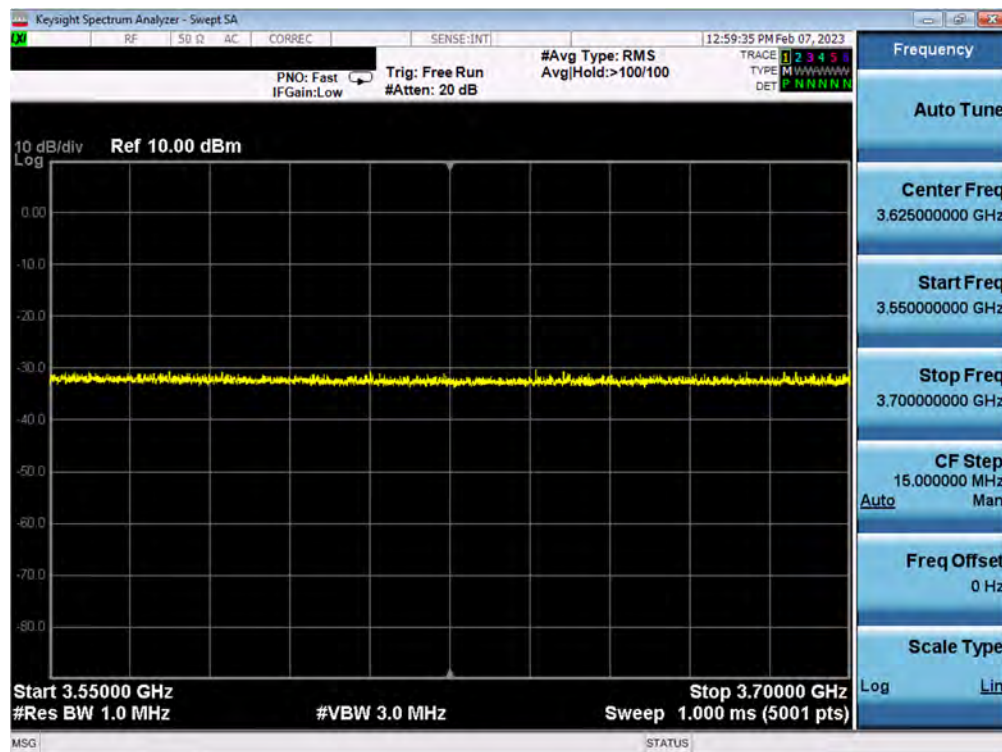
**Plot 1. Conducted Measurement – No RF transmission in entire band for 60s of elapsed time (WINNF.FT.C.REG.1) - NR**

|                                                   |                                               |                               |                                          |
|---------------------------------------------------|-----------------------------------------------|-------------------------------|------------------------------------------|
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## A2 [WINNF.FT.C.REG.8] Missing Required parameters (responseCode 102)

|   | Test Execution Steps                                                                                                                                                                                                                          | PASS                                | FAIL                     |
|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|--------------------------|
| 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 cbsdId</li> <li>- responseCode = R</li> </ul>                                 | --                                  | --                       |
| 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: <ul style="list-style-type: none"> <li>• UUT shall not transmit RF</li> </ul>                             | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

### Test Plots:



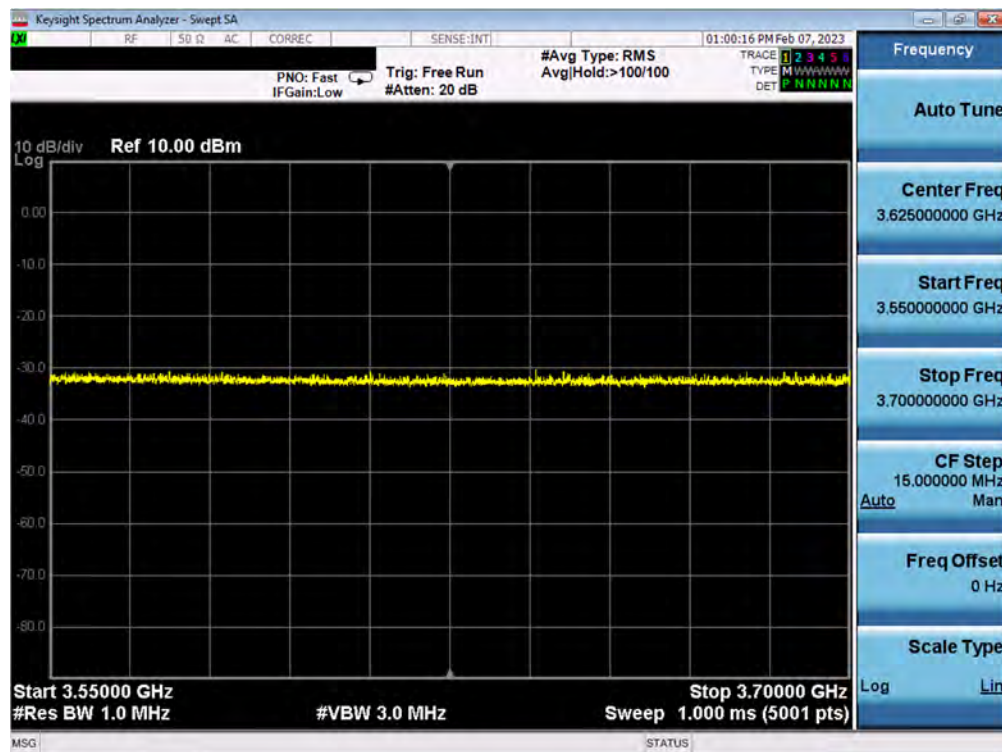
Plot 2. Conducted Measurement – No RF transmission in entire band for 60s of elapsed time (WINNF.FT.C.REG.8) – NR

|                                            |                                       |                        |                                   |
|--------------------------------------------|---------------------------------------|------------------------|-----------------------------------|
| FCC ID: A3LSOG2201                         | MEASUREMENT REPORT<br>(CERTIFICATION) |                        | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1M2302100007-01-R1.A3L | Test Dates:<br>2/7/2023 – 2/9/2023    | EUT Type:<br>Smallcell | Page 13 of 67                     |

### A3 [WINNF.FT.C.REG.10] Pending registration (responseCode 200)

|   | Test Execution Steps                                                                                                                                                                                                                          | PASS                                | FAIL                     |
|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|--------------------------|
| 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 cbsdId</li> <li>- responseCode = R</li> </ul>                                 | --                                  | --                       |
| 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: <ul style="list-style-type: none"> <li>• UUT shall not transmit RF</li> </ul>                             | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

### Test Plots:



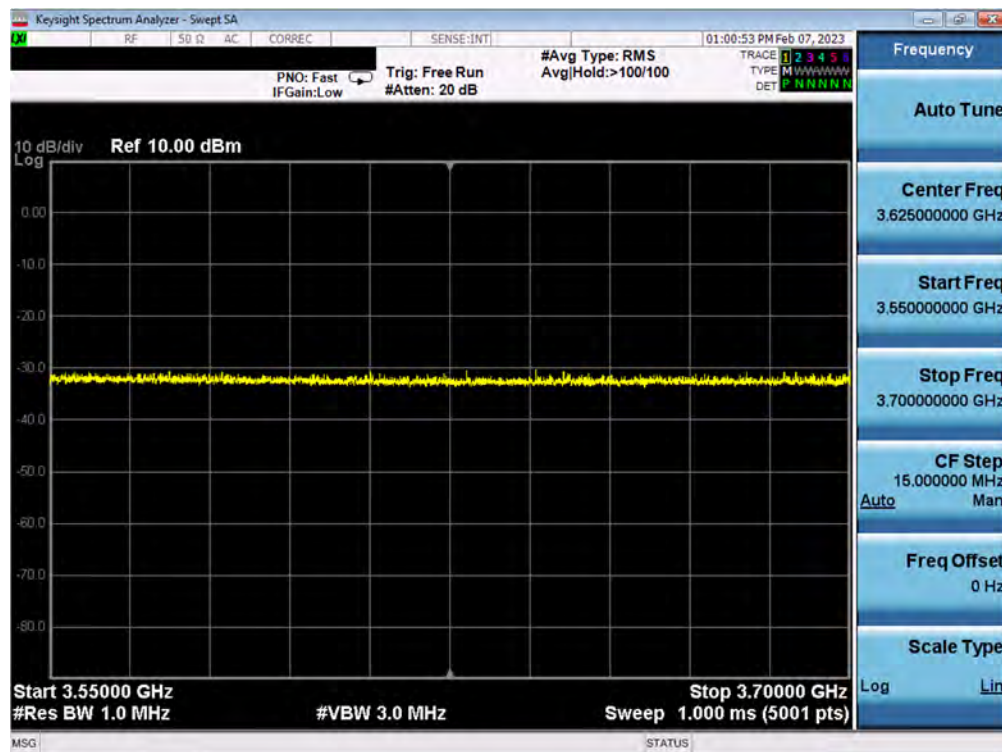
**Plot 3. Conducted Measurement – No RF transmission in entire band for 60s of elapsed time (WINNF.FT.C.REG.10) – NR**

|                                            |                                       |                        |                                   |
|--------------------------------------------|---------------------------------------|------------------------|-----------------------------------|
| FCC ID: A3LSOG2201                         | MEASUREMENT REPORT<br>(CERTIFICATION) |                        | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1M2302100007-01-R1.A3L | Test Dates:<br>2/7/2023 – 2/9/2023    | EUT Type:<br>Smallcell | Page 14 of 67                     |

## A4 [WINNF.FT.C.REG.12] Invalid parameter (responseCode 103)

|   | Test Execution Steps                                                                                                                                                                                                                          | PASS                                | FAIL                     |
|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|--------------------------|
| 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 cbsdId</li> <li>- responseCode = R</li> </ul>                                 | --                                  | --                       |
| 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: <ul style="list-style-type: none"> <li>• UUT shall not transmit RF</li> </ul>                             | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

## Test Plots:



Plot 4. Conducted Measurement – No RF transmission in entire band for 60s of elapsed time (WINNF.FT.C.REG.12) – NR

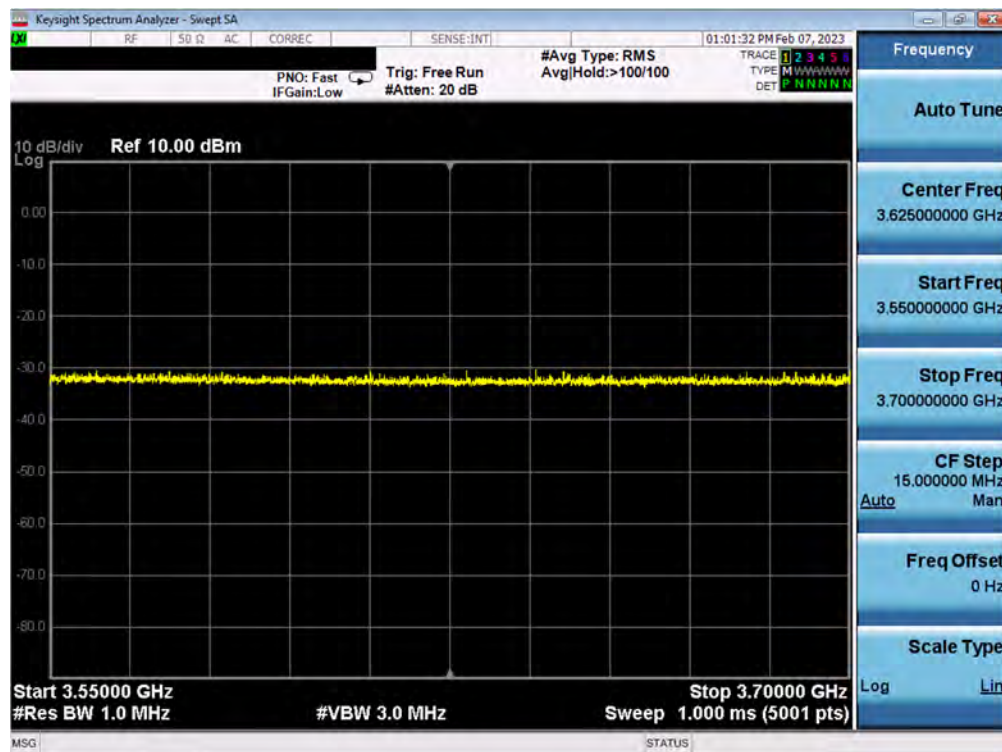
|                                            |                                       |                        |                                   |
|--------------------------------------------|---------------------------------------|------------------------|-----------------------------------|
| FCC ID: A3LSOG2201                         | MEASUREMENT REPORT<br>(CERTIFICATION) |                        | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1M2302100007-01-R1.A3L | Test Dates:<br>2/7/2023 – 2/9/2023    | EUT Type:<br>Smallcell | Page 15 of 67                     |



## A5 [WINNF.FT.C.REG.14] Blacklisted CBSD (responseCode 101)

|   | Test Execution Steps                                                                                                                                                                                                                          | PASS                                | FAIL                     |
|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|--------------------------|
| 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 cbsdId</li> <li>- responseCode = R</li> </ul>                                 | --                                  | --                       |
| 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: <ul style="list-style-type: none"> <li>• UUT shall not transmit RF</li> </ul>                             | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

### Test Plots:



Plot 5. Conducted Measurement – No RF transmission in entire band for 60s of elapsed time (WINNF.FT.C.REG.14) – NR

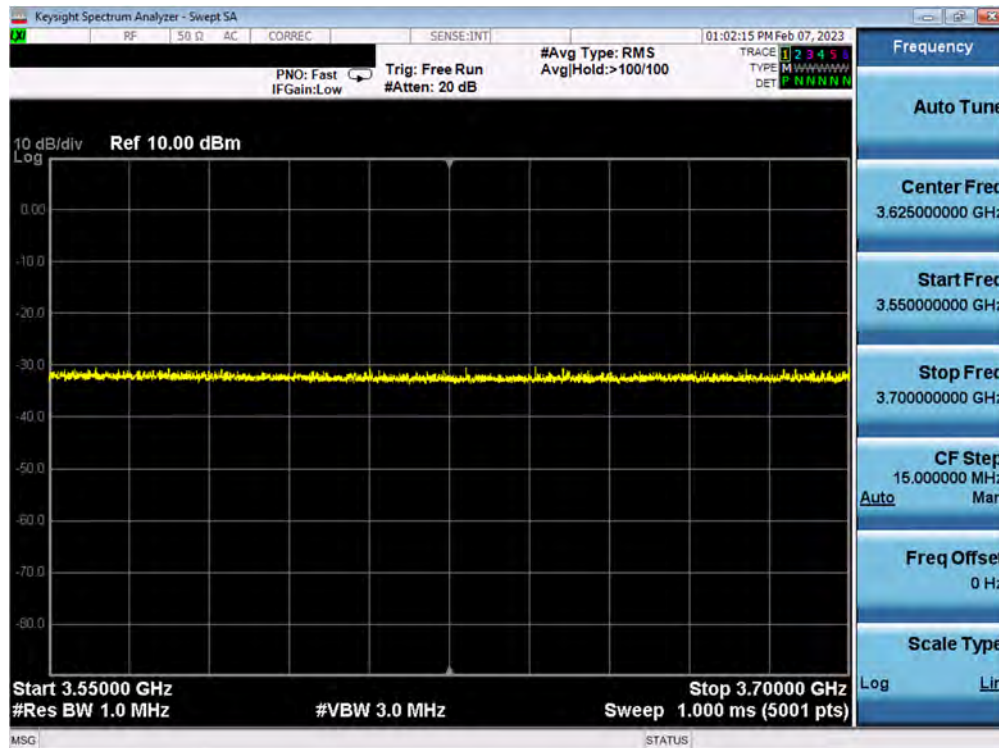
|                                            |                                       |                        |                                   |
|--------------------------------------------|---------------------------------------|------------------------|-----------------------------------|
| FCC ID: A3LSOG2201                         | MEASUREMENT REPORT<br>(CERTIFICATION) |                        | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1M2302100007-01-R1.A3L | Test Dates:<br>2/7/2023 – 2/9/2023    | EUT Type:<br>Smallcell | Page 16 of 67                     |



## A6 [WINNF.FT.C.REG.16] Unsupported SAS protocol version (responseCode 100)

|   | Test Execution Steps                                                                                                                                                                                                                          | PASS                                | FAIL                     |
|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|--------------------------|
| 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 cbsdId</li> <li>- responseCode = R</li> </ul>                                 | --                                  | --                       |
| 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: <ul style="list-style-type: none"> <li>• UUT shall not transmit RF</li> </ul>                             | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

### Test Plots:



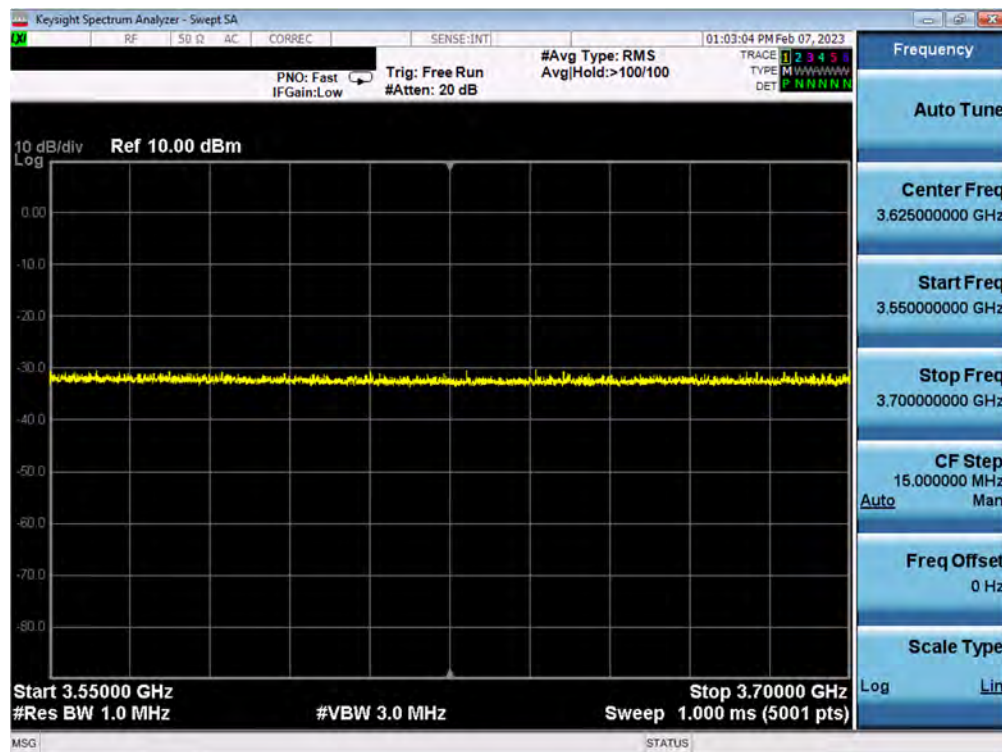
Plot 6. Conducted Measurement – No RF transmission in entire band for 60s of elapsed time (WINNF.FT.C.REG.16) – NR

|                                            |                                       |                        |                                   |
|--------------------------------------------|---------------------------------------|------------------------|-----------------------------------|
| FCC ID: A3LSOG2201                         | MEASUREMENT REPORT<br>(CERTIFICATION) |                        | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1M2302100007-01-R1.A3L | Test Dates:<br>2/7/2023 – 2/9/2023    | EUT Type:<br>Smallcell | Page 17 of 67                     |

## A7 [WINNF.FT.C.REG.18] Group Error (responseCode 201)

|   | Test Execution Steps                                                                                                                                                                                                                          | PASS                                | FAIL                     |
|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|--------------------------|
| 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 cbsdId</li> <li>- responseCode = R</li> </ul>                                 | --                                  | --                       |
| 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: <ul style="list-style-type: none"> <li>• UUT shall not transmit RF</li> </ul>                             | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

## Test Plots:



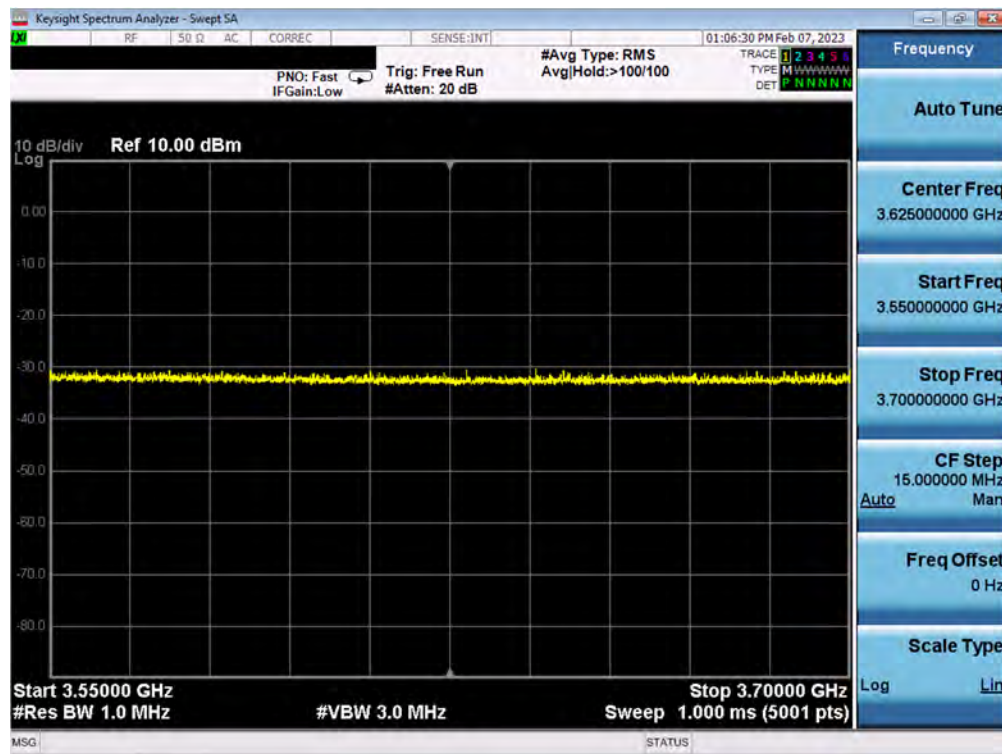
Plot 7. Conducted Measurement – No RF transmission in entire band for 60s of elapsed time (WINNF.FT.C.REG.18) – NR

|                                            |                                       |                        |                                   |
|--------------------------------------------|---------------------------------------|------------------------|-----------------------------------|
| FCC ID: A3LSOG2201                         | MEASUREMENT REPORT<br>(CERTIFICATION) |                        | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1M2302100007-01-R1.A3L | Test Dates:<br>2/7/2023 – 2/9/2023    | EUT Type:<br>Smallcell | Page 18 of 67                     |

## A8 [WINNF.FT.C.GRA.1] Unsuccessful Grant responseCode=400 (INTERFERENCE)

|   | Test Execution Steps                                                                                                                                               | PASS                                | FAIL                     |
|---|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|--------------------------|
| 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 | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

### Test Plots:



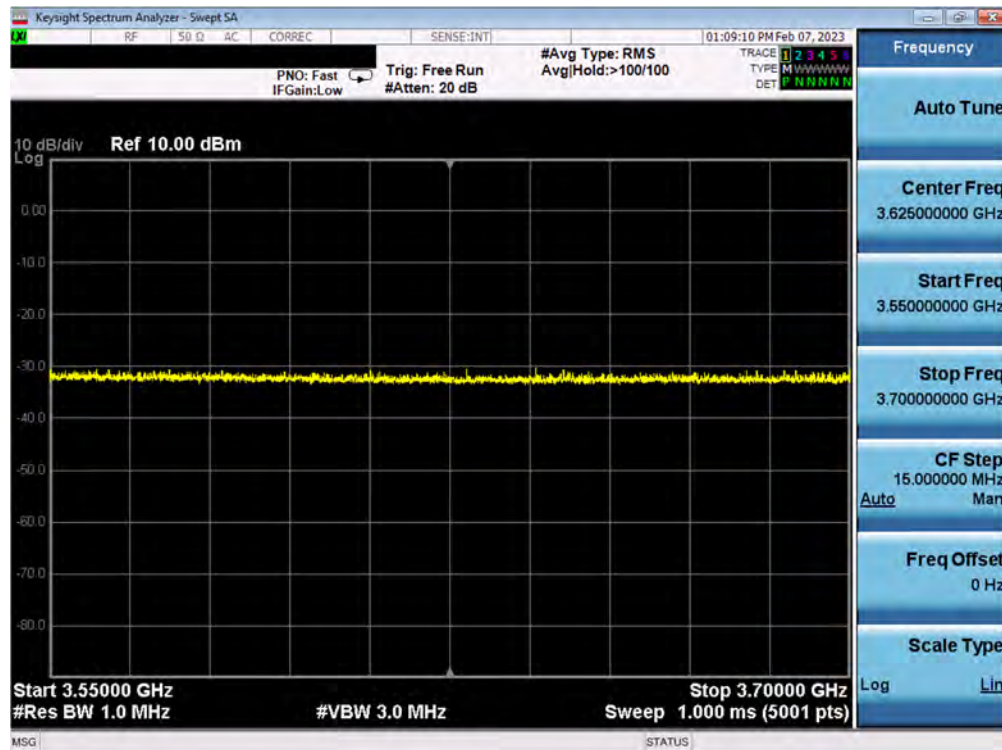
Plot 8. Conducted Measurement – No RF transmission in entire band for 60s of elapsed time (WINNF.FT.C.GRA.1) – NR

|                                            |                                       |                        |                                   |
|--------------------------------------------|---------------------------------------|------------------------|-----------------------------------|
| FCC ID: A3LSOG2201                         | MEASUREMENT REPORT<br>(CERTIFICATION) |                        | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1M2302100007-01-R1.A3L | Test Dates:<br>2/7/2023 – 2/9/2023    | EUT Type:<br>Smallcell | Page 19 of 67                     |

## A9 [WINNF.FT.C.GRA.2] Unsuccessful Grant responseCode=401 (GRANT\_CONFLICT)

|   | Test Execution Steps                                                                                                                                               | PASS                                | FAIL                     |
|---|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|--------------------------|
| 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 | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

### Test Plots:



Plot 9. Conducted Measurement – No RF transmission in entire band for 60s of elapsed time (WINNF.FT.C.GRA.2) – NR

|                                            |                                       |                        |                                   |
|--------------------------------------------|---------------------------------------|------------------------|-----------------------------------|
| FCC ID: A3LSOG2201                         | MEASUREMENT REPORT<br>(CERTIFICATION) |                        | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1M2302100007-01-R1.A3L | Test Dates:<br>2/7/2023 – 2/9/2023    | EUT Type:<br>Smallcell | Page 20 of 67                     |

# A10 [WINNF.FT.C.HBT.1] Heartbeat Success Case (first Heartbeat Response)

|   | Test Execution Steps                                                                                                                                                                                                                                                                                                                                                                                                                                 | PASS                                | FAIL                     |
|---|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|--------------------------|
| 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                                                                                                                                                                                                                                                                                                    | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 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                                                                                                                                                                                                              | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 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"                                                                                                                                                                                                                                                                 | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 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 | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

|                                            |                                       |                        |                                   |
|--------------------------------------------|---------------------------------------|------------------------|-----------------------------------|
| FCC ID: A3LSOG2201                         | MEASUREMENT REPORT<br>(CERTIFICATION) |                        | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1M2302100007-01-R1.A3L | Test Dates:<br>2/7/2023 – 2/9/2023    | EUT Type:<br>Smallcell | Page 21 of 67                     |



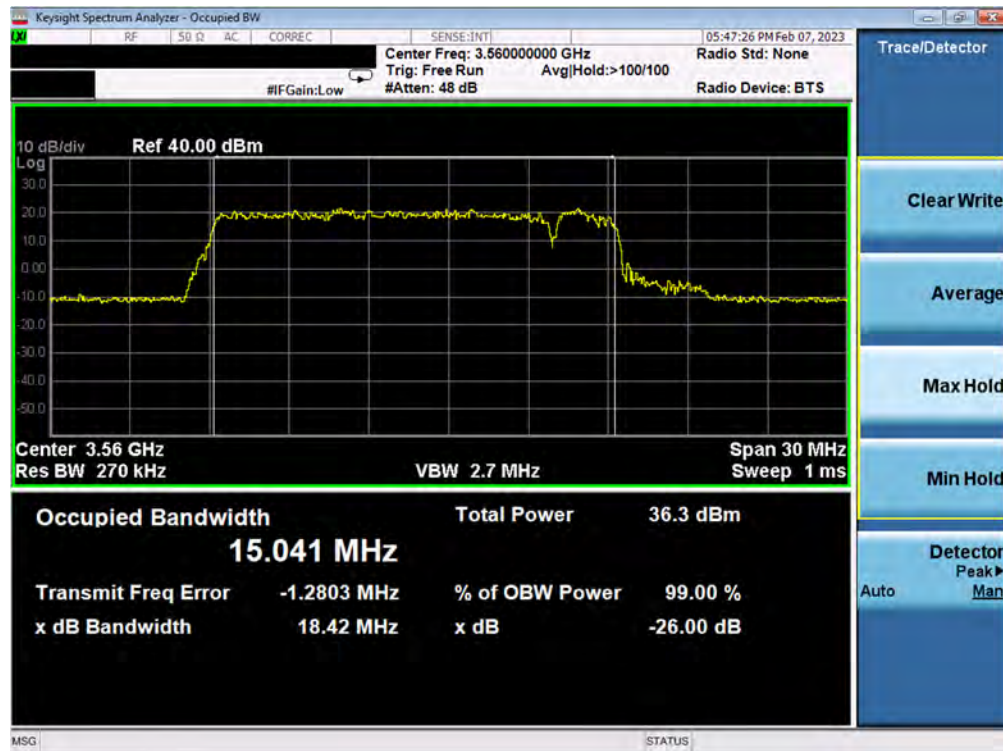
|    |                                                                                                                                                                                                                                                                                                                                                                   |                                     |                          |
|----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|--------------------------|
| 10 | <p>Monitor the RF output of the UUT from start of test until UUT transmission commences. Verify:</p> <ul style="list-style-type: none"> <li>• UUT does not transmit at any time prior to completion of the first heartbeat response</li> <li>• UUT transmits after step 8 is complete, and its transmission is limited to within the bandwidth range F</li> </ul> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
|----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|--------------------------|

## Test Plots:



Plot 10. Conducted Measurement - RF transmission after SAS heartbeat response (WINNF.FT.C.HBT.1) – NR

|                                            |                                       |                        |                                   |
|--------------------------------------------|---------------------------------------|------------------------|-----------------------------------|
| FCC ID: A3LSOG2201                         | MEASUREMENT REPORT<br>(CERTIFICATION) |                        | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1M2302100007-01-R1.A3L | Test Dates:<br>2/7/2023 – 2/9/2023    | EUT Type:<br>Smallcell | Page 22 of 67                     |



Plot 11. Conducted Measurement Occupied Bandwidth for 20MHz (WINNF.FT.C.HBT.1) – NR

|                                            |                                       |                        |                                   |
|--------------------------------------------|---------------------------------------|------------------------|-----------------------------------|
| FCC ID: A3LSOG2201                         | MEASUREMENT REPORT<br>(CERTIFICATION) |                        | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1M2302100007-01-R1.A3L | Test Dates:<br>2/7/2023 – 2/9/2023    | EUT Type:<br>Smallcell | Page 23 of 67                     |

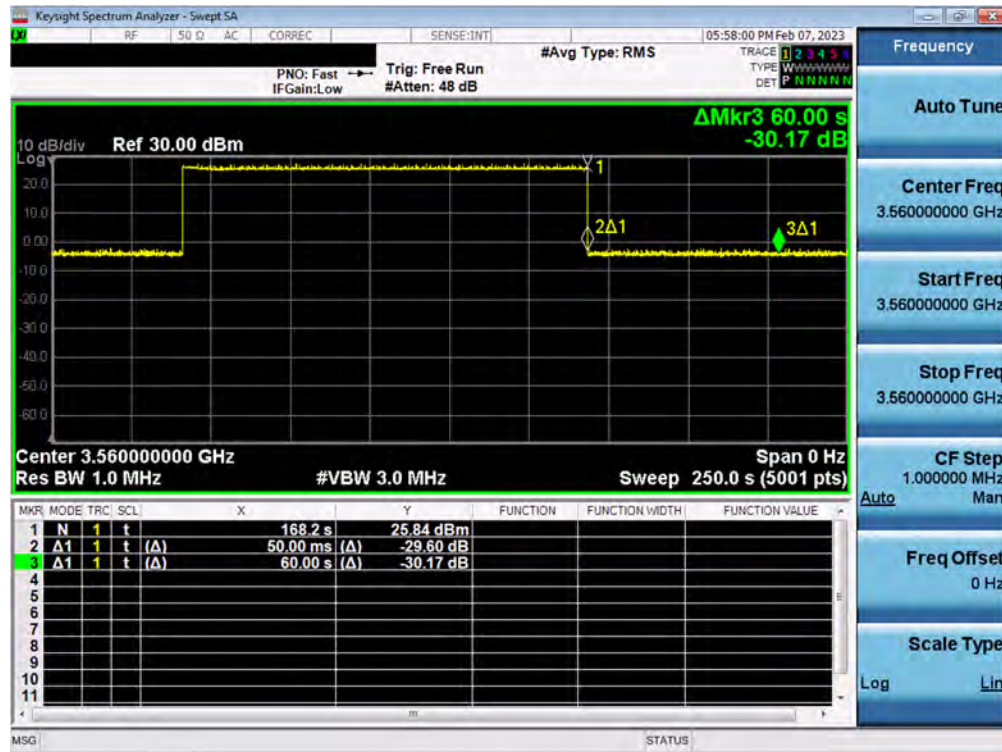
# A11 [WINNF.FT.C.HBT.3] Heartbeat responseCode=105 (DEREGISTER)

|   | Test Execution Steps                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | PASS                                | FAIL                     |
|---|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|--------------------------|
| 1 | <p>Ensure the following conditions are met for test entry:</p> <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>o valid cbsdId = C</li> <li>o valid grantId = G</li> <li>o grant is for frequency range F, power P</li> <li>o grantExpireTime = 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 | <p>UUT sends a Heartbeat Request message.</p> <p>Ensure Heartbeat Request message is sent within Heartbeat Interval specified in the latest Heartbeat Response, and formatted correctly, including:</p> <ul style="list-style-type: none"> <li>• cbsdId = C</li> <li>• grantId = G</li> <li>• operationState = "AUTHORIZED"</li> </ul>                                                                                                                                                                                                                            | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 3 | <p>SAS Test Harness sends a Heartbeat Response message, including the following parameters:</p> <ul style="list-style-type: none"> <li>• cbsdId = C</li> <li>• grantId = G</li> <li>• transmitExpireTime = T = Current UTC time</li> <li>• responseCode = 105 (DEREGISTER)</li> </ul>                                                                                                                                                                                                                                                                             | --                                  | --                       |
| 4 | After completion of step 3, SAS Test Harness shall not allow any further grants to the UUT.                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | --                                  | --                       |
| 5 | <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"/> | <input type="checkbox"/> |

|                                            |                                       |                        |                                   |
|--------------------------------------------|---------------------------------------|------------------------|-----------------------------------|
| FCC ID: A3LSOG2201                         | MEASUREMENT REPORT<br>(CERTIFICATION) |                        | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1M2302100007-01-R1.A3L | Test Dates:<br>2/7/2023 – 2/9/2023    | EUT Type:<br>Smallcell | Page 24 of 67                     |



## Test Plots:



Plot 12. Conducted Measurement - RF transmission stops within 60s of SAS message indicated by Marker 1 (WINNF.FT.C.HBT.3) – NR

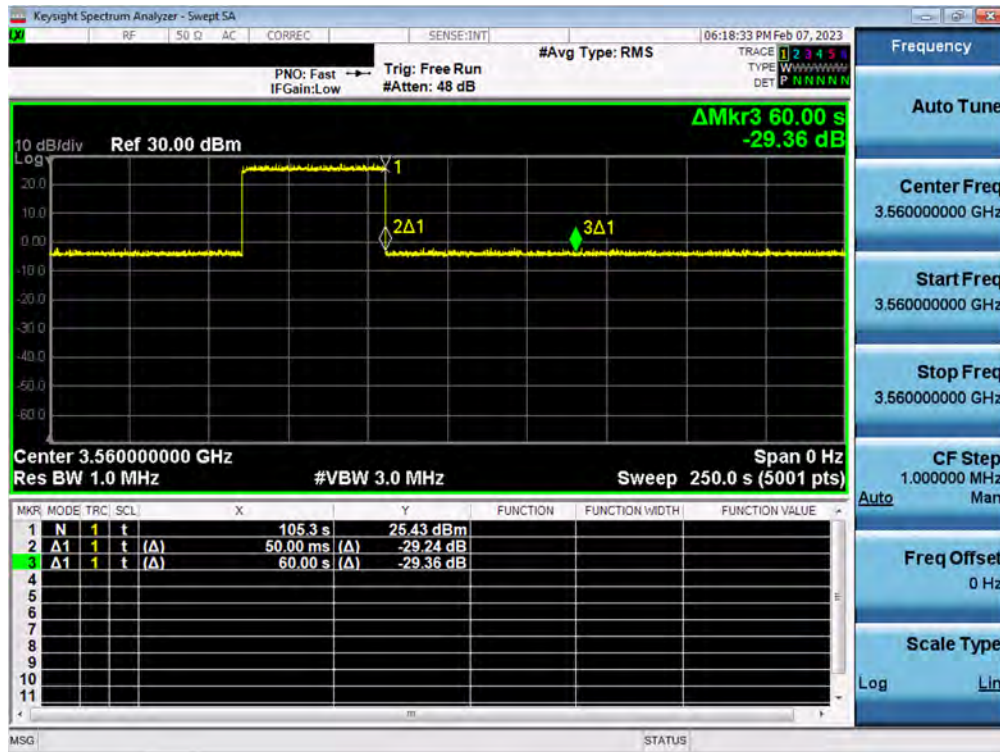
|                                            |                                       |                        |                                   |
|--------------------------------------------|---------------------------------------|------------------------|-----------------------------------|
| FCC ID: A3LSOG2201                         | MEASUREMENT REPORT<br>(CERTIFICATION) |                        | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1M2302100007-01-R1.A3L | Test Dates:<br>2/7/2023 – 2/9/2023    | EUT Type:<br>Smallcell | Page 25 of 67                     |

# A12 [WINNF.FT.C.HBT.4] Heartbeat responseCode=500 (TERMINATED\_GRANT)

|   | Test Execution Steps                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | PASS                                | FAIL                     |
|---|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|--------------------------|
| 1 | <p>Ensure the following conditions are met for test entry:</p> <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>o valid cbsdId = C</li> <li>o valid grantId = G</li> <li>o grant is for frequency range F, power P</li> <li>o grantExpireTime = 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 | <p>UUT sends a Heartbeat Request message.</p> <p>Ensure Heartbeat Request message is sent within Heartbeat Interval specified in the latest Heartbeat Response, and formatted correctly, including:</p> <ul style="list-style-type: none"> <li>• cbsdId = C</li> <li>• grantId = G</li> <li>• operationState = "AUTHORIZED"</li> </ul>                                                                                                                                                                                                                            | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 3 | <p>SAS Test Harness sends a Heartbeat Response message, including the following parameters:</p> <ul style="list-style-type: none"> <li>• cbsdId = C</li> <li>• grantId = G</li> <li>• transmitExpireTime = T = Current UTC time</li> <li>• responseCode = 500 (TERMINATED_GRANT)</li> </ul>                                                                                                                                                                                                                                                                       | --                                  | --                       |
| 4 | After completion of step 3, SAS Test Harness shall not allow any further grants to the UUT.                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | --                                  | --                       |
| 5 | <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"/> | <input type="checkbox"/> |

|                                            |                                       |                        |                                   |
|--------------------------------------------|---------------------------------------|------------------------|-----------------------------------|
| FCC ID: A3LSOG2201                         | MEASUREMENT REPORT<br>(CERTIFICATION) |                        | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1M2302100007-01-R1.A3L | Test Dates:<br>2/7/2023 – 2/9/2023    | EUT Type:<br>Smallcell | Page 26 of 67                     |

## Test Plots:



Plot 13. Conducted Measurement - RF transmission stops within 60s of SAS message indicated by Marker 1 (X) (WINNF.FT.C.HBT.4) – NR

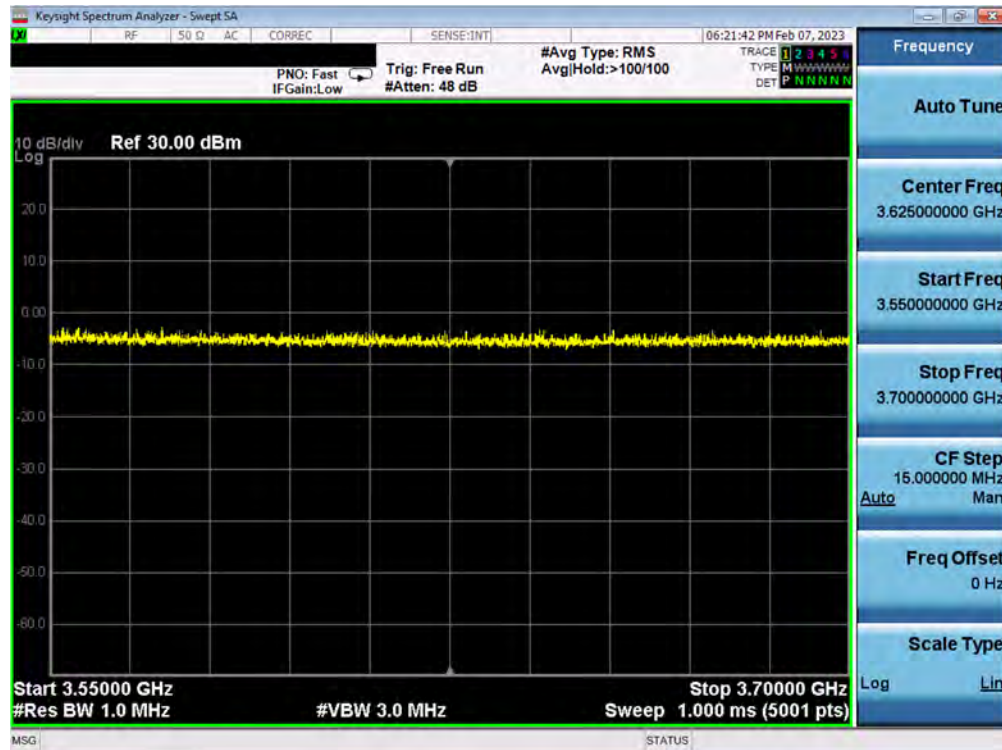
|                                            |                                       |                        |                                   |
|--------------------------------------------|---------------------------------------|------------------------|-----------------------------------|
| FCC ID: A3LSOG2201                         | MEASUREMENT REPORT<br>(CERTIFICATION) |                        | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1M2302100007-01-R1.A3L | Test Dates:<br>2/7/2023 – 2/9/2023    | EUT Type:<br>Smallcell | Page 27 of 67                     |

# A13 [WINNF.FT.C.HBT.5] Heartbeat responseCode=501 (SUSPENDED\_GRANT) in First Heartbeat Response

|   | Test Execution Steps                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | PASS                                | FAIL                     |
|---|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|--------------------------|
| 1 | <p>Ensure the following conditions are met for test entry:</p> <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>o valid cbsdId = C</li> <li>o valid grantId = G</li> <li>o grant is for frequency range F, power P</li> <li>o grantExpireTime = 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 | <p>UUT sends a Heartbeat Request message.</p> <p>Ensure Heartbeat Request message is sent within Heartbeat Interval specified in the latest Heartbeat Response, and formatted correctly, including:</p> <ul style="list-style-type: none"> <li>• cbsdId = C</li> <li>• grantId = G</li> <li>• operationState = "GRANTED"</li> </ul>                                                                                                                                                                                                                                                                                                                                                                      | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 3 | <p>SAS Test Harness sends a Heartbeat Response message, including the following parameters:</p> <ul style="list-style-type: none"> <li>• cbsdId = C</li> <li>• grantId = G</li> <li>• transmitExpireTime = T = Current UTC time</li> <li>• responseCode = 501 (SUSPENDED_GRANT)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                               | --                                  | --                       |
| 4 | <p>After completion of step 3, SAS Test Harness shall not allow any further grants to the UUT.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | --                                  | --                       |
| 5 | <p>Monitor the SAS-CBSD interface. Verify either A OR B occurs:</p> <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>• cbsdId = C</li> <li>• grantId = G</li> <li>• operationState = "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>• cbsdId = C</li> <li>• grantId = 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"/> | <input type="checkbox"/> |

|                                            |                                       |                        |                                   |
|--------------------------------------------|---------------------------------------|------------------------|-----------------------------------|
| FCC ID: A3LSOG2201                         | MEASUREMENT REPORT<br>(CERTIFICATION) |                        | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1M2302100007-01-R1.A3L | Test Dates:<br>2/7/2023 – 2/9/2023    | EUT Type:<br>Smallcell | Page 28 of 67                     |

## Test Plots:



Plot 14. Conducted Measurement – No RF transmission in entire band (WINNF.FT.C.HBT.5) – NR

|                                            |                                       |                        |                                   |
|--------------------------------------------|---------------------------------------|------------------------|-----------------------------------|
| FCC ID: A3LSOG2201                         | MEASUREMENT REPORT<br>(CERTIFICATION) |                        | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1M2302100007-01-R1.A3L | Test Dates:<br>2/7/2023 – 2/9/2023    | EUT Type:<br>Smallcell | Page 29 of 67                     |

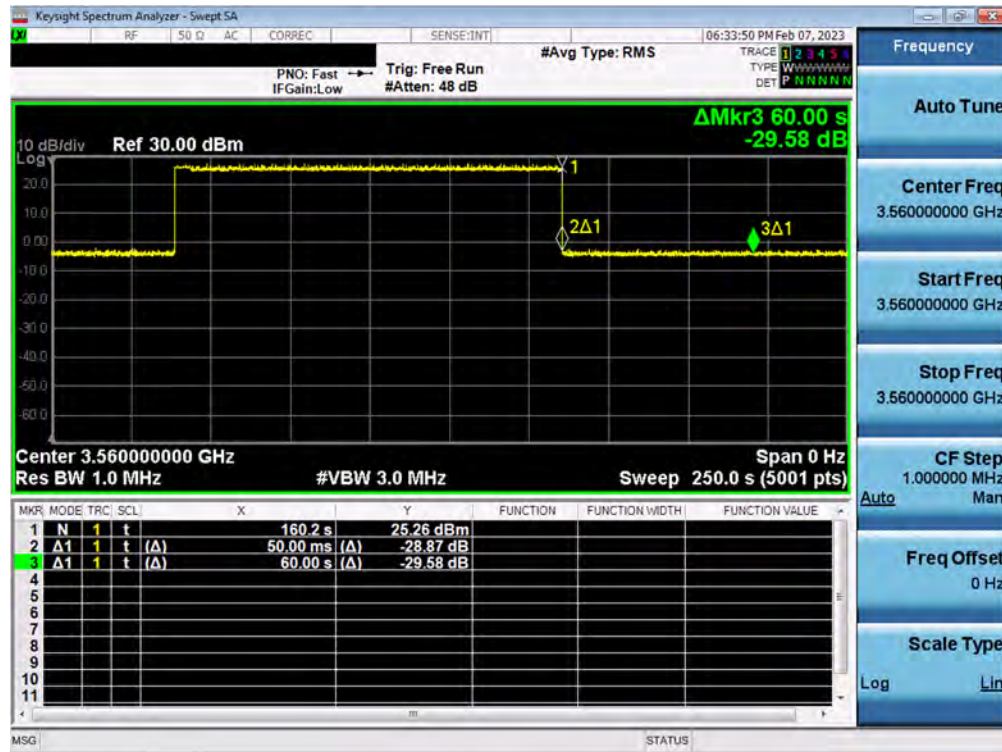
# A14 [WINNF.FT.C.HBT.6] Heartbeat responseCode=501 (SUSPENDED\_GRANT) in Subsequent Heartbeat Response

|   | Test Execution Steps                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | PASS                                | FAIL                     |
|---|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|--------------------------|
| 1 | <p>Ensure the following conditions are met for test entry:</p> <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>o valid cbsdId = C</li> <li>o valid grantId = G</li> <li>o grant is for frequency range F, power P</li> <li>o grantExpireTime = 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 | <p>UUT sends a Heartbeat Request message.</p> <p>Ensure Heartbeat Request message is sent within Heartbeat Interval specified in the latest Heartbeat Response, and formatted correctly, including:</p> <ul style="list-style-type: none"> <li>• cbsdId = C</li> <li>• grantId = G</li> <li>• operationState = "AUTHORIZED"</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                             | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 3 | <p>SAS Test Harness sends a Heartbeat Response message, including the following parameters:</p> <ul style="list-style-type: none"> <li>• cbsdId = C</li> <li>• grantId = G</li> <li>• transmitExpireTime = T = Current UTC time</li> <li>• responseCode = 501 (SUSPENDED_GRANT)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                         | --                                  | --                       |
| 4 | <p>After completion of step 3, SAS Test Harness shall not allow any further grants to the UUT.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | --                                  | --                       |
| 5 | <p>Monitor the SAS-CBSD interface. Verify either A OR B occurs:</p> <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>• cbsdId = C</li> <li>• grantId = G</li> <li>• operationState = "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>• cbsdId = C</li> <li>• grantId = 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"/> | <input type="checkbox"/> |

|                                            |                                       |                        |                                   |
|--------------------------------------------|---------------------------------------|------------------------|-----------------------------------|
| FCC ID: A3LSOG2201                         | MEASUREMENT REPORT<br>(CERTIFICATION) |                        | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1M2302100007-01-R1.A3L | Test Dates:<br>2/7/2023 – 2/9/2023    | EUT Type:<br>Smallcell | Page 30 of 67                     |



## Test Plots:



Plot 15. Conducted Measurement - RF transmission stops within 60s of SAS message indicated by Marker 1 (X) (WINNF.FT.C.HBT.6) – NR

|                                            |                                       |                        |                                   |
|--------------------------------------------|---------------------------------------|------------------------|-----------------------------------|
| FCC ID: A3LSOG2201                         | MEASUREMENT REPORT<br>(CERTIFICATION) |                        | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1M2302100007-01-R1.A3L | Test Dates:<br>2/7/2023 – 2/9/2023    | EUT Type:<br>Smallcell | Page 31 of 67                     |

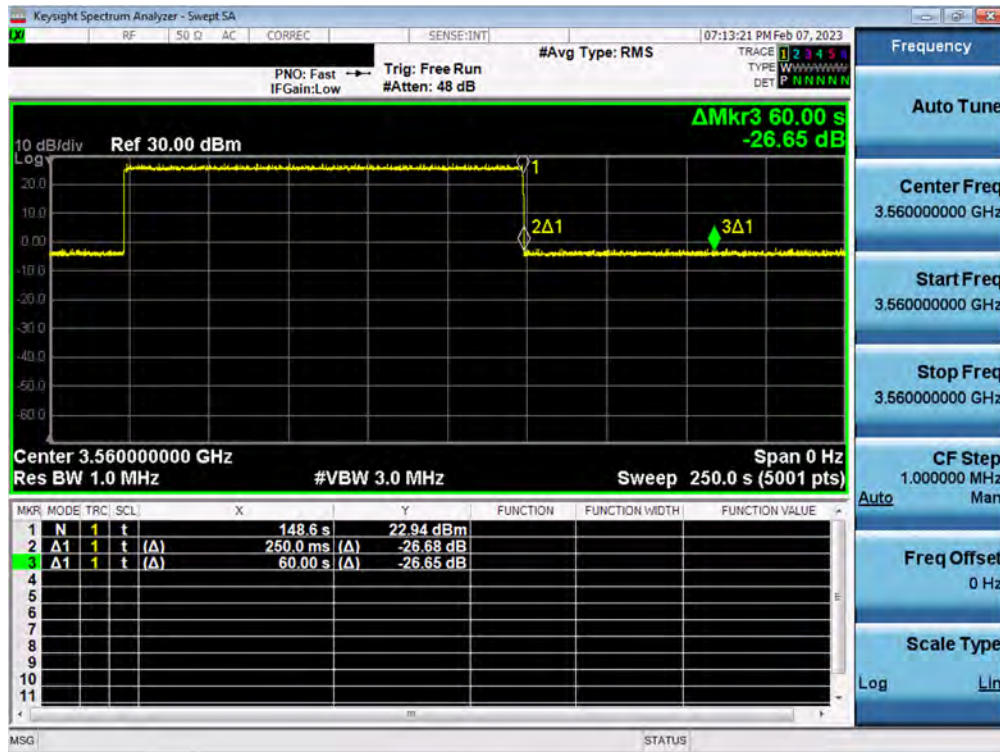


# A15 [WINNF.FT.C.HBT.7] Heartbeat responseCode=502 (UNSYNC\_OP\_PARAM)

|   | Test Execution Steps                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | PASS                                | FAIL                     |
|---|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|--------------------------|
| 1 | <p>Ensure the following conditions are met for test entry:</p> <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>o valid cbsdId = C</li> <li>o valid grantId = G</li> <li>o grant is for frequency range F, power P</li> <li>o grantExpireTime = 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 | <p>UUT sends a Heartbeat Request message.</p> <p>Ensure Heartbeat Request message is sent within Heartbeat Interval specified in the latest Heartbeat Response, and formatted correctly, including:</p> <ul style="list-style-type: none"> <li>• cbsdId = C</li> <li>• grantId = G</li> <li>• operationState = "AUTHORIZED"</li> </ul>                                                                                                                                                                                                                            | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 3 | <p>SAS Test Harness sends a Heartbeat Response message, including the following parameters:</p> <ul style="list-style-type: none"> <li>• cbsdId = C</li> <li>• grantId = G</li> <li>• transmitExpireTime = T = Current UTC time</li> <li>• responseCode = 502 (UNSYNC_OP_PARAM)</li> </ul>                                                                                                                                                                                                                                                                        | --                                  | --                       |
| 4 | <p>After completion of step 3, SAS Test Harness shall not allow any further grants to the UUT.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                | --                                  | --                       |
| 5 | <p>Monitor the SAS-CBSD interface. Verify:</p> <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>o cbsdId = C</li> <li>o grantId = G</li> </ul> </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"/> | <input type="checkbox"/> |

|                                            |                                       |                        |                                   |
|--------------------------------------------|---------------------------------------|------------------------|-----------------------------------|
| FCC ID: A3LSOG2201                         | MEASUREMENT REPORT<br>(CERTIFICATION) |                        | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1M2302100007-01-R1.A3L | Test Dates:<br>2/7/2023 – 2/9/2023    | EUT Type:<br>Smallcell | Page 32 of 67                     |

## Test Plots:



Plot 16. Conducted Measurement - RF transmission stops within 60s of SAS message indicated by Marker 1 (X) (WINNF.FT.C.HBT.7) - NR

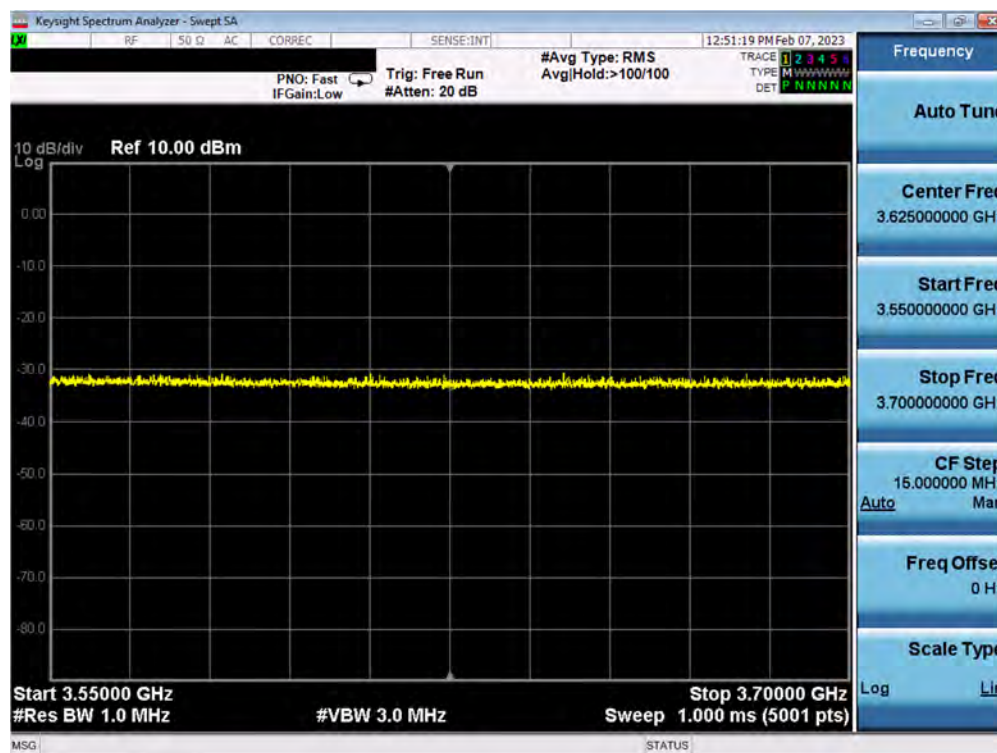
|                                            |                                       |                        |                                   |
|--------------------------------------------|---------------------------------------|------------------------|-----------------------------------|
| FCC ID: A3LSOG2201                         | MEASUREMENT REPORT<br>(CERTIFICATION) |                        | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1M2302100007-01-R1.A3L | Test Dates:<br>2/7/2023 – 2/9/2023    | EUT Type:<br>Smallcell | Page 33 of 67                     |

# A16 [WINNF.FT.C.HBT.9] Heartbeat Response Absent (First Heartbeat)

|   | Test Execution Steps                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | PASS                                | FAIL                     |
|---|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|--------------------------|
| 1 | <p>Ensure the following conditions are met for test entry:</p> <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>o valid cbsdId = C</li> <li>o valid grantId = G</li> <li>o grant is for frequency range F, power P</li> <li>o grantExpireTime = 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 | <p>UUT sends a Heartbeat Request message.</p> <p>Ensure Heartbeat Request message is sent within latest specified heartbeatInterval, and is formatted correctly, including:</p> <ul style="list-style-type: none"> <li>• cbsdId = C</li> <li>• grantId = G</li> <li>• operationState = "GRANTED"</li> </ul>                                                                                                                                                                                                                                                            | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 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 | <p>Monitor the RF output of the UUT from start of test to 60 seconds after step 3. Verify:</p> <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"/> | <input type="checkbox"/> |

|                                            |                                       |                        |                                   |
|--------------------------------------------|---------------------------------------|------------------------|-----------------------------------|
| FCC ID: A3LSOG2201                         | MEASUREMENT REPORT<br>(CERTIFICATION) |                        | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1M2302100007-01-R1.A3L | Test Dates:<br>2/7/2023 – 2/9/2023    | EUT Type:<br>Smallcell | Page 34 of 67                     |

## Test Plots:



Plot 17. Conducted Measurement – No RF transmission in entire band at anytime (WINNF.FT.C.HBT.9) – NR

|                                            |                                       |                        |                                   |
|--------------------------------------------|---------------------------------------|------------------------|-----------------------------------|
| FCC ID: A3LSOG2201                         | MEASUREMENT REPORT<br>(CERTIFICATION) |                        | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1M2302100007-01-R1.A3L | Test Dates:<br>2/7/2023 – 2/9/2023    | EUT Type:<br>Smallcell | Page 35 of 67                     |

# A17 [WINNF.FT.C.HBT.10] Heartbeat Response Absent (Subsequent Heartbeat)

|   | Test Execution Steps                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | PASS                                | FAIL                     |
|---|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|--------------------------|
| 1 | <p>Ensure the following conditions are met for test entry:</p> <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>o valid cbsdId = C</li> <li>o valid grantId = G</li> <li>o grant is for frequency range F, power P</li> <li>o grantExpireTime = 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 | <p>UUT sends a Heartbeat Request message.</p> <p>Verify Heartbeat Request message is sent within the latest specified heartbeatInterval, and is formatted correctly, including:</p> <ul style="list-style-type: none"> <li>• cbsdId = C</li> <li>• grantId = G</li> <li>• operationState = "AUTHORIZED"</li> </ul>                                                                                                                                                                                                                                                | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 3 | <p>SAS Test Harness sends a Heartbeat Response message, including the following parameters:</p> <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>                                                                                                                                                                                                                                                                                  | --                                  | --                       |
| 4 | After completion of Step 3, SAS Test Harness does not respond to any further messages from UUT                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | --                                  | --                       |
| 5 | <p>Monitor the RF output of the UUT. Verify:</p> <ul style="list-style-type: none"> <li>• UUT shall stop all transmission on RF interface within (transmitExpireTime + 60 seconds), using the transmitExpireTime sent in Step 3.</li> </ul>                                                                                                                                                                                                                                                                                                                       | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

|                                            |                                       |                        |                                   |
|--------------------------------------------|---------------------------------------|------------------------|-----------------------------------|
| FCC ID: A3LSOG2201                         | MEASUREMENT REPORT<br>(CERTIFICATION) |                        | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1M2302100007-01-R1.A3L | Test Dates:<br>2/7/2023 – 2/9/2023    | EUT Type:<br>Smallcell | Page 36 of 67                     |

## Test Plots:



Plot 18. Conducted Measurement - RF transmission stops within transmitExpireTime + 60s. The last SAS heartbeat message is indicated by Marker 1 (X) (WINNF.FT.C.HBT.10) – NR

|                                            |                                       |                        |                                   |
|--------------------------------------------|---------------------------------------|------------------------|-----------------------------------|
| FCC ID: A3LSOG2201                         | MEASUREMENT REPORT<br>(CERTIFICATION) |                        | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1M2302100007-01-R1.A3L | Test Dates:<br>2/7/2023 – 2/9/2023    | EUT Type:<br>Smallcell | Page 37 of 67                     |

# A18 [WINNF.FT.C.MES.1] Registration Response contains measReportConfig

|   | Test Execution Steps                                                                                                                                                                                                                                                                                                                                             | PASS                                | FAIL                     |
|---|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|--------------------------|
| 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.<br>Validate the Registration Request message is formatted correctly, including: <ul style="list-style-type: none"> <li>• userId is present and correct</li> <li>• fcId is present and correct</li> <li>• cbsdSerialNumber is present and correct</li> <li>• measCapability = "RECEIVED_POWER_WITHOUT_GRANT"</li> </ul> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 3 | SAS Test Harness sends a Registration Response message, with the following parameters: <ul style="list-style-type: none"> <li>• cbsdId = C = valid cbsdId for this UUT</li> <li>• measReportConfig= "RECEIVED_POWER_WITHOUT_GRANT"</li> <li>• responseCode = 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>• cbsdId = C</li> <li>• measReport is present, and is a properly formatted rcvdPowerMeasReport.</li> </ul>                                                                         | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 6 | SAS Test Harness sends a Spectrum Inquiry Response, with the following parameters: <ul style="list-style-type: none"> <li>• cbsdId = C</li> <li>• availableChannel is an array of availableChannel objects</li> <li>• responseCode = 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>• cbsdId = C</li> <li>• measReport is present, and is a properly formatted rcvdPowerMeasReport.</li> </ul>                                                                            | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

|                                            |                                       |                        |                                   |
|--------------------------------------------|---------------------------------------|------------------------|-----------------------------------|
| FCC ID: A3LSOG2201                         | MEASUREMENT REPORT<br>(CERTIFICATION) |                        | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1M2302100007-01-R1.A3L | Test Dates:<br>2/7/2023 – 2/9/2023    | EUT Type:<br>Smallcell | Page 38 of 67                     |



```

"rcvdPowerMeasReports": [
  {
    "measBandwidth": 10000000,
    "measFrequency": 3550000000,
    "measRcvdPower": -100
  },
  {
    "measBandwidth": 10000000,
    "measFrequency": 3560000000,
    "measRcvdPower": -100
  },
  {
    "measBandwidth": 10000000,
    "measFrequency": 3570000000,
    "measRcvdPower": -100
  },
  {
    "measBandwidth": 10000000,
    "measFrequency": 3580000000,
    "measRcvdPower": -100
  },
  {
    "measBandwidth": 10000000,
    "measFrequency": 3590000000,
    "measRcvdPower": -100
  },
  {
    "measBandwidth": 10000000,
    "measFrequency": 3600000000,
    "measRcvdPower": -100
  },
  {
    "measBandwidth": 10000000,
    "measFrequency": 3610000000,
    "measRcvdPower": -100
  },
  {
    "measBandwidth": 10000000,
    "measFrequency": 3620000000,
    "measRcvdPower": -100
  },
],

```

**Plot 19. Measurement Report in Registration Response (WINNF.FT.C.MES.1)**

|                                                   |                                               |                               |                                          |
|---------------------------------------------------|-----------------------------------------------|-------------------------------|------------------------------------------|
| <b>FCC ID:</b> A3LSOG2201                         | <b>MEASUREMENT REPORT<br/>(CERTIFICATION)</b> |                               | <b>Approved by:</b><br>Technical Manager |
| <b>Test Report S/N:</b><br>1M2302100007-01-R1.A3L | <b>Test Dates:</b><br>2/7/2023 – 2/9/2023     | <b>EUT Type:</b><br>Smallcell | Page 39 of 67                            |

```
{
  "measBandwidth": 10000000,
  "measFrequency": 3630000000,
  "measRcvdPower": -100
},
{
  "measBandwidth": 10000000,
  "measFrequency": 3640000000,
  "measRcvdPower": -100
},
{
  "measBandwidth": 10000000,
  "measFrequency": 3650000000,
  "measRcvdPower": -100
},
{
  "measBandwidth": 10000000,
  "measFrequency": 3660000000,
  "measRcvdPower": -100
},
{
  "measBandwidth": 10000000,
  "measFrequency": 3670000000,
  "measRcvdPower": -100
},
{
  "measBandwidth": 10000000,
  "measFrequency": 3680000000,
  "measRcvdPower": -100
},
{
  "measBandwidth": 10000000,
  "measFrequency": 3690000000,
  "measRcvdPower": -100
}
```

**Plot 20.Measurement Report in Registration Response Cont. (WINNF.FT.C.MES.1)**

|                                                   |                                               |                               |                                          |
|---------------------------------------------------|-----------------------------------------------|-------------------------------|------------------------------------------|
| <b>FCC ID:</b> A3LSOG2201                         | <b>MEASUREMENT REPORT<br/>(CERTIFICATION)</b> |                               | <b>Approved by:</b><br>Technical Manager |
| <b>Test Report S/N:</b><br>1M2302100007-01-R1.A3L | <b>Test Dates:</b><br>2/7/2023 – 2/9/2023     | <b>EUT Type:</b><br>Smallcell | Page 40 of 67                            |

## A19 [WINNF.FT.C.RLQ.1] Successful Relinquishment

|   | Test Execution Steps                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | PASS                                | FAIL                     |
|---|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|--------------------------|
| 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 SAS Test Harness</li> <li>• UUT has successfully registered with SAS Test Harness, with cbsdId=C</li> <li>• UUT has received a valid grant with grantId = G</li> <li>• UUT is in Grant State AUTHORIZED and is actively transmitting within the bounds of its grant.</li> </ul> <p>Invoke trigger to relinquish UUT Grant from the SAS Test Harness</p> | --                                  | --                       |
| 2 | <p>UUT sends a Relinquishment Request message. Verify message contains all required parameters properly formatted, and specifically:</p> <ul style="list-style-type: none"> <li>• cbsdId = C</li> <li>• grantId = G</li> </ul>                                                                                                                                                                                                                                                                                                       | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 3 | <p>SAS Test Harness shall approve the request with a Relinquishment Response message with parameters:</p> <ul style="list-style-type: none"> <li>• cbsdId = C</li> <li>• grantId = G</li> <li>• responseCode = 0</li> </ul>                                                                                                                                                                                                                                                                                                          | --                                  | --                       |
| 4 | <p>After completion of step 3, SAS Test Harness will not provide any additional positive response (responseCode=0) to further request messages from the UUT.</p>                                                                                                                                                                                                                                                                                                                                                                     | --                                  | --                       |
| 5 | <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 stop RF transmission at any time between triggering the relinquishment and UUT sending the relinquishment request</li> </ul>                                                                                                                                                                                                           | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

|                                            |                                       |                        |                                   |
|--------------------------------------------|---------------------------------------|------------------------|-----------------------------------|
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| Test Report S/N:<br>1M2302100007-01-R1.A3L | Test Dates:<br>2/7/2023 – 2/9/2023    | EUT Type:<br>Smallcell | Page 41 of 67                     |

## Test Plots:



Plot 21. Conducted Measurement - RF transmission stops (WINNF.FT.C.RLQ.1) – NR

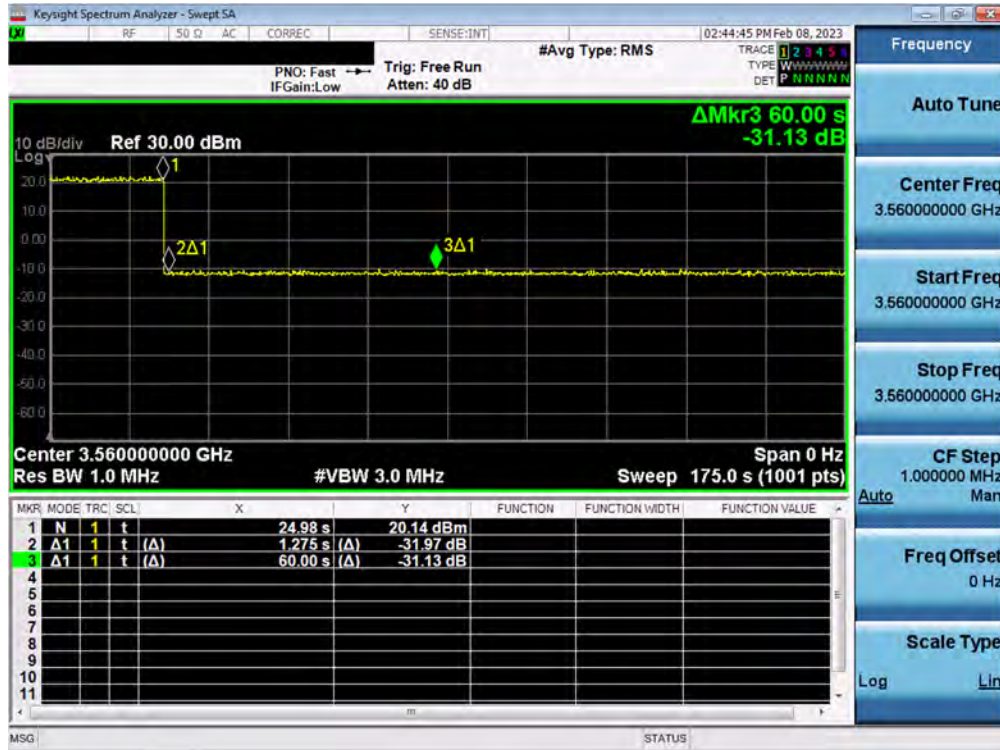
|                                            |                                       |                        |                                   |
|--------------------------------------------|---------------------------------------|------------------------|-----------------------------------|
| FCC ID: A3LSOG2201                         | MEASUREMENT REPORT<br>(CERTIFICATION) |                        | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1M2302100007-01-R1.A3L | Test Dates:<br>2/7/2023 – 2/9/2023    | EUT Type:<br>Smallcell | Page 42 of 67                     |

## A20 [WINNF.FT.C.DRG.1] Successful Deregistration

|   | Test Execution Steps                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | PASS                                | FAIL                     |
|---|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|--------------------------|
| 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 SAS Test Harness</li> <li>• UUT has successfully registered with SAS Test Harness, with cbsdId=C</li> <li>• UUT has received a valid grant with grantId = G</li> <li>• UUT is in Grant State AUTHORIZED and is actively transmitting within the bounds of its grant.</li> </ul> <p>Invoke trigger to deregister UUT from the SAS Test Harness</p> | --                                  | --                       |
| 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.                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 4 | <p>SAS Test Harness shall approve the request with a Deregistration Response message with parameters:</p> <ul style="list-style-type: none"> <li>• cbsdId = C</li> <li>• responseCode = 0</li> </ul>                                                                                                                                                                                                                                                                                                                           | --                                  | --                       |
| 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 | <p>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:</p> <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"/> | <input type="checkbox"/> |

|                                            |                                       |                        |                                   |
|--------------------------------------------|---------------------------------------|------------------------|-----------------------------------|
| FCC ID: A3LSOG2201                         | MEASUREMENT REPORT<br>(CERTIFICATION) |                        | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1M2302100007-01-R1.A3L | Test Dates:<br>2/7/2023 – 2/9/2023    | EUT Type:<br>Smallcell | Page 43 of 67                     |

## Test Plots:



Plot 22. Conducted Measurement - RF transmission stops within 60s. The SAS message is indicated by Marker 1 (X) (WINNF.FT.C.DRG.1) – NR

|                                            |                                       |                        |                                   |
|--------------------------------------------|---------------------------------------|------------------------|-----------------------------------|
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| Test Report S/N:<br>1M2302100007-01-R1.A3L | Test Dates:<br>2/7/2023 – 2/9/2023    | EUT Type:<br>Smallcell | Page 44 of 67                     |



## A21 [WINNF.FT.C.SCS.1] Successful TLS connection between UUT and SAS Test Harness

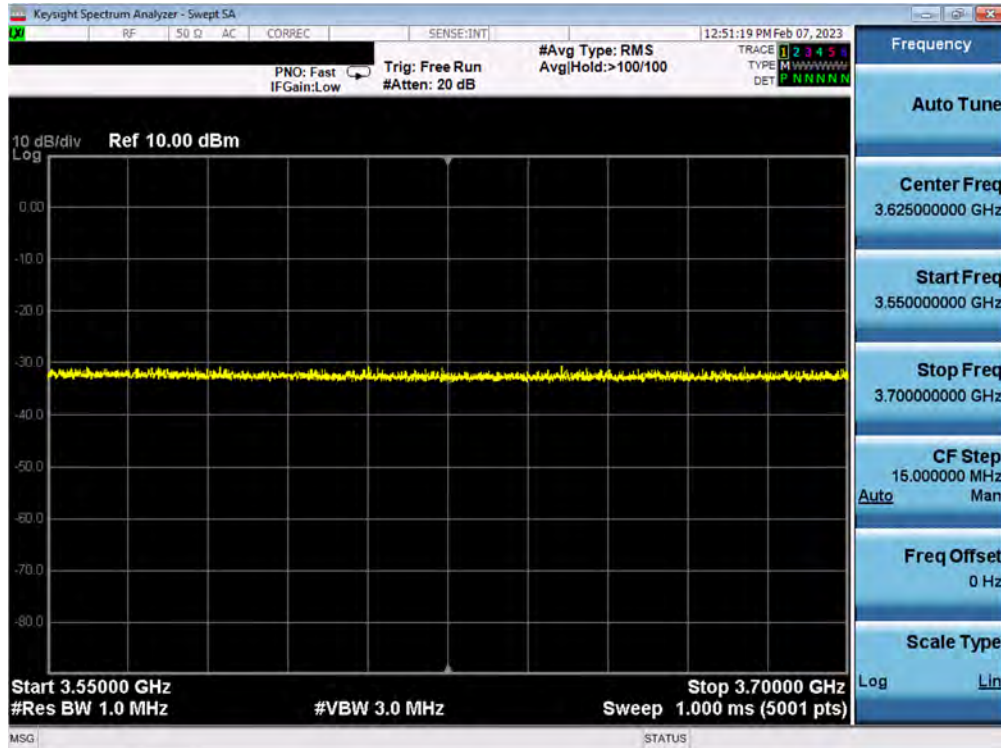
|   | Test Execution Steps                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | PASS                                | FAIL                     |
|---|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|--------------------------|
| 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"/> | <input type="checkbox"/> |
| 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,</li> <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> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 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 responseCode = 0 and cbsdId.</li> </ul>                                                                                                                                                                 | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 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"/> | <input type="checkbox"/> |

|                                            |                                       |                        |                                   |
|--------------------------------------------|---------------------------------------|------------------------|-----------------------------------|
| FCC ID: A3LSOG2201                         | MEASUREMENT REPORT<br>(CERTIFICATION) |                        | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1M2302100007-01-R1.A3L | Test Dates:<br>2/7/2023 – 2/9/2023    | EUT Type:<br>Smallcell | Page 45 of 67                     |





## Test Plots:



Plot 23. Conducted Measurement – No RF transmission in entire band at anytime (WINNF.FT.C.SCS.1) – NR

| No. | Time                       | Source         | Destination    | Protocol | Length | Info                                                                                                                                           |
|-----|----------------------------|----------------|----------------|----------|--------|------------------------------------------------------------------------------------------------------------------------------------------------|
| 82  | 2023-02-07 17:46:10.109518 | 172.100.154.18 | 172.100.154.18 | TCP      | 74     | 1733 → 443 [SYN] Seq=0 Win=0 Len=0 MSS=1460 SACK_PERM=1 TSval=3776196798 TSecr=0 WS=256                                                        |
| 83  | 2023-02-07 17:46:10.109576 | 173.59.230.213 | 172.100.154.18 | TCP      | 60     | 443 → 1733 [SYN, ACK] Seq=0 Ack=1 Win=0 Len=0 MSS=1460 WS=256 SACK_PERM=1                                                                      |
| 84  | 2023-02-07 17:46:10.152725 | 172.100.154.18 | 173.59.230.213 | TCP      | 60     | 1733 → 443 [ACK] Seq=1 Ack=1 Win=29440 Len=0                                                                                                   |
| 85  | 2023-02-07 17:46:10.152844 | 172.100.154.18 | 173.59.230.213 | TLSv1.2  | 294    | Client Hello                                                                                                                                   |
| 86  | 2023-02-07 17:46:10.153076 | 173.59.230.213 | 172.100.154.18 | TLSv1.2  | 3181   | Server Hello, Certificate, Certificate Request, Server Hello Done                                                                              |
| 88  | 2023-02-07 17:46:10.201341 | 172.100.154.18 | 173.59.230.213 | TCP      | 60     | 1733 → 443 [ACK] Seq=241 Ack=3048 Win=35328 Len=0                                                                                              |
| 89  | 2023-02-07 17:46:10.201230 | 172.100.154.18 | 173.59.230.213 | TCP      | 1514   | 1733 → 443 [ACK] Seq=241 Ack=3048 Win=35328 Len=1460 [TCP segment of a reassembled PDU]                                                        |
| 90  | 2023-02-07 17:46:10.201231 | 172.100.154.18 | 173.59.230.213 | TCP      | 1514   | 1733 → 443 [ACK] Seq=1781 Ack=3048 Win=35328 Len=1460 [TCP segment of a reassembled PDU]                                                       |
| 91  | 2023-02-07 17:46:10.201232 | 172.100.154.18 | 173.59.230.213 | TLSv1.2  | 252    | Certificate, Client Key Exchange                                                                                                               |
| 92  | 2023-02-07 17:46:10.201321 | 173.59.230.213 | 172.100.154.18 | TCP      | 54     | 443 → 1733 [ACK] Seq=3048 Ack=3359 Win=262656 Len=0                                                                                            |
| 93  | 2023-02-07 17:46:10.206560 | 172.100.154.18 | 173.59.230.213 | TLSv1.2  | 323    | Certificate Verify                                                                                                                             |
| 94  | 2023-02-07 17:46:10.206561 | 172.100.154.18 | 173.59.230.213 | TLSv1.2  | 60     | Change Cipher Spec                                                                                                                             |
| 95  | 2023-02-07 17:46:10.206562 | 172.100.154.18 | 173.59.230.213 | TLSv1.2  | 99     | Encrypted Handshake Message                                                                                                                    |
| 96  | 2023-02-07 17:46:10.206624 | 173.59.230.213 | 172.100.154.18 | TCP      | 54     | 443 → 1733 [ACK] Seq=3048 Ack=3679 Win=262400 Len=0                                                                                            |
| 98  | 2023-02-07 17:46:10.220471 | 173.59.230.213 | 172.100.154.18 | TLSv1.2  | 185    | Change Cipher Spec, Encrypted Handshake Message                                                                                                |
| 99  | 2023-02-07 17:46:10.278911 | 172.100.154.18 | 173.59.230.213 | TCP      | 1514   | 1733 → 443 [ACK] Seq=3679 Ack=3099 Win=35328 Len=1460 [TCP segment of a reassembled PDU]                                                       |
| 99  | 2023-02-07 17:46:10.278911 | 172.100.154.18 | 173.59.230.213 | TLSv1.2  | 1874   | Application Data                                                                                                                               |
| 100 | 2023-02-07 17:46:10.278965 | 173.59.230.213 | 172.100.154.18 | TCP      | 54     | 443 → 1733 [ACK] Seq=3099 Ack=6159 Win=262656 Len=0                                                                                            |
| 101 | 2023-02-07 17:46:10.290655 | 173.59.230.213 | 172.100.154.18 | TLSv1.2  | 100    | Application Data                                                                                                                               |
| 102 | 2023-02-07 17:46:10.307995 | 172.100.154.18 | 173.59.230.213 | TCP      | 60     | 1733 → 443 [ACK] Seq=6159 Ack=3145 Win=35328 Len=0                                                                                             |
| 103 | 2023-02-07 17:46:10.308056 | 173.59.230.213 | 172.100.154.18 | TLSv1.2  | 548    | Application Data, Application Data, Application Data, Application Data, Application Data, Application Data, Application Data, Application Data |
| 104 | 2023-02-07 17:46:10.437569 | 172.100.154.18 | 173.59.230.213 | TCP      | 60     | 1733 → 443 [ACK] Seq=6159 Ack=3639 Win=38400 Len=0                                                                                             |

Plot 24. WireShark Screenshot – Successful Handshake (WINNF.FT.C.SCS.1) – NR

|                                            |                                       |                        |                                   |
|--------------------------------------------|---------------------------------------|------------------------|-----------------------------------|
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| Test Report S/N:<br>1M2302100007-01-R1.A3L | Test Dates:<br>2/7/2023 – 2/9/2023    | EUT Type:<br>Smallcell | Page 46 of 67                     |

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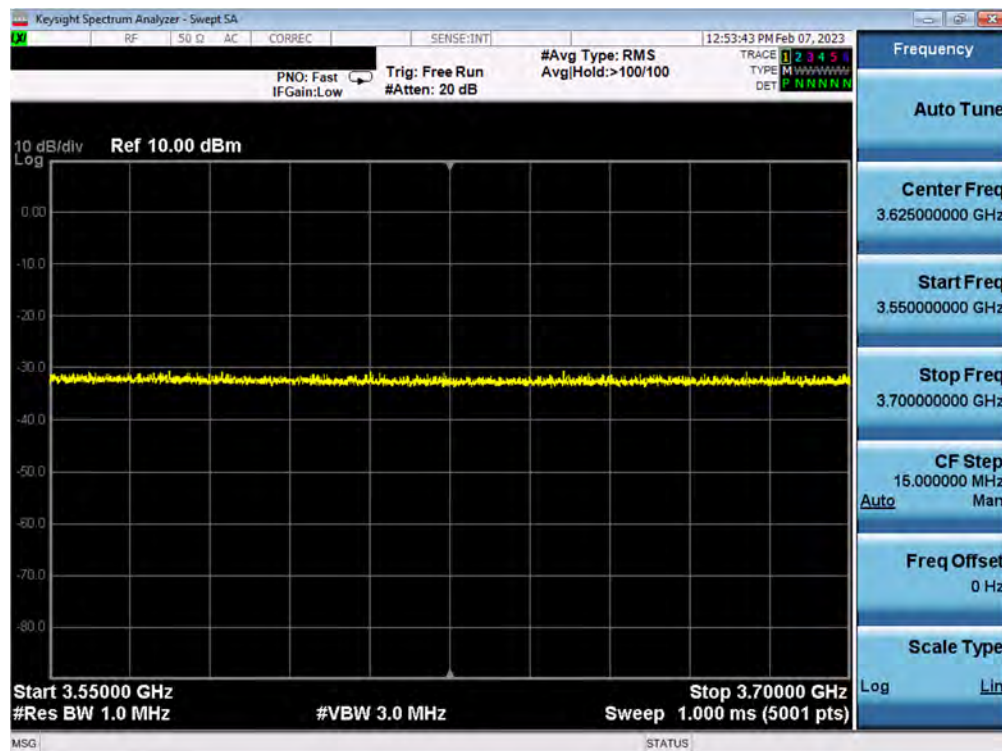
V1.0

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## A22 [WINNF.FT.C.SCS.2] TLS failure due to revoked certificate

|   | Test Execution Steps                                                                                                                                                                                                                                                                                | PASS                                | FAIL                     |
|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|--------------------------|
| 1 | • UUT shall start CBSD-SAS communication with the security procedure                                                                                                                                                                                                                                | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 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 | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 3 | UUT may retry for the security procedure which shall fail                                                                                                                                                                                                                                           | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 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                                                                                                                                  | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

### Test Plots:



Plot 25. Conducted Measurement – No RF transmission in entire band at anytime (WINNF.FT.C.SCS.2) – NR

|                                            |                                       |                        |                                   |
|--------------------------------------------|---------------------------------------|------------------------|-----------------------------------|
| FCC ID: A3LSOG2201                         | MEASUREMENT REPORT<br>(CERTIFICATION) |                        | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1M2302100007-01-R1.A3L | Test Dates:<br>2/7/2023 – 2/9/2023    | EUT Type:<br>Smallcell | Page 47 of 67                     |



| No. | Time                       | Source         | Destination    | Protocol | Length | Info                                                                                         |
|-----|----------------------------|----------------|----------------|----------|--------|----------------------------------------------------------------------------------------------|
| 19  | 2023-02-07 17:48:51.618401 | 172.100.154.18 | 173.59.230.213 | TCP      | 74     | 38204 → 443 [SYN] Seq=0 win=29200 Len=0 MSS=1460 SACK_PERM=1 TSval=3776352285 TSecr=0 ws=256 |
| 20  | 2023-02-07 17:48:51.618455 | 172.100.154.18 | 172.100.154.18 | TCP      | 54     | 443 → 10254 [ACK] Seq=0 Ack=0 Len=0                                                          |
| 200 | 2023-02-07 17:49:22.367817 | 172.100.154.18 | 173.59.230.213 | TCP      | 74     | 7830 → 443 [SYN] Seq=0 win=29200 Len=0 MSS=1460 SACK_PERM=1 TSval=3776353043 TSecr=0 ws=256  |
| 207 | 2023-02-07 17:49:22.367855 | 173.59.230.213 | 172.100.154.18 | TCP      | 66     | 443 → 7830 [SYN, ACK] Seq=0 Ack=1 win=65535 Len=0 MSS=1460 ws=256 SACK_PERM=1                |
| 208 | 2023-02-07 17:49:22.417688 | 172.100.154.18 | 173.59.230.213 | TCP      | 60     | 7830 → 443 [ACK] Seq=1 Ack=1 win=29440 Len=0                                                 |
| 209 | 2023-02-07 17:49:22.418720 | 172.100.154.18 | 173.59.230.213 | TLSv1.2  | 294    | Client Hello                                                                                 |
| 210 | 2023-02-07 17:49:22.419060 | 173.59.230.213 | 172.100.154.18 | TLSv1.2  | 3229   | Server Hello, Certificate, Certificate Request, Server Hello Done                            |
| 211 | 2023-02-07 17:49:22.467163 | 172.100.154.18 | 173.59.230.213 | TCP      | 60     | 7830 → 443 [ACK] Seq=241 Ack=1461 win=32256 Len=0                                            |
| 212 | 2023-02-07 17:49:22.467301 | 172.100.154.18 | 173.59.230.213 | TCP      | 60     | 7830 → 443 [ACK] Seq=241 Ack=1461 win=32256 Len=0                                            |
| 213 | 2023-02-07 17:49:22.545413 | 172.100.154.18 | 173.59.230.213 | TCP      | 74     | 25026 → 80 [SYN] Seq=0 win=29200 Len=0 MSS=1460 SACK_PERM=1 TSval=3776383221 TSecr=0 ws=256  |
| 214 | 2023-02-07 17:49:22.545543 | 173.59.230.213 | 172.100.154.18 | TCP      | 60     | 80 → 25026 [SYN, ACK] Seq=0 Ack=1 win=65535 Len=0 MSS=1460 ws=256 SACK_PERM=1                |
| 215 | 2023-02-07 17:49:22.596183 | 172.100.154.18 | 173.59.230.213 | TCP      | 60     | 25026 → 80 [ACK] Seq=1 Ack=1 win=29440 Len=0                                                 |
| 216 | 2023-02-07 17:49:22.599125 | 172.100.154.18 | 173.59.230.213 | HTTP     | 222    | GET /criserver.cri HTTP/1.1                                                                  |
| 217 | 2023-02-07 17:49:22.607549 | 173.59.230.213 | 172.100.154.18 | PKIX-CRL | 1583   | Certificate Revocation List                                                                  |
| 218 | 2023-02-07 17:49:22.653812 | 172.100.154.18 | 173.59.230.213 | TCP      | 60     | 25026 → 80 [ACK] Seq=169 Ack=1530 win=32512 Len=0                                            |
| 219 | 2023-02-07 17:49:22.669063 | 172.100.154.18 | 173.59.230.213 | TLSv1.2  | 61     | Alert (Level: Fatal, Description: Certificate Unknown)                                       |
| 220 | 2023-02-07 17:49:22.669064 | 172.100.154.18 | 173.59.230.213 | TCP      | 60     | 7830 → 443 [FIN, ACK] Seq=248 Ack=3176 win=35584 Len=0                                       |
| 221 | 2023-02-07 17:49:22.669162 | 173.59.230.213 | 172.100.154.18 | TCP      | 54     | 443 → 7830 [ACK] Seq=3176 Ack=249 win=262400 Len=0                                           |
| 222 | 2023-02-07 17:49:22.669478 | 172.100.154.18 | 173.59.230.213 | TCP      | 36     | 443 → 7830 [FIN, ACK] Seq=3276 Ack=249 win=262400 Len=0                                      |
| 223 | 2023-02-07 17:49:22.712559 | 172.100.154.18 | 173.59.230.213 | TCP      | 60     | 7830 → 443 [ACK] Seq=249 Ack=3177 win=35584 Len=0                                            |

Plot 26.WireShark Screenshot - Failed Handshake (WINNF.FT.C.SCS.2) – NR

|                                            |                                       |                        |                                   |
|--------------------------------------------|---------------------------------------|------------------------|-----------------------------------|
| FCC ID: A3LSOG2201                         | MEASUREMENT REPORT<br>(CERTIFICATION) |                        | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1M2302100007-01-R1.A3L | Test Dates:<br>2/7/2023 – 2/9/2023    | EUT Type:<br>Smallcell | Page 48 of 67                     |

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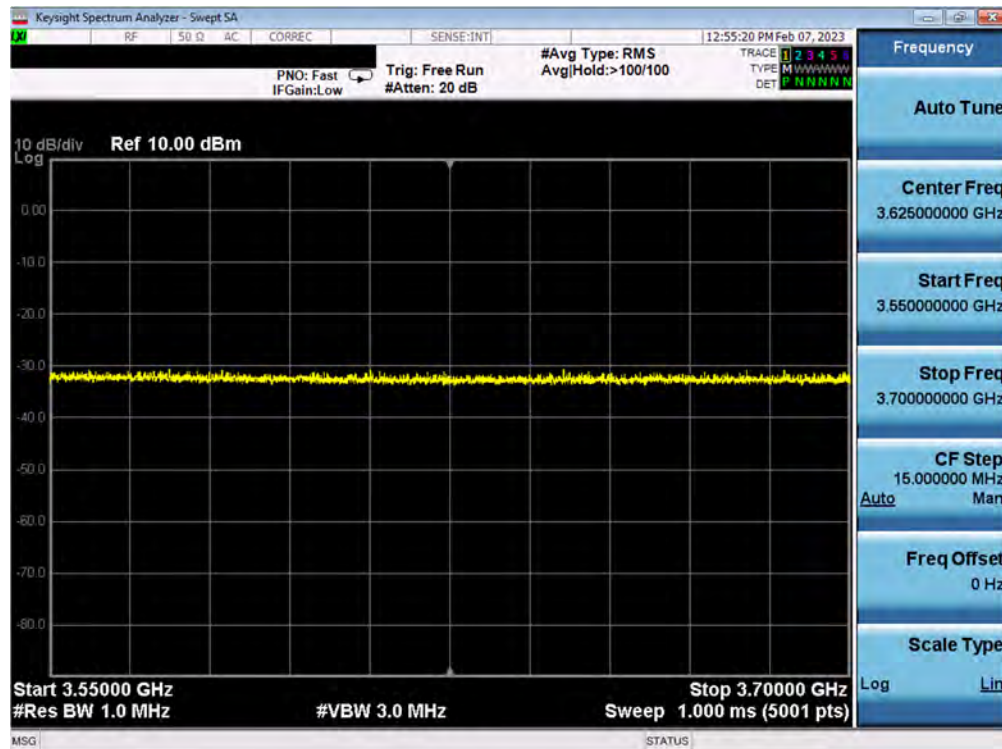
V1.0

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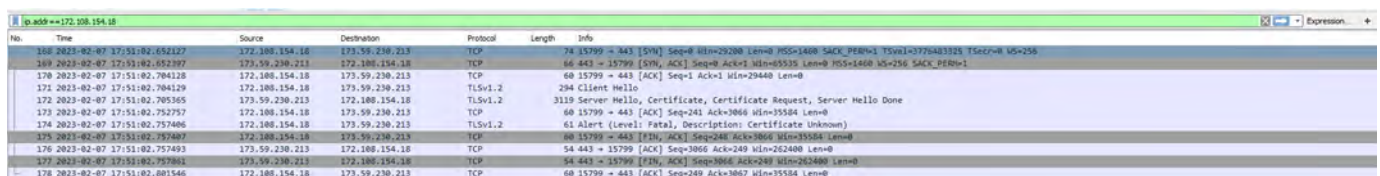
## A23 [WINNF.FT.C.SCS.3] TLS failure due to expired server certificate

|   | Test Execution Steps                                                                                                                                                                                                                                                                                                                                                     | PASS                                | FAIL                     |
|---|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|--------------------------|
| 1 | • UUT shall start CBSD-SAS communication with the security procedure                                                                                                                                                                                                                                                                                                     | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 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"/> | <input type="checkbox"/> |
| 3 | UUT may retry for the security procedure which shall fail                                                                                                                                                                                                                                                                                                                | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 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"/> | <input type="checkbox"/> |

### Test Plots:



Plot 27. Conducted Measurement – No RF transmission in entire band at anytime (WINNF.FT.C.SCS.3) – NR



Plot 28. WireShark Screenshot - Failed Handshake (WINNF.FT.C.SCS.3) – NR

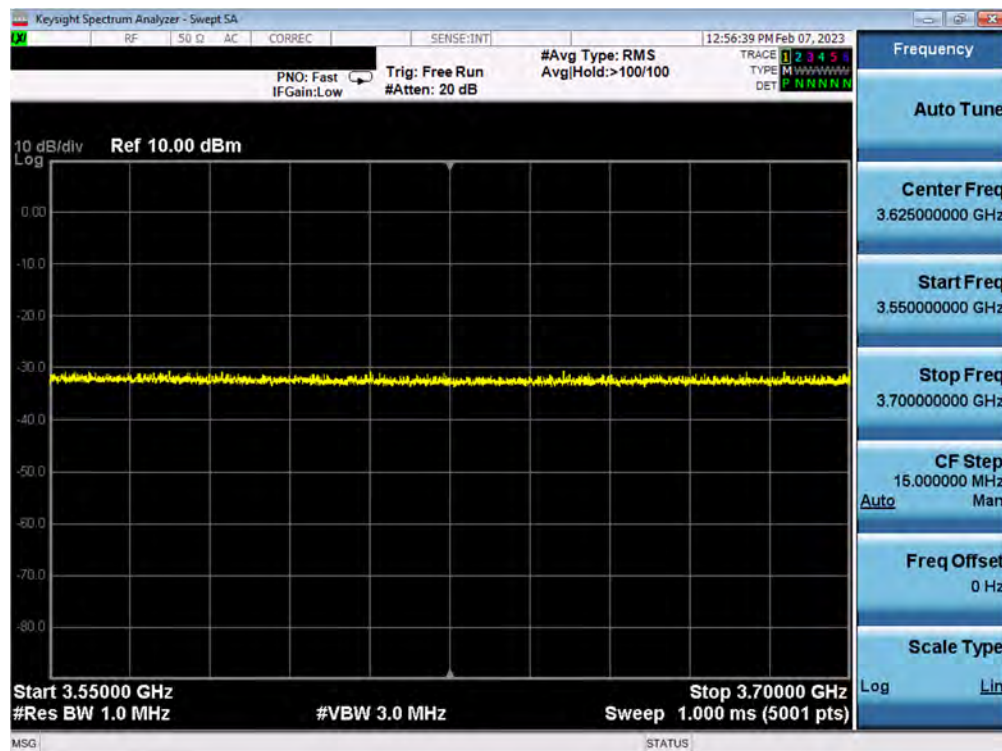
|                                            |                                       |                        |                                   |
|--------------------------------------------|---------------------------------------|------------------------|-----------------------------------|
| FCC ID: A3LSOG2201                         | MEASUREMENT REPORT<br>(CERTIFICATION) |                        | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1M2302100007-01-R1-A3L | Test Dates:<br>2/7/2023 – 2/9/2023    | EUT Type:<br>Smallcell | Page 49 of 67                     |



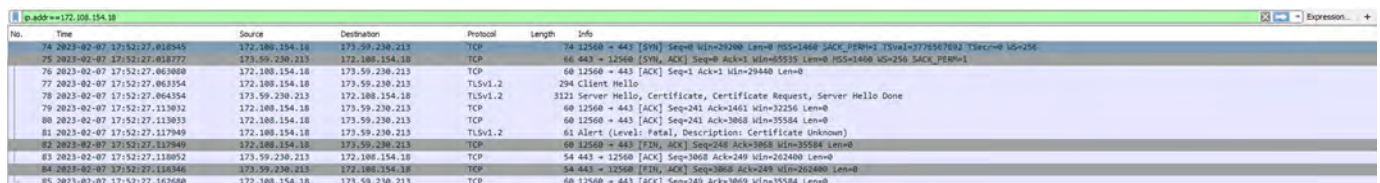
## A24 [WINNF.FT.C.SCS.4] TLS failure when SAS Test Harness certificate is issued by an unknown CA

|   | Test Execution Steps                                                                                                                                                                                                                                                                                                                                                     | PASS                                | FAIL                     |
|---|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|--------------------------|
| 1 | • UUT shall start CBSD-SAS communication with the security procedure                                                                                                                                                                                                                                                                                                     | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 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"/> | <input type="checkbox"/> |
| 3 | UUT may retry for the security procedure which shall fail                                                                                                                                                                                                                                                                                                                | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 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"/> | <input type="checkbox"/> |

### Test Plots:



Plot 29. Conducted Measurement – No RF transmission in entire band at anytime (WINNF.FT.C.SCS.4) – NR



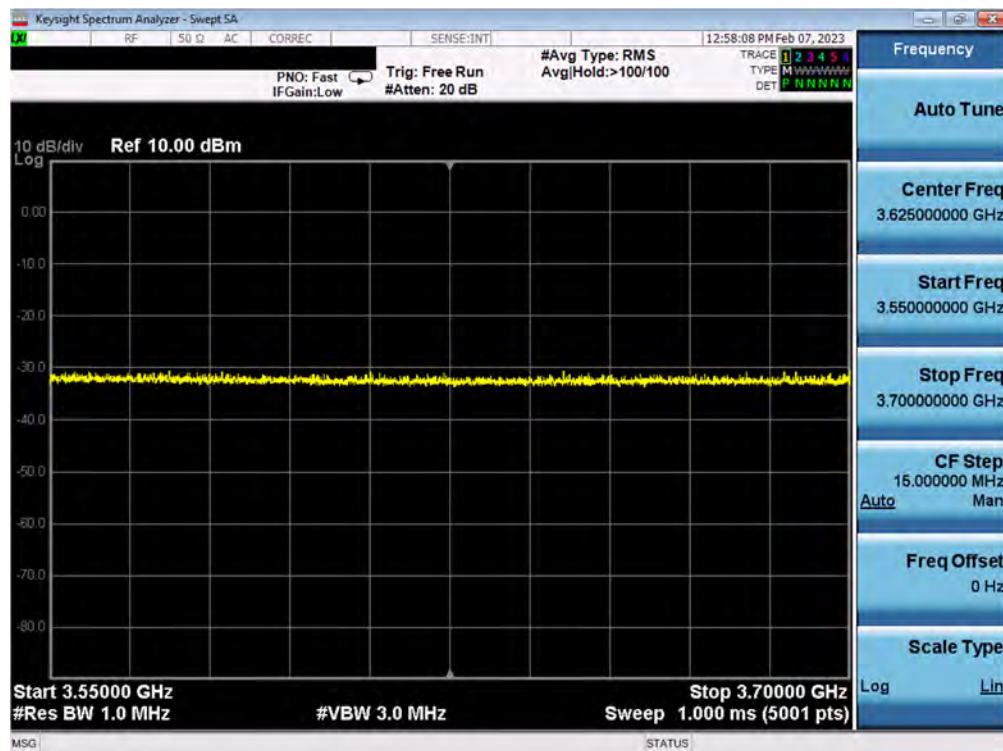
Plot 30. WireShark Screenshot – Failed Handshake (WINNF.FT.C.SCS.4) – NR

|                                            |                                       |                        |                                   |
|--------------------------------------------|---------------------------------------|------------------------|-----------------------------------|
| FCC ID: A3LSOG2201                         | MEASUREMENT REPORT<br>(CERTIFICATION) |                        | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1M2302100007-01-R1-A3L | Test Dates:<br>2/7/2023 – 2/9/2023    | EUT Type:<br>Smallcell | Page 50 of 67                     |

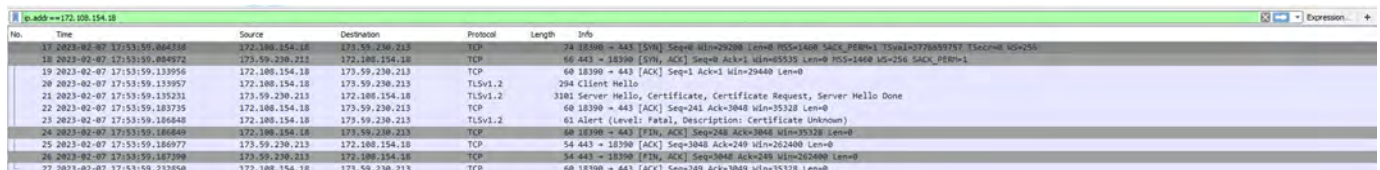
## A25 [WINNF.FT.C.SCS.5] TLS failure when certificate at the SAS Test Harness is corrupted

|   | Test Execution Steps                                                                                                                                                                                                                                                                                                                                                     | PASS                                | FAIL                     |
|---|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|--------------------------|
| 1 | • UUT shall start CBSD-SAS communication with the security procedure                                                                                                                                                                                                                                                                                                     | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 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"/> | <input type="checkbox"/> |
| 3 | UUT may retry for the security procedure which shall fail                                                                                                                                                                                                                                                                                                                | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 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"/> | <input type="checkbox"/> |

### Test Plots:



Plot 31. Conducted Measurement – No RF transmission in entire band at anytime (WINNF.FT.C.SCS.5) – NR



Plot 32. WireShark Screenshot - Failed Handshake (WINNF.FT.C.SCS.5) – NR

|                                            |                                       |                        |                                   |
|--------------------------------------------|---------------------------------------|------------------------|-----------------------------------|
| FCC ID: A3LSOG2201                         | MEASUREMENT REPORT<br>(CERTIFICATION) |                        | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1M2302100007-01-R1-A3L | Test Dates:<br>2/7/2023 – 2/9/2023    | EUT Type:<br>Smallcell | Page 51 of 67                     |

## A26 [WINNF.PT.C.HBT.1] UUT RF Transmit Power Measurement

|   | Test Execution Steps                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | PASS                                | FAIL                     |
|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|--------------------------|
| 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 CBSID = 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>o cbsid = C</li> <li>o grantId = G</li> </ul> </li> <li>• SAS Test Harness responds with Heartbeat Response, including: <ul style="list-style-type: none"> <li>o cbsid = C</li> <li>o grantId = G</li> <li>o transmitExpireTime = current UTC time + 200 seconds</li> <li>o 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 fulfil 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"/> | <input type="checkbox"/> |

|                                            |                                       |                        |                                   |
|--------------------------------------------|---------------------------------------|------------------------|-----------------------------------|
| FCC ID: A3LSOG2201                         | MEASUREMENT REPORT<br>(CERTIFICATION) |                        | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1M2302100007-01-R1.A3L | Test Dates:<br>2/7/2023 – 2/9/2023    | EUT Type:<br>Smallcell | Page 52 of 67                     |



## RF Power Measurements:

Testing is performed per KDB 971168 D01 and across the transmit dynamic range of 29dBm/MHz to 17dBm/MHz for 20MHz Bandwidth. Per the manufacturer, when all 8 antennas are operating, the maximum antenna gain is 8dBi. 8dbi is used for maximum directional gain per KDB 662911 because the device operates in 4 sectors, each with a pair of cross-polarized antennas. The PSD of each transmitter was measured and summed in linear terms and then the directional antenna gain was added to yield the max EIRP.

| Granted EIRP<br>[dBm/MHz] | Tx1 Conducted<br>PSD<br>[dBm/MHz] | Tx2 Conducted<br>PSD<br>[dBm/MHz] | Tx3 Conducted<br>PSD<br>[dBm/MHz] | Tx4 Conducted<br>PSD<br>[dBm/MHz] | Tx5 Conducted<br>PSD<br>[dBm/MHz] | Tx6 Conducted<br>PSD<br>[dBm/MHz] | Tx7 Conducted<br>PSD<br>[dBm/MHz] | Tx8 Conducted<br>PSD<br>[dBm/MHz] | Summed PSD<br>[dBm/MHz] | Max Directional<br>Ant Gain [dBi] | EIRP<br>[dBm/MHz] | Margin<br>[dB] |
|---------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-------------------------|-----------------------------------|-------------------|----------------|
| 29.00                     | 11.40                             | 11.32                             | 11.98                             | 11.14                             | 11.79                             | 11.26                             | 11.51                             | 11.72                             | 20.55                   | 8.00                              | 28.55             | -0.45          |
| 23.00                     | 5.73                              | 5.39                              | 5.63                              | 5.14                              | 5.40                              | 5.48                              | 5.63                              | 5.38                              | 14.51                   | 8.00                              | 22.51             | -0.49          |
| 17.00                     | -0.52                             | -0.64                             | -0.70                             | -0.49                             | -0.49                             | -0.32                             | -0.58                             | -0.58                             | 8.49                    | 8.00                              | 16.49             | -0.51          |

**Table 7-1 RF Output Power Measurements (WINNF.PT.C.HBT.1 – NR)**

Example Summed PSD calculation:

$$Tx1 + Tx2 + Tx3 + Tx4 + Tx5 + Tx6 + Tx7 + Tx8 = \text{Total Conducted PSD}$$

$$11.40 \text{ dBm} + 11.32 \text{ dBm} + 11.98 \text{ dBm} + 11.14 \text{ dBm} + 11.79 \text{ dBm} + 11.26 \text{ dBm} + 11.51 \text{ dBm} + 11.72 \text{ dBm} =$$

$$13.804 \text{ mW} + 13.552 \text{ mW} + 15.776 \text{ mW} + 13.002 \text{ mW} + 15.101 \text{ mW} + 13.336 \text{ mW} + 14.158 \text{ mW} + 14.859 \text{ mW} =$$

$$113.618 \text{ mW} = 20.55 \text{ dBm}$$

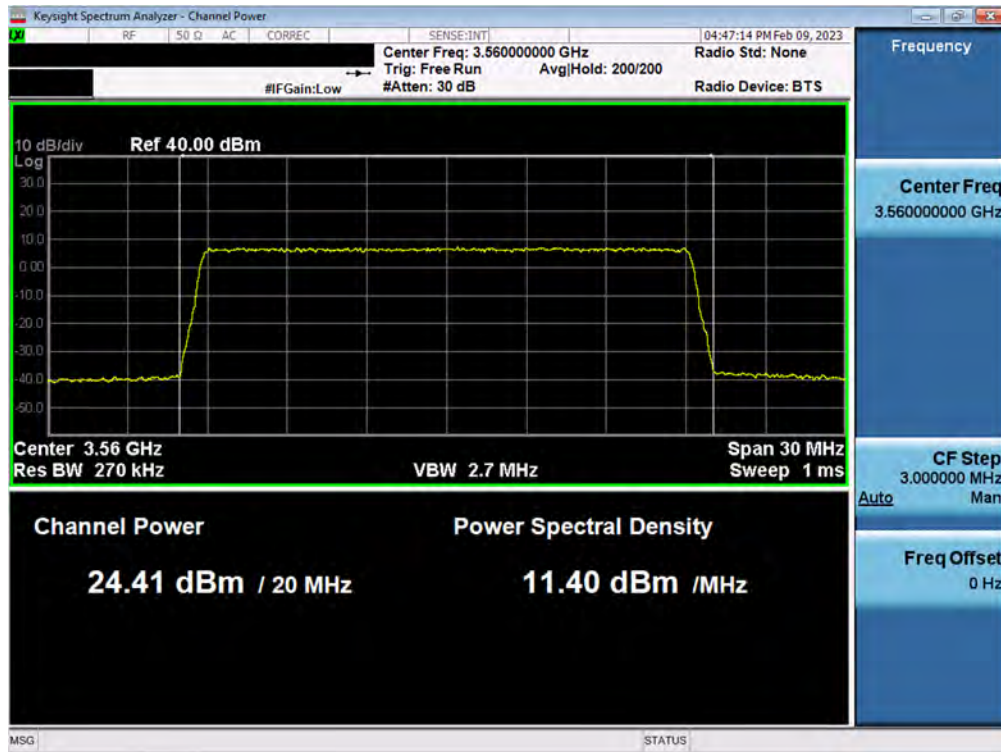
Example EIRP calculation

$$\text{Total Conducted PSD} + \text{Directional Antenna Gain} = \text{EIRP/MHz}$$

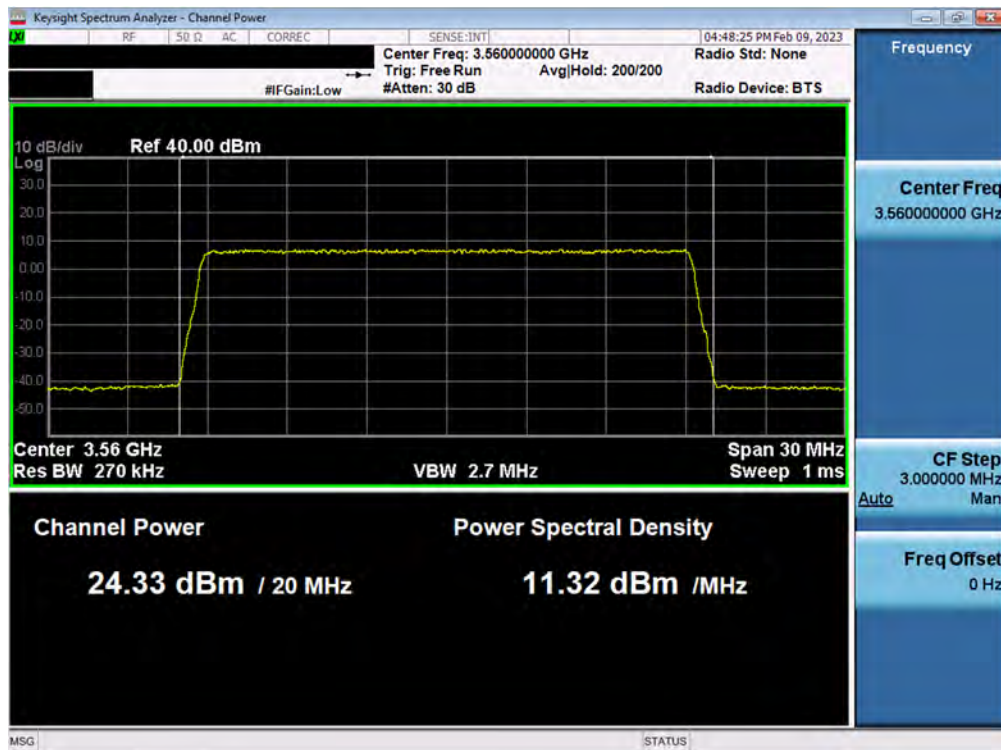
$$20.55 \text{ dBm/MHz} + 8.00 \text{ dBi} = 28.55 \text{ dBm/MHz}$$

|                                                   |                                               |                               |                                          |
|---------------------------------------------------|-----------------------------------------------|-------------------------------|------------------------------------------|
| <b>FCC ID:</b> A3LSOG2201                         | <b>MEASUREMENT REPORT<br/>(CERTIFICATION)</b> |                               | <b>Approved by:</b><br>Technical Manager |
| <b>Test Report S/N:</b><br>1M2302100007-01-R1.A3L | <b>Test Dates:</b><br>2/7/2023 – 2/9/2023     | <b>EUT Type:</b><br>Smallcell | Page 53 of 67                            |

## Test Plots:

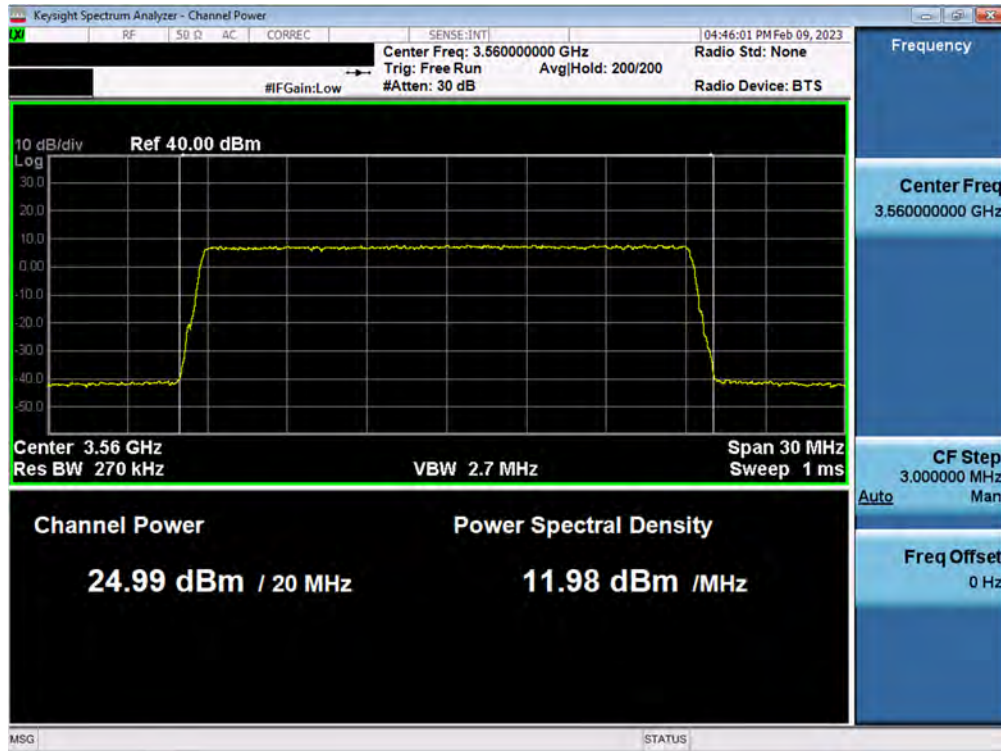


Plot 33. Conducted PSD, 3.56GHz, 20MHz BW – ANT1, SAS Granted maxEIRP 29dBm/MHz (NR)

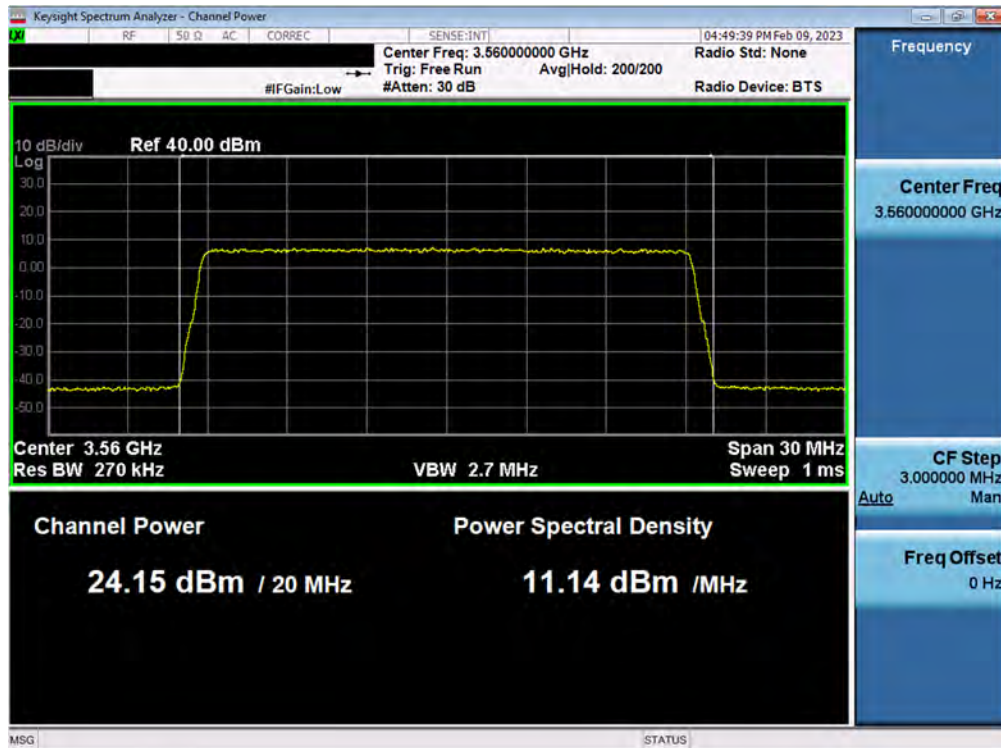


Plot 34. Conducted PSD, 3.56GHz, 20MHz BW – ANT2, SAS Granted maxEIRP 29dBm/MHz (NR)

|                                            |                                       |                        |                                   |
|--------------------------------------------|---------------------------------------|------------------------|-----------------------------------|
| FCC ID: A3LSOG2201                         | MEASUREMENT REPORT<br>(CERTIFICATION) |                        | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1M2302100007-01-R1.A3L | Test Dates:<br>2/7/2023 – 2/9/2023    | EUT Type:<br>Smallcell | Page 54 of 67                     |

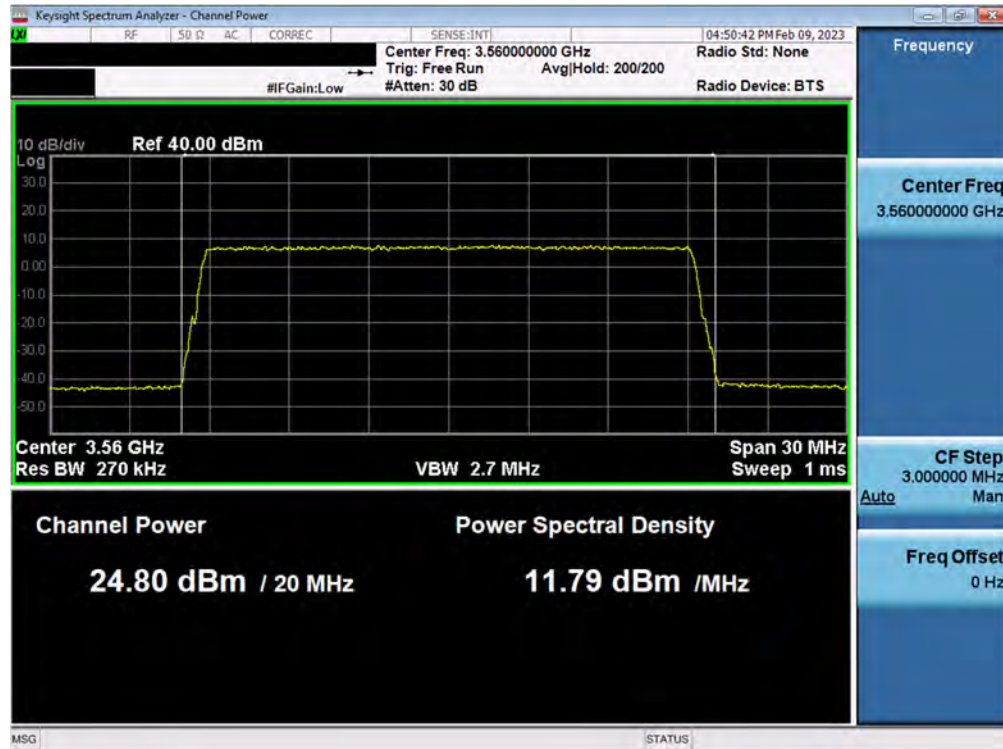


Plot 35. Conducted PSD, 3.56GHz, 20MHz BW – ANT3, SAS Granted maxEIRP 29dBm/MHz (NR)

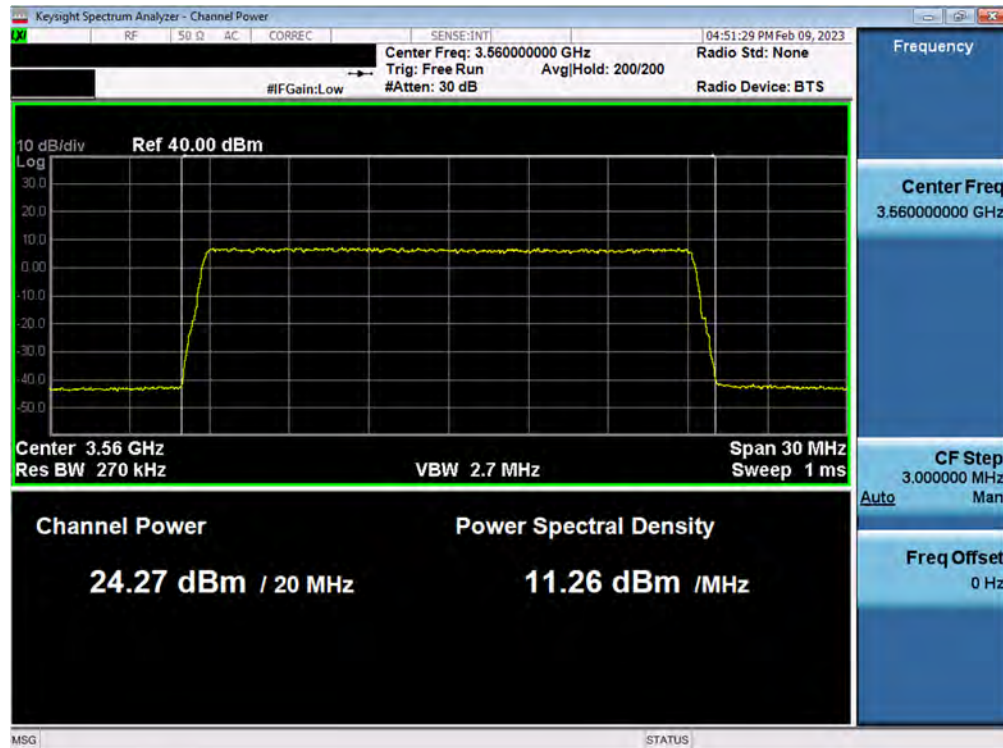


Plot 36. Conducted PSD, 3.56GHz, 20MHz BW – ANT4, SAS Granted maxEIRP 29dBm/MHz (NR)

|                                            |                                       |                        |                                   |
|--------------------------------------------|---------------------------------------|------------------------|-----------------------------------|
| FCC ID: A3LSOG2201                         | MEASUREMENT REPORT<br>(CERTIFICATION) |                        | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1M2302100007-01-R1.A3L | Test Dates:<br>2/7/2023 – 2/9/2023    | EUT Type:<br>Smallcell | Page 55 of 67                     |



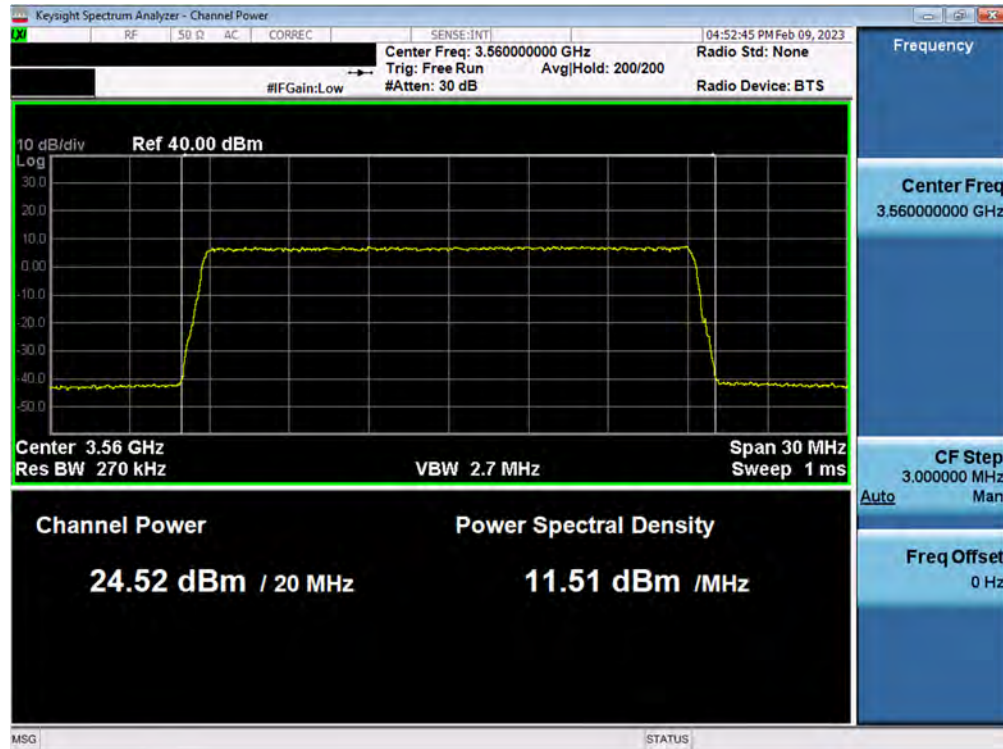
Plot 37. Conducted PSD, 3.56GHz, 20MHz BW – ANT5, SAS Granted maxEIRP 29dBm/MHz (NR)



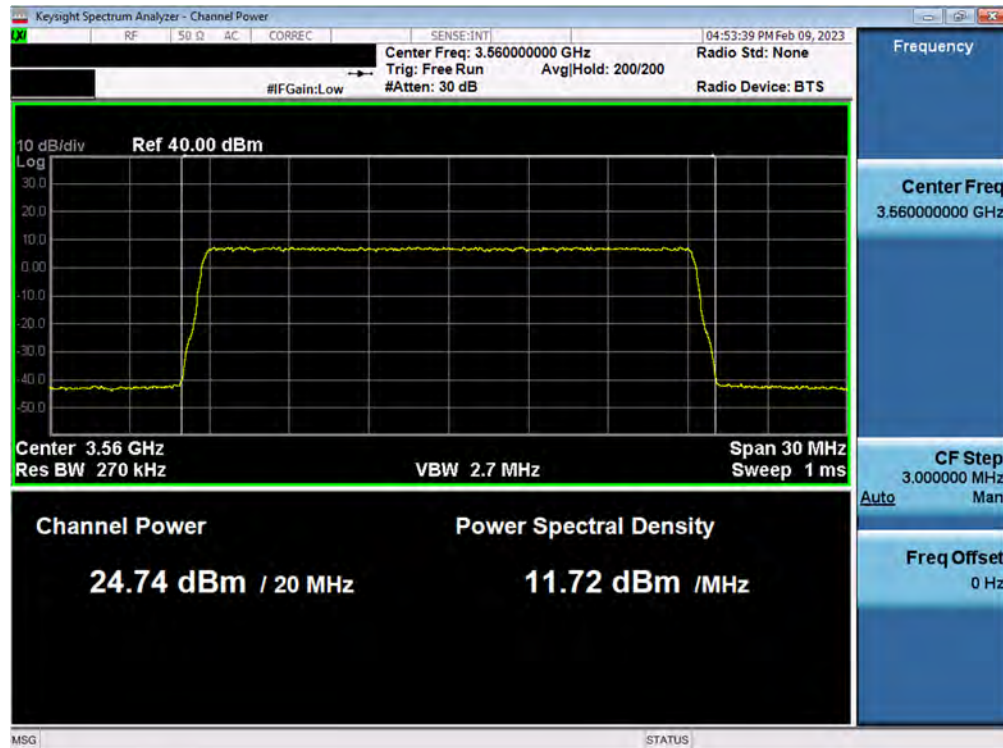
Plot 38. Conducted PSD, 3.56GHz, 20MHz BW – ANT6, SAS Granted maxEIRP 29dBm/MHz (NR)

|                                            |                                       |                        |                                   |
|--------------------------------------------|---------------------------------------|------------------------|-----------------------------------|
| FCC ID: A3LSOG2201                         | MEASUREMENT REPORT<br>(CERTIFICATION) |                        | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1M2302100007-01-R1.A3L | Test Dates:<br>2/7/2023 – 2/9/2023    | EUT Type:<br>Smallcell | Page 56 of 67                     |



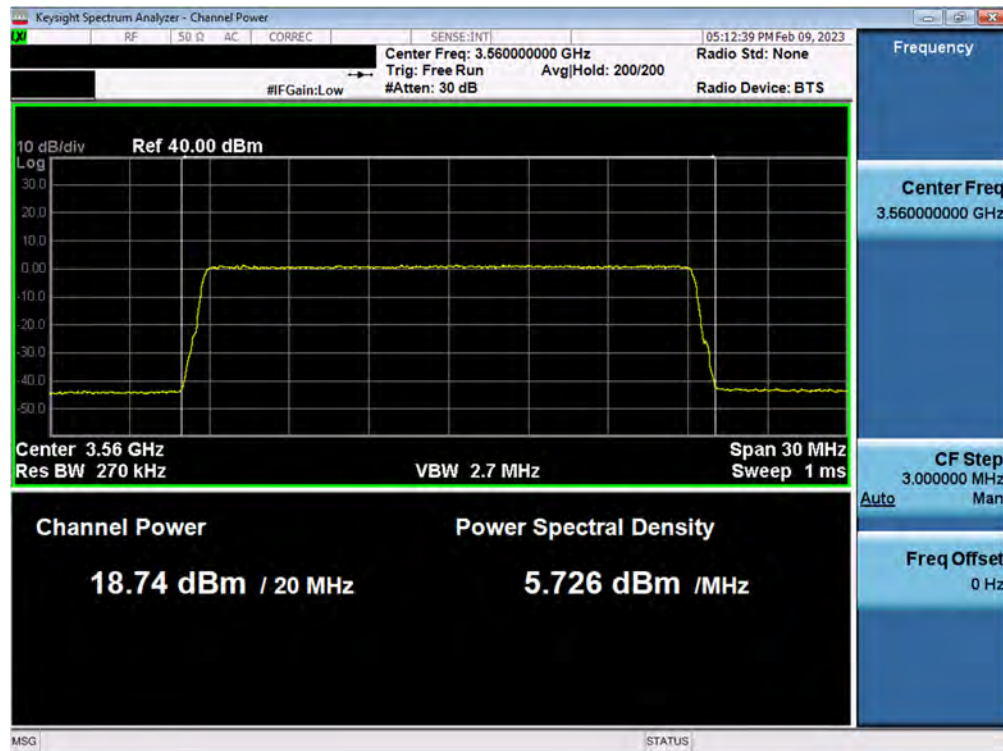


Plot 39. Conducted PSD, 3.56GHz, 20MHz BW – ANT7, SAS Granted maxEIRP 29dBm/MHz (NR)

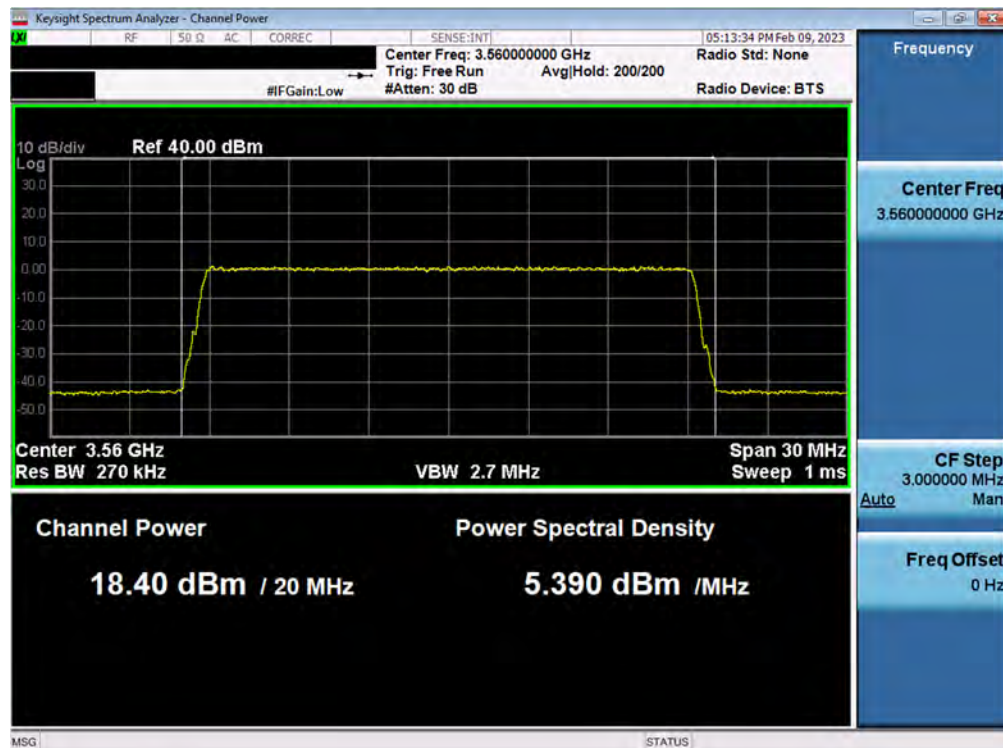


Plot 40. Conducted PSD, 3.56GHz, 20MHz BW – ANT8, SAS Granted maxEIRP 29dBm/MHz (NR)

|                                            |                                       |                        |                                   |
|--------------------------------------------|---------------------------------------|------------------------|-----------------------------------|
| FCC ID: A3LSOG2201                         | MEASUREMENT REPORT<br>(CERTIFICATION) |                        | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1M2302100007-01-R1.A3L | Test Dates:<br>2/7/2023 – 2/9/2023    | EUT Type:<br>Smallcell | Page 57 of 67                     |



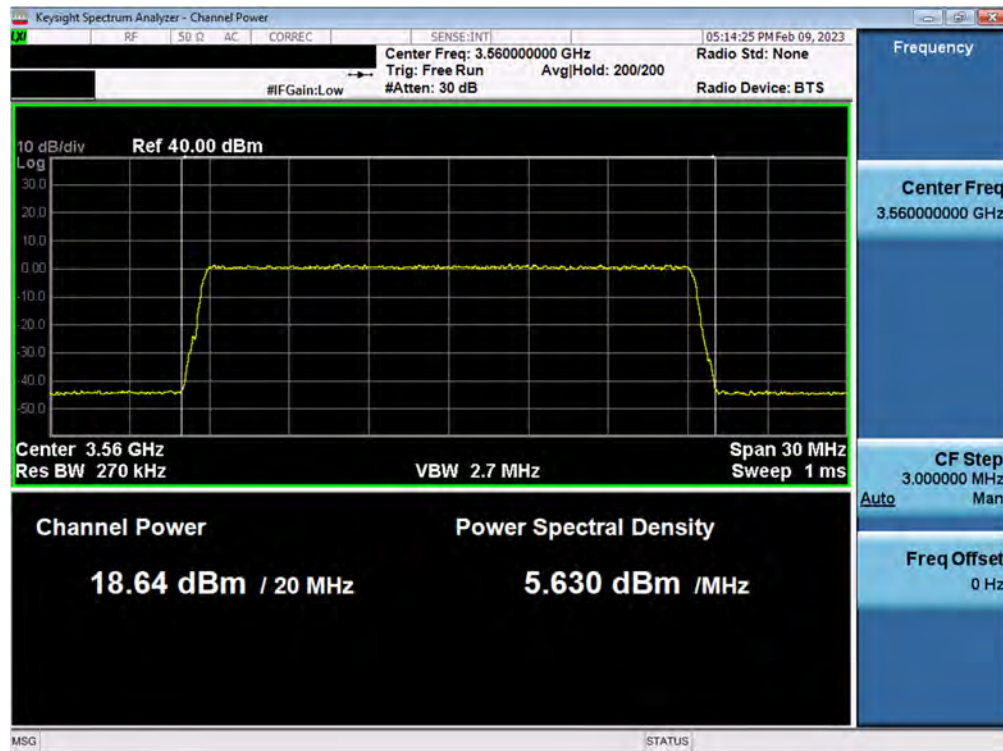
Plot 41. Conducted PSD, 3.56GHz, 20MHz BW – ANT1, SAS Granted maxEIRP 23dBm/MHz (NR)



Plot 42. Conducted PSD, 3.56GHz, 20MHz BW – ANT2, SAS Granted maxEIRP 23dBm /MHz (NR)

|                                            |                                       |                        |                                   |
|--------------------------------------------|---------------------------------------|------------------------|-----------------------------------|
| FCC ID: A3LSOG2201                         | MEASUREMENT REPORT<br>(CERTIFICATION) |                        | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1M2302100007-01-R1.A3L | Test Dates:<br>2/7/2023 – 2/9/2023    | EUT Type:<br>Smallcell | Page 58 of 67                     |



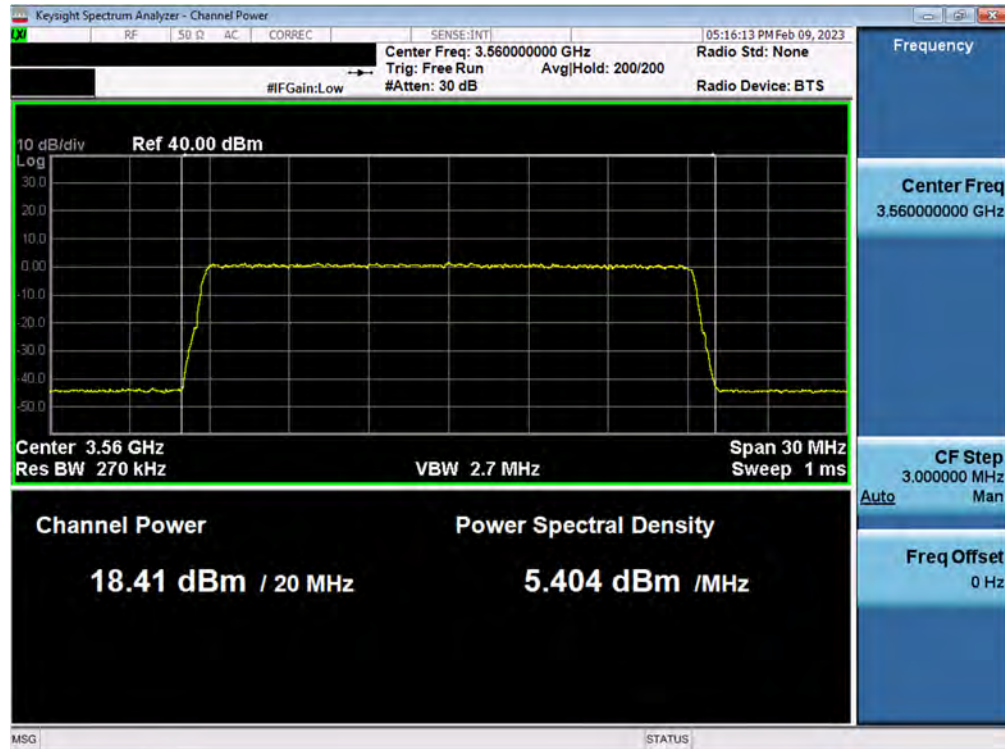


Plot 43. Conducted PSD, 3.56GHz, 20MHz BW – ANT3, SAS Granted maxEIRP 23dBm /MHz (NR)

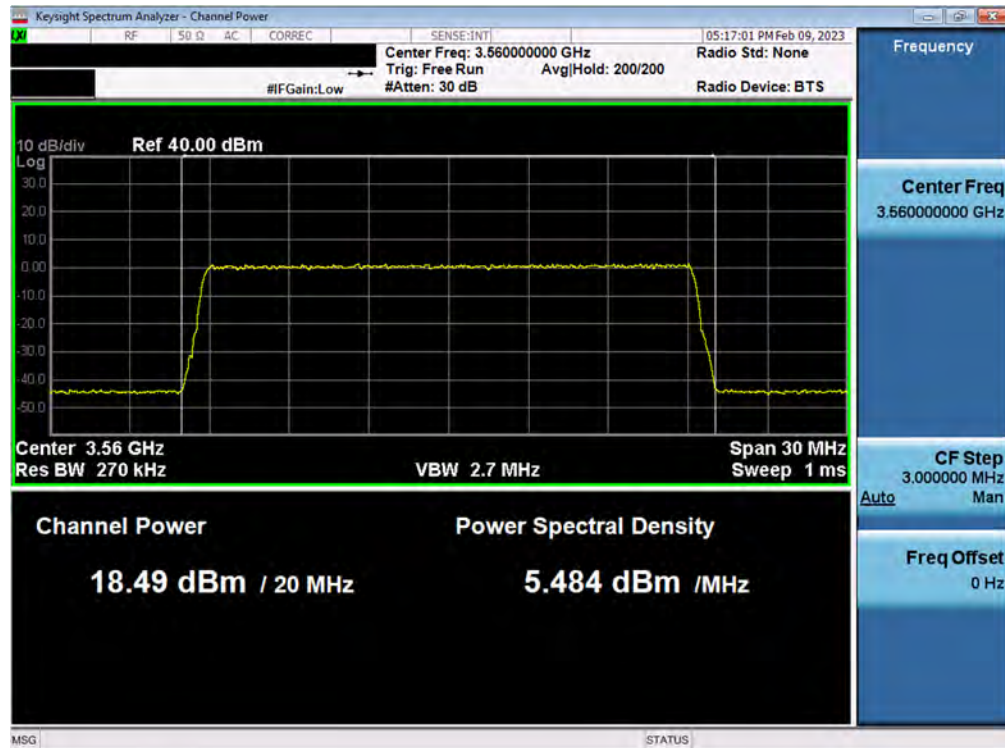


Plot 44. Conducted PSD, 3.56GHz, 20MHz BW – ANT4, SAS Granted maxEIRP 23dBm /MHz (NR)

|                                            |                                       |                        |                                   |
|--------------------------------------------|---------------------------------------|------------------------|-----------------------------------|
| FCC ID: A3LSOG2201                         | MEASUREMENT REPORT<br>(CERTIFICATION) |                        | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1M2302100007-01-R1.A3L | Test Dates:<br>2/7/2023 – 2/9/2023    | EUT Type:<br>Smallcell | Page 59 of 67                     |

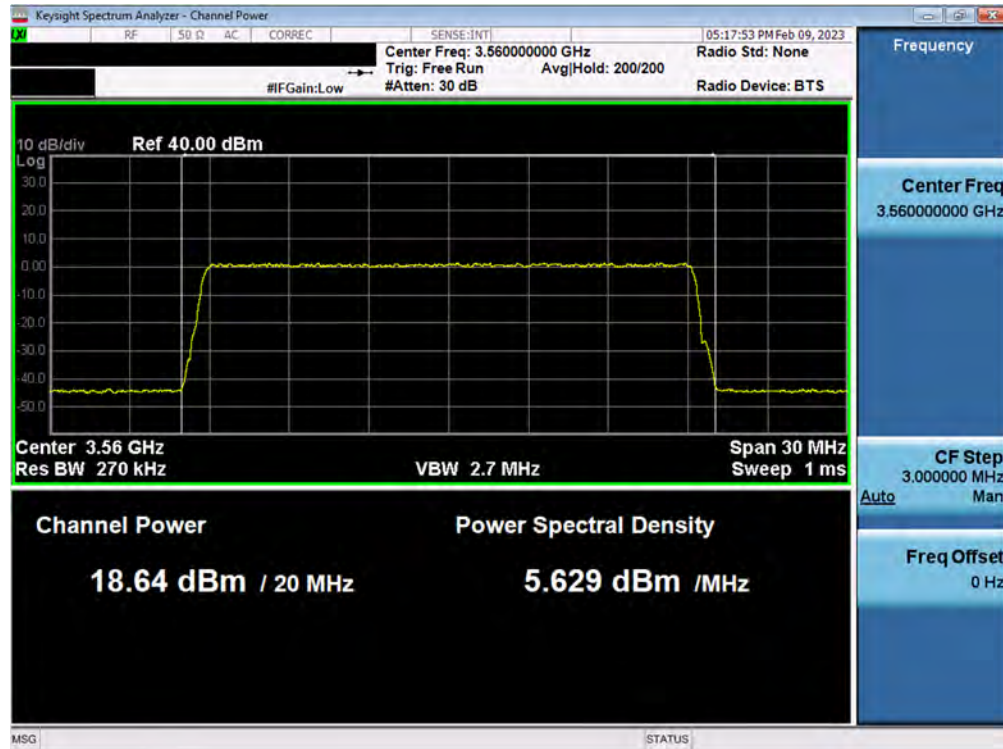


Plot 45. Conducted PSD, 3.56GHz, 20MHz BW – ANT5, SAS Granted maxEIRP 23dBm /MHz (NR)



Plot 46. Conducted PSD, 3.56GHz, 20MHz BW – ANT6, SAS Granted maxEIRP 23dBm /MHz (NR)

|                                            |                                       |                        |                                   |
|--------------------------------------------|---------------------------------------|------------------------|-----------------------------------|
| FCC ID: A3LSOG2201                         | MEASUREMENT REPORT<br>(CERTIFICATION) |                        | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1M2302100007-01-R1.A3L | Test Dates:<br>2/7/2023 – 2/9/2023    | EUT Type:<br>Smallcell | Page 60 of 67                     |



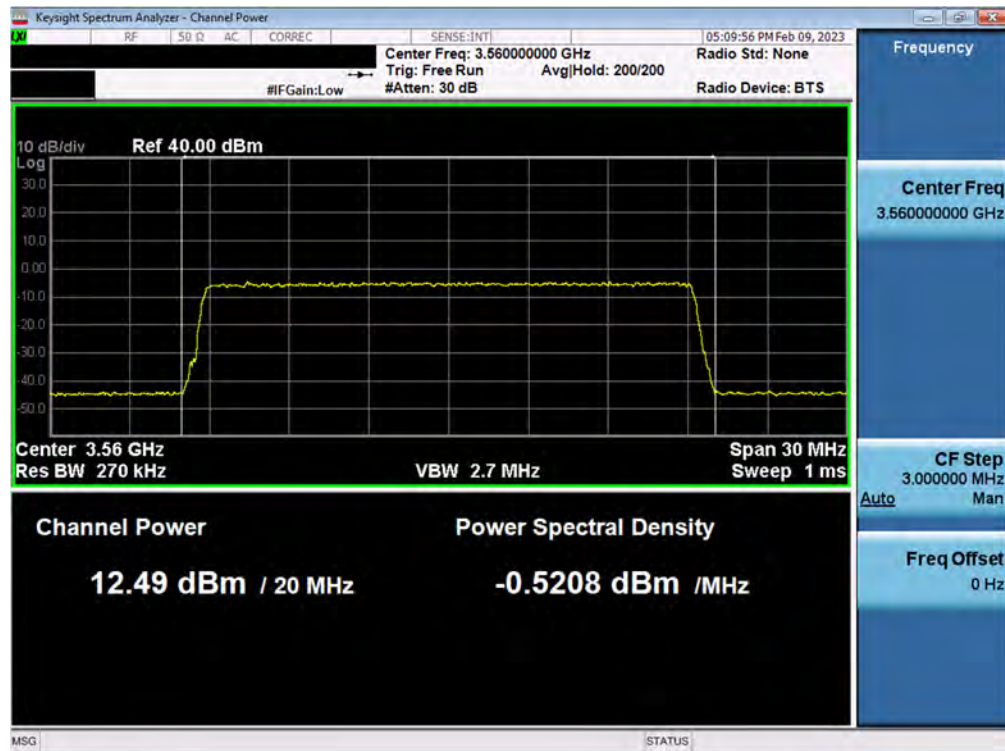
Plot 47. Conducted PSD, 3.56GHz, 20MHz BW – ANT7, SAS Granted maxEIRP 23dBm /MHz (NR)



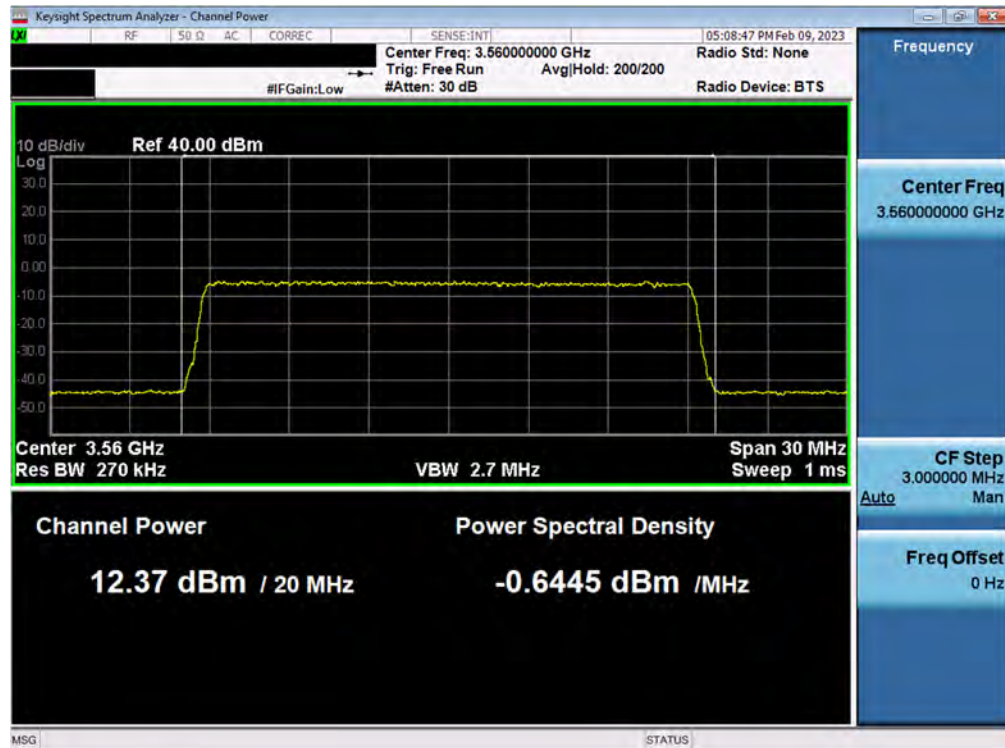
Plot 48. Conducted PSD, 3.56GHz, 20MHz BW – ANT8, SAS Granted maxEIRP 23dBm /MHz (NR)

|                                            |                                       |                        |                                   |
|--------------------------------------------|---------------------------------------|------------------------|-----------------------------------|
| FCC ID: A3LSOG2201                         | MEASUREMENT REPORT<br>(CERTIFICATION) |                        | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1M2302100007-01-R1.A3L | Test Dates:<br>2/7/2023 – 2/9/2023    | EUT Type:<br>Smallcell | Page 61 of 67                     |





Plot 49. Conducted PSD, 3.56GHz, 20MHz BW – ANT1, SAS Granted maxEIRP 17dBm/MHz (NR)

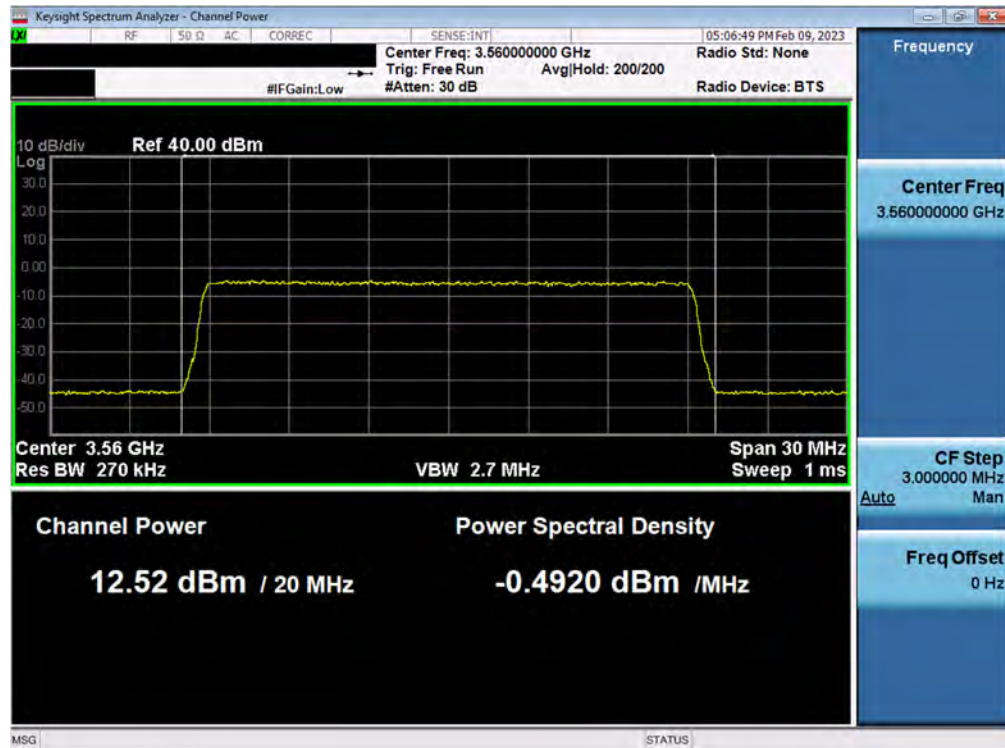


Plot 50. Conducted PSD, 3.56GHz, 20MHz BW – ANT2, SAS Granted maxEIRP 17dBm /MHz (NR)

|                                            |                                       |                        |                                   |
|--------------------------------------------|---------------------------------------|------------------------|-----------------------------------|
| FCC ID: A3LSOG2201                         | MEASUREMENT REPORT<br>(CERTIFICATION) |                        | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1M2302100007-01-R1.A3L | Test Dates:<br>2/7/2023 – 2/9/2023    | EUT Type:<br>Smallcell | Page 62 of 67                     |

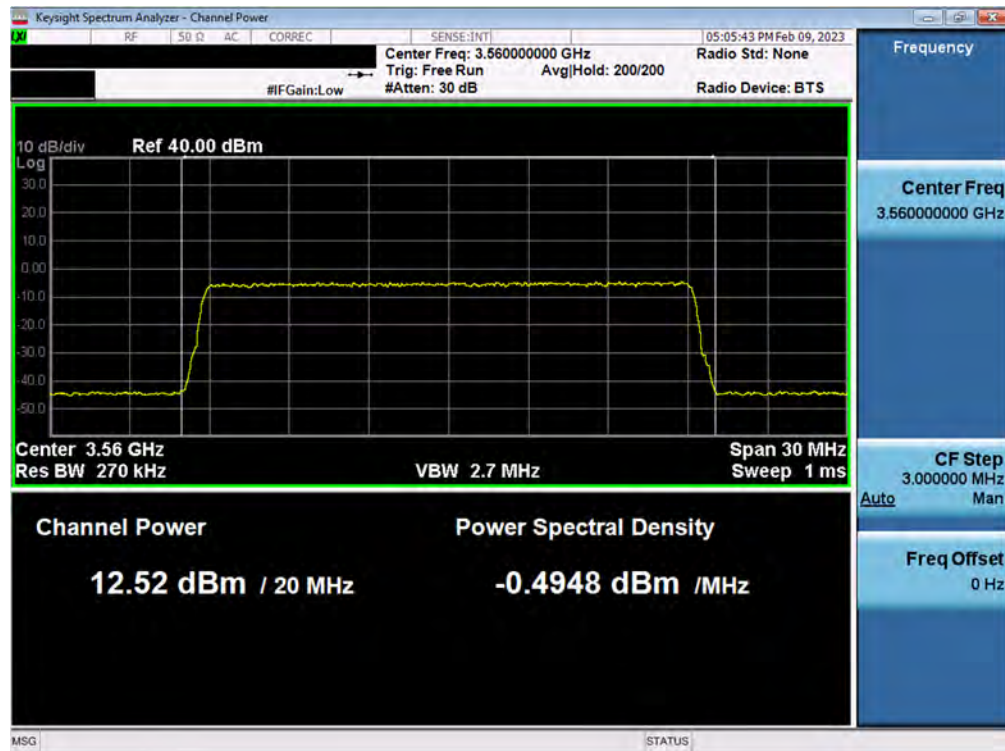


Plot 51. Conducted PSD, 3.56GHz, 20MHz BW – ANT3, SAS Granted maxEIRP 17dBm /MHz (NR)

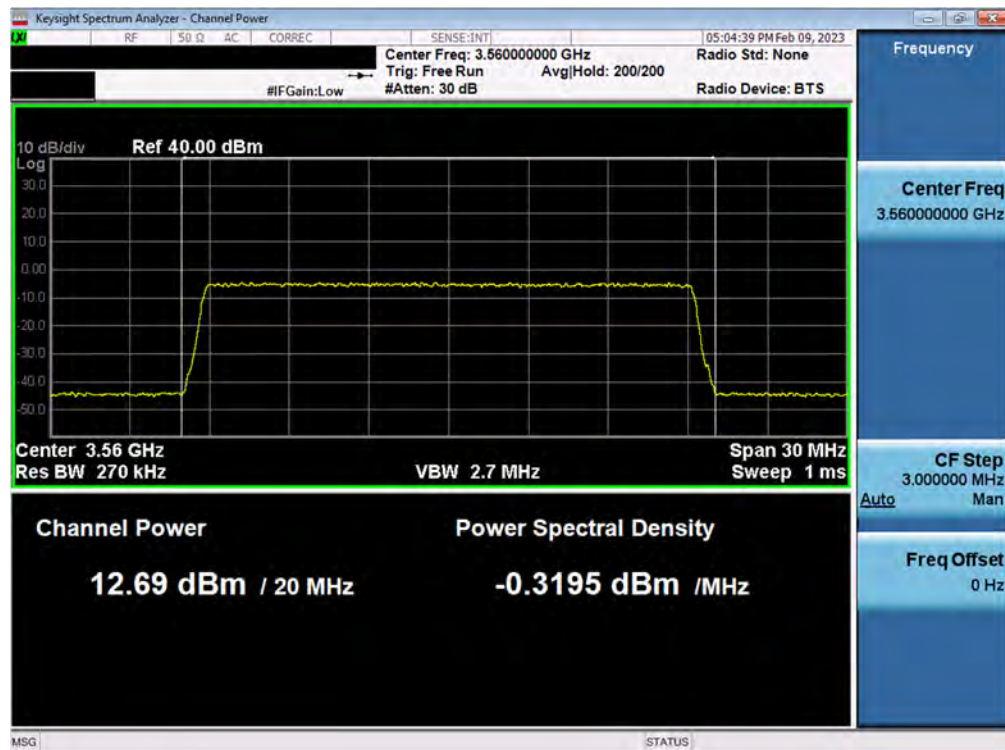


Plot 52. Conducted PSD, 3.56GHz, 20MHz BW – ANT4, SAS Granted maxEIRP 17dBm /MHz (NR)

|                                            |                                       |                        |                                   |
|--------------------------------------------|---------------------------------------|------------------------|-----------------------------------|
| FCC ID: A3LSOG2201                         | MEASUREMENT REPORT<br>(CERTIFICATION) |                        | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1M2302100007-01-R1.A3L | Test Dates:<br>2/7/2023 – 2/9/2023    | EUT Type:<br>Smallcell | Page 63 of 67                     |



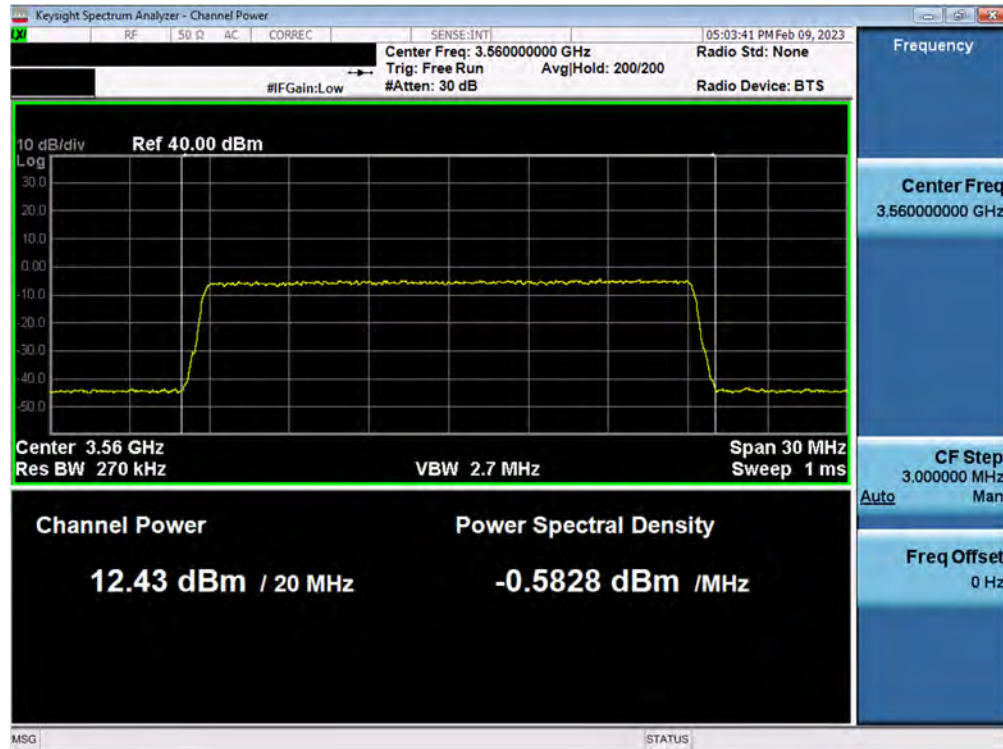
Plot 53. Conducted PSD, 3.56GHz, 20MHz BW – ANT5, SAS Granted maxEIRP 17dBm /MHz (NR)



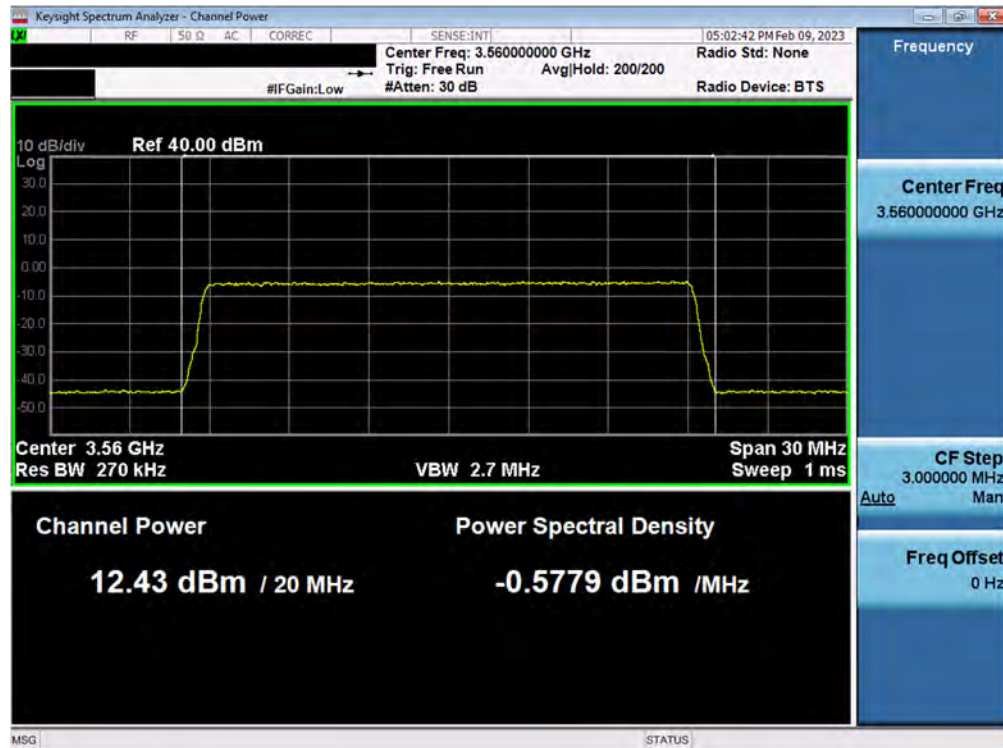
Plot 54. Conducted PSD, 3.56GHz, 20MHz BW – ANT6, SAS Granted maxEIRP 17dBm /MHz (NR)

|                                            |                                       |                        |                                   |
|--------------------------------------------|---------------------------------------|------------------------|-----------------------------------|
| FCC ID: A3LSOG2201                         | MEASUREMENT REPORT<br>(CERTIFICATION) |                        | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1M2302100007-01-R1.A3L | Test Dates:<br>2/7/2023 – 2/9/2023    | EUT Type:<br>Smallcell | Page 64 of 67                     |





Plot 55. Conducted PSD, 3.56GHz, 20MHz BW – ANT7, SAS Granted maxEIRP 17dBm /MHz (NR)



Plot 56. Conducted PSD, 3.56GHz, 20MHz BW – ANT8, SAS Granted maxEIRP 17dBm /MHz (NR)

|                                            |                                       |                        |                                   |
|--------------------------------------------|---------------------------------------|------------------------|-----------------------------------|
| FCC ID: A3LSOG2201                         | MEASUREMENT REPORT<br>(CERTIFICATION) |                        | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1M2302100007-01-R1.A3L | Test Dates:<br>2/7/2023 – 2/9/2023    | EUT Type:<br>Smallcell | Page 65 of 67                     |

## APPENDIX B – TEST LOGS

Logs are available upon request

|                                                                                                                            |                   |                      |
|----------------------------------------------------------------------------------------------------------------------------|-------------------|----------------------|
|  PowerMeasTest_2023-02-09T20.53.29Z       | 2/9/2023 4:51 PM  | Text Document        |
|  PowerMeasTest_2023-02-09T21.56.49Z       | 2/9/2023 5:06 PM  | Text Document        |
|  PowerMeasTest_2023-02-09T22.07.06Z       | 2/13/2023 4:06 PM | Text Document        |
|  SCS.1                                    | 2/7/2023 12:47 PM | Wireshark capture... |
|  SCS.2                                    | 2/7/2023 12:50 PM | Wireshark capture... |
|  SCS.3                                    | 2/7/2023 12:51 PM | Wireshark capture... |
|  SCS.4                                    | 2/7/2023 12:52 PM | Wireshark capture... |
|  SCS.5                                    | 2/7/2023 12:54 PM | Wireshark capture... |
|  WINNF.FT.C.DRG.1_2023-02-08T19.36.27Z    | 2/8/2023 2:39 PM  | Text Document        |
|  WINNF.FT.C.GRA.1_2023-02-07T17.59.40Z    | 2/7/2023 1:02 PM  | Text Document        |
|  WINNF.FT.C.GRA.2_2023-02-07T18.04.51Z    | 2/7/2023 1:05 PM  | Text Document        |
|  WINNF.FT.C.HBT.1_2023-02-07T18.06.48Z    | 2/7/2023 1:17 PM  | Text Document        |
|  WINNF.FT.C.HBT.3_2023-02-07T22.49.30Z    | 2/7/2023 5:53 PM  | Text Document        |
|  WINNF.FT.C.HBT.4_2023-02-07T23.07.37Z    | 2/7/2023 6:12 PM  | Text Document        |
|  WINNF.FT.C.HBT.5_2023-02-07T23.16.02Z  | 2/7/2023 6:17 PM  | Text Document        |
|  WINNF.FT.C.HBT.6_2023-02-07T23.25.06Z  | 2/7/2023 6:30 PM  | Text Document        |
|  WINNF.FT.C.HBT.7_2023-02-08T00.04.41Z  | 2/7/2023 7:07 PM  | Text Document        |
|  WINNF.FT.C.HBT.9_2023-02-07T22.25.58Z  | 2/7/2023 5:30 PM  | Text Document        |
|  WINNF.FT.C.HBT.10_2023-02-08T19.04.53Z | 2/8/2023 2:11 PM  | Text Document        |
|  WINNF.FT.C.MES.1_2023-02-07T22.24.37Z  | 2/7/2023 5:25 PM  | Text Document        |
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|---------------------------------------------------|-----------------------------------------------|-------------------------------|------------------------------------------|
| <b>FCC ID:</b> A3LSOG2201                         | <b>MEASUREMENT REPORT<br/>(CERTIFICATION)</b> |                               | <b>Approved by:</b><br>Technical Manager |
| <b>Test Report S/N:</b><br>1M2302100007-01-R1.A3L | <b>Test Dates:</b><br>2/7/2023 – 2/9/2023     | <b>EUT Type:</b><br>Smallcell | Page 66 of 67                            |