

**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:**

3/24/2022 – 3/31/2022

**Test Site/Location:**

Element Lab. Columbia, MD, USA

**Test Report Serial No.:**

1M2204040047-01.A3L

**FCC ID:**

**A3LRT4401-48A1**

**APPLICANT:**

**Samsung Electronics Co., Ltd.**

**Application Type:**

Certification

**Model:**

RT4401-48A1

**EUT Type:**

LTE/NR Base Station

**Frequency Range:**

3550 – 3700 MHz

**FCC Classification:**

Citizens Band Category B Devices (CBD)

**FCC Rule Part(s):**

Part 96

**Test Procedure(s):**

KDB 940660 D01 v03, WINNF-TS-0122-V1.0.2, CBRSA-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.

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> A3LRT4401-48A1	<b>MEASUREMENT REPORT (CERTIFICATION)</b>		<b>Approved by:</b> Quality Manager
<b>Test Report S/N:</b> 1M2204040047-01.A3L	<b>Test Dates:</b> 3/24/2022 – 3/31/2022	<b>EUT Type:</b> LTE/NR Base Station	Page 1 of 69

V1.0

## 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 .....	5
3.0	TEST EQUIPMENT CALIBRATION DATA.....	6
4.0	ENVIRONMENTAL CONDITIONS .....	7
5.0	EVALUATION PROCEDURE .....	8
6.0	TEST Summary.....	9
6.1	Summary .....	9
7.0	CONCLUSION .....	11
	APPENDIX A – TEST RESULT AND DATA .....	12
A1	[WINNF.FT.C.REG.1] MULTI-STEP REGISTRATION.....	12
A2	[WINNF.FT.C.REG.8] MISSING REQUIRED PARAMETERS (RESPONSECODE 102) .....	14
A3	[WINNF.FT.C.REG.10] PENDING REGISTRATION (RESPONSECODE 200).....	15
A4	[WINNF.FT.C.REG.12] INVALID PARAMETER (RESPONSECODE 103).....	16
A5	[WINNF.FT.C.REG.14] BLACKLISTED CBSD (RESPONSECODE 101).....	17
A6	[WINNF.FT.C.REG.16] UNSUPPORTED SAS PROTOCOL VERSION (RESPONSECODE 100).....	18
A7	[WINNF.FT.C.REG.18] GROUP ERROR (RESPONSECODE 201).....	19
A8	[WINNF.FT.C.GRA.1] UNSUCCESSFUL GRANT RESPONSECODE=400 (INTERFERENCE) .....	20
A9	[WINNF.FT.C.GRA.2] UNSUCCESSFUL GRANT RESPONSECODE=401 (GRANT_CONFLICT).....	21
A10	[WINNF.FT.C.HBT.1] HEARTBEAT SUCCESS CASE (FIRST HEARTBEAT RESPONSE).....	22
A11	[WINNF.FT.C.HBT.3] HEARTBEAT RESPONSECODE=105 (DEREGISTER).....	25
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.....	29
A14	[WINNF.FT.C.HBT.6] HEARTBEAT RESPONSECODE=501 (SUSPENDED_GRANT) IN SUBSEQUENT HEARTBEAT RESPONSE.....	31
A15	[WINNF.FT.C.HBT.7] HEARTBEAT RESPONSECODE=502 (UNSYNC_OP_PARAM) .....	33
A16	[WINNF.FT.C.HBT.9] HEARTBEAT RESPONSE ABSENT (FIRST HEARTBEAT) .....	35
A17	[WINNF.FT.C.HBT.10] HEARTBEAT RESPONSE ABSENT (SUBSEQUENT HEARTBEAT).....	37
A18	[WINNF.FT.C.MES.1] REGISTRATION RESPONSE CONTAINS MEASREPORTCONFIG .....	39
A19	[WINNF.FT.C.RLQ.1] SUCCESSFUL RELINQUISHMENT .....	40
A20	[WINNF.FT.C.DRG.1] SUCCESSFUL DEREGISTRATION.....	42
A21	[WINNF.FT.C.SCS.1] SUCCESSFUL TLS CONNECTION BETWEEN UUT AND SAS TEST HARNESS .....	44
A22	[WINNF.FT.C.SCS.2] TLS FAILURE DUE TO REVOKED CERTIFICATE .....	46
A23	[WINNF.FT.C.SCS.3] TLS FAILURE DUE TO EXPIRED SERVER CERTIFICATE .....	48
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 .....	52
A26	[WINNF.PT.C.HBT.1] UUT RF TRANSMIT POWER MEASUREMENT .....	54
A27	WINNF.PT.C.HBT.1 - RF POWER MEASUREMENTS:.....	55
	APPENDIX B – TEST LOGS .....	68
	APPENDIX C – TEST SETUP .....	69

<b>FCC ID:</b> A3LRT4401-48A1	<b>MEASUREMENT REPORT (CERTIFICATION)</b>		<b>Approved by:</b> Quality Manager
<b>Test Report S/N:</b> 1M2204040047-01.A3L	<b>Test Dates:</b> 3/24/2022 – 3/31/2022	<b>EUT Type:</b> LTE/NR Base Station	Page 2 of 69

## 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.

<b>FCC ID:</b> A3LRT4401-48A1	<b>MEASUREMENT REPORT (CERTIFICATION)</b>		<b>Approved by:</b> Quality Manager
<b>Test Report S/N:</b> 1M2204040047-01.A3L	<b>Test Dates:</b> 3/24/2022 – 3/31/2022	<b>EUT Type:</b> LTE/NR Base Station	Page 3 of 69

## 2.0 PRODUCT INFORMATION

### 2.1 Equipment Description

The Equipment Under Test (EUT) is the **Samsung Electronics Co., Ltd., LTE/NR Base Station FCC ID: A3LRT4401-48A1**. The test data contained in this report pertains only to CBSD-SAS interoperability. The EUT is a CBSD.

**Test Device Serial Number(s):** S527A86741

**Test Device Hardware Version:** PCS01

**Test Device Software Version:** 21D

**CBSD Category:** B

### 2.2 Device Capabilities

This device contains the following capabilities:

LTE Band 48, 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 latest version of the SAS Test Harness (V1.0.0.2) provided by CBRS Alliance was used. The SAS Test Harness is synchronized to UTC time.

The full WINNF test plan was executed for NR. Per Section 5.3.4 of WINNF TS-0122, only WINNF.PT.C.HBT was tested for LTE

<b>FCC ID:</b> A3LRT4401-48A1	<b>MEASUREMENT REPORT (CERTIFICATION)</b>		<b>Approved by:</b> Quality Manager
<b>Test Report S/N:</b> 1M2204040047-01.A3L	<b>Test Dates:</b> 3/24/2022 – 3/31/2022	<b>EUT Type:</b> LTE/NR Base Station	Page 4 of 69

## 2.4 Modifications

No modifications were made to EUT during testing.

<b>FCC ID:</b> A3LRT4401-48A1	<b>MEASUREMENT REPORT (CERTIFICATION)</b>		<b>Approved by:</b> Quality Manager
<b>Test Report S/N:</b> 1M2204040047-01.A3L	<b>Test Dates:</b> 3/24/2022 – 3/31/2022	<b>EUT Type:</b> LTE/NR Base Station	Page 5 of 69

### 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
Keysight	N9030A	PXA Signal Analyzer	2/14/2022	Annual	2/14/2023	MY54490576
Dell	Latitude 5580	Test Harness Laptop	N/A	N/A	N/A	N/A
Agilent HP	6032A	AutoRanging System Power Supply	N/A	N/A	N/A	N/A

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

<b>FCC ID:</b> A3LRT4401-48A1	<b>MEASUREMENT REPORT (CERTIFICATION)</b>		<b>Approved by:</b> Quality Manager
<b>Test Report S/N:</b> 1M2204040047-01.A3L	<b>Test Dates:</b> 3/24/2022 – 3/31/2022	<b>EUT Type:</b> LTE/NR Base Station	Page 6 of 69

V1.0

## 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> A3LRT4401-48A1	<b>MEASUREMENT REPORT (CERTIFICATION)</b>		<b>Approved by:</b> Quality Manager
<b>Test Report S/N:</b> 1M2204040047-01.A3L	<b>Test Dates:</b> 3/24/2022 – 3/31/2022	<b>EUT Type:</b> LTE/NR Base Station	Page 7 of 69

## 5.0 EVALUATION PROCEDURE

The measurement procedure described in KDB 940660 D01 v03 and WINNF-TS-0122-V1.0.2 was used in the measurement of the EUT.

Deviation from measurement procedure.....None

<b>FCC ID:</b> A3LRT4401-48A1	<b>MEASUREMENT REPORT (CERTIFICATION)</b>		<b>Approved by:</b> Quality Manager
<b>Test Report S/N:</b> 1M2204040047-01.A3L	<b>Test Dates:</b> 3/24/2022 – 3/31/2022	<b>EUT Type:</b> LTE/NR Base Station	Page 8 of 69



## 6.0 TEST SUMMARY

### 6.1 Summary

Company Name: Samsung Electronics Co., Ltd.

FCC ID: A3LRT4401-48A1

**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 WINNF.FT.C.REG.8 WINNF.FT.C.REG.10 WINNF.FT.C.REG.12 WINNF.FT.C.REG.14 WINNF.FT.C.REG.16 WINNF.FT.C.REG.18 WINNF.FT.C.GRA.1 WINNF.FT.C.GRA.2 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 WINNF.FT.C.REG.8 WINNF.FT.C.REG.10 WINNF.FT.C.REG.12 WINNF.FT.C.REG.14 WINNF.FT.C.REG.16 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 WINNF.FT.C.HBT.4 WINNF.FT.C.HBT.6 WINNF.FT.C.HBT.7 WINNF.FT.C.HBT.10 WINNF.FT.C.RLQ.1 WINNF.FT.C.DRG.1	Pass

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

FCC ID: A3LRT4401-48A1	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2204040047-01.A3L	Test Dates: 3/24/2022 – 3/31/2022	EUT Type: LTE/NR Base Station	Page 9 of 69

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: 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. ii) Describe the process for re-establishment of the communications and confirm that the CBSD acts accordingly. iii) Confirm power-on restart process for registration (re-registration) occurs as expected. iv) Confirm the process for de-registration occurs as expected.	WINNF.FT.C.HBT.9 WINNF.FT.C.HBT.10	Pass
96.39(f)	KDB940660 D01 Section 4	SAS and Device Security Requirements	WINNF.FT.C.SCS.1 WINNF.FT.C.SCS.2 WINNF.FT.C.SCS.3 WINNF.FT.C.SCS.4 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.

<b>FCC ID:</b> A3LRT4401-48A1	<b>MEASUREMENT REPORT (CERTIFICATION)</b>		<b>Approved by:</b> Quality Manager
<b>Test Report S/N:</b> 1M2204040047-01.A3L	<b>Test Dates:</b> 3/24/2022 – 3/31/2022	<b>EUT Type:</b> LTE/NR Base Station	Page 10 of 69

## 7.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **Samsung Electronics Co., Ltd., LTE/NR Base Station FCC ID: A3LRT4401-48A1** has been tested to show compliance with Part 96 and KDB 940660 D01 v03.

<b>FCC ID:</b> A3LRT4401-48A1	<b>MEASUREMENT REPORT (CERTIFICATION)</b>		<b>Approved by:</b> Quality Manager
<b>Test Report S/N:</b> 1M2204040047-01.A3L	<b>Test Dates:</b> 3/24/2022 – 3/31/2022	<b>EUT Type:</b> LTE/NR Base Station	Page 11 of 69

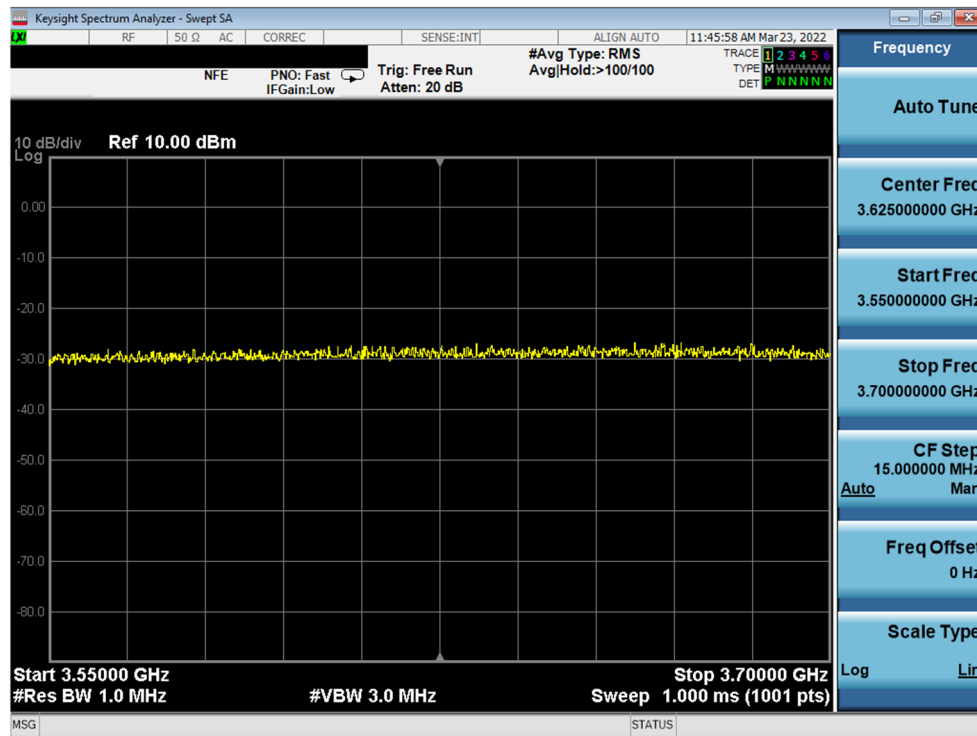
## APPENDIX A – TEST RESULT AND DATA

### 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:</li> <li>- cbsdId = Ci</li> <li>- measReportConfig shall not be included</li> <li>- responseCode = 0</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"/>

FCC ID: A3LRT4401-48A1	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2204040047-01.A3L	Test Dates: 3/24/2022 – 3/31/2022	EUT Type: LTE/NR Base Station	Page 12 of 69

## Test Plots:



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

<b>FCC ID:</b> A3LRT4401-48A1	<b>MEASUREMENT REPORT (CERTIFICATION)</b>		<b>Approved by:</b> Quality Manager
<b>Test Report S/N:</b> 1M2204040047-01.A3L	<b>Test Dates:</b> 3/24/2022 – 3/31/2022	<b>EUT Type:</b> LTE/NR Base Station	Page 13 of 69

V1.0





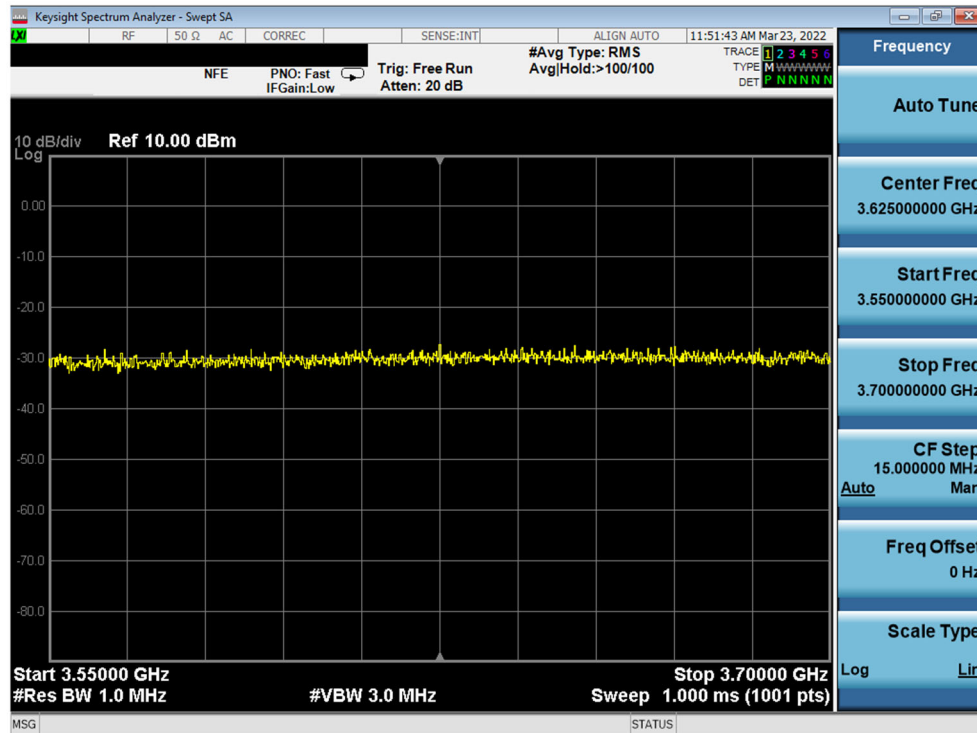




## A5 [WINNF.FT.C.REG.14] Blacklisted CBSD (responseCode 101)

	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:



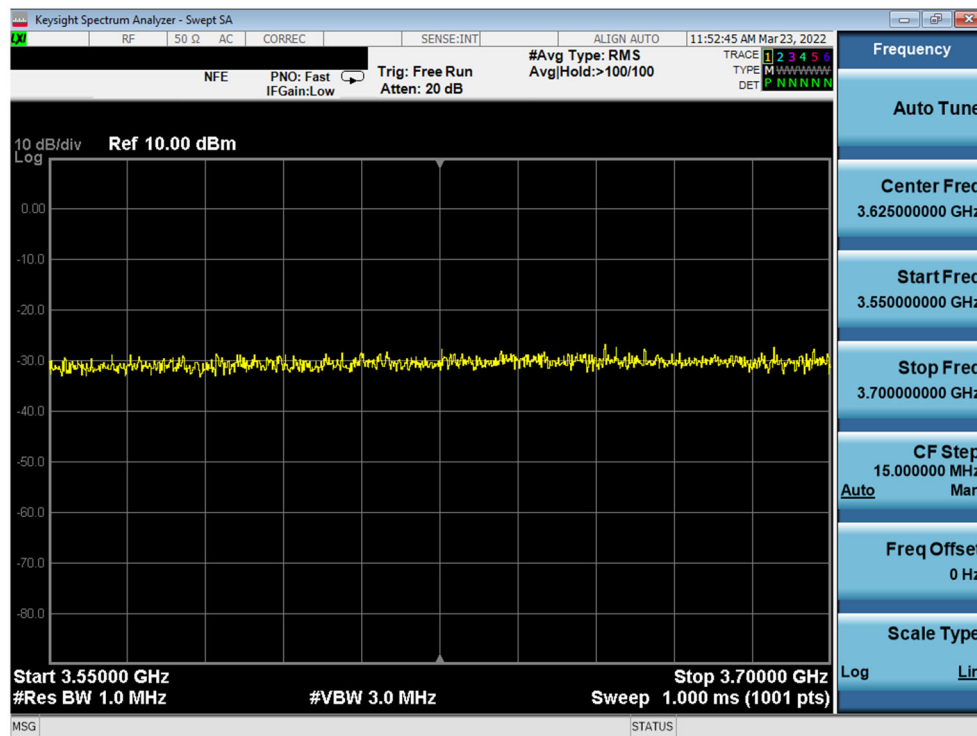
**Plot 5. Conducted Measurement – No RF transmission in entire band for 60s of elapsed time (WINNF.FT.C.REG.14)**

FCC ID: A3LRT4401-48A1	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2204040047-01.A3L	Test Dates: 3/24/2022 – 3/31/2022	EUT Type: LTE/NR Base Station	Page 17 of 69

## 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:



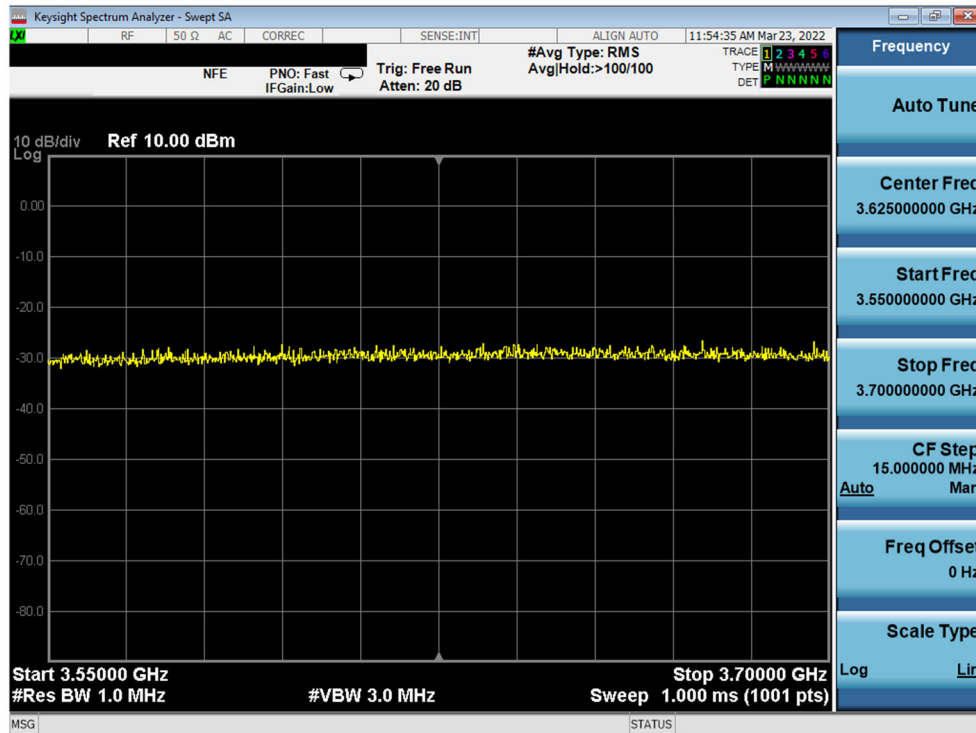
**Plot 6. Conducted Measurement – No RF transmission in entire band for 60s of elapsed time (WINNF.FT.C.REG.16)**

FCC ID: A3LRT4401-48A1	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2204040047-01.A3L	Test Dates: 3/24/2022 – 3/31/2022	EUT Type: LTE/NR Base Station	Page 18 of 69

## 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:



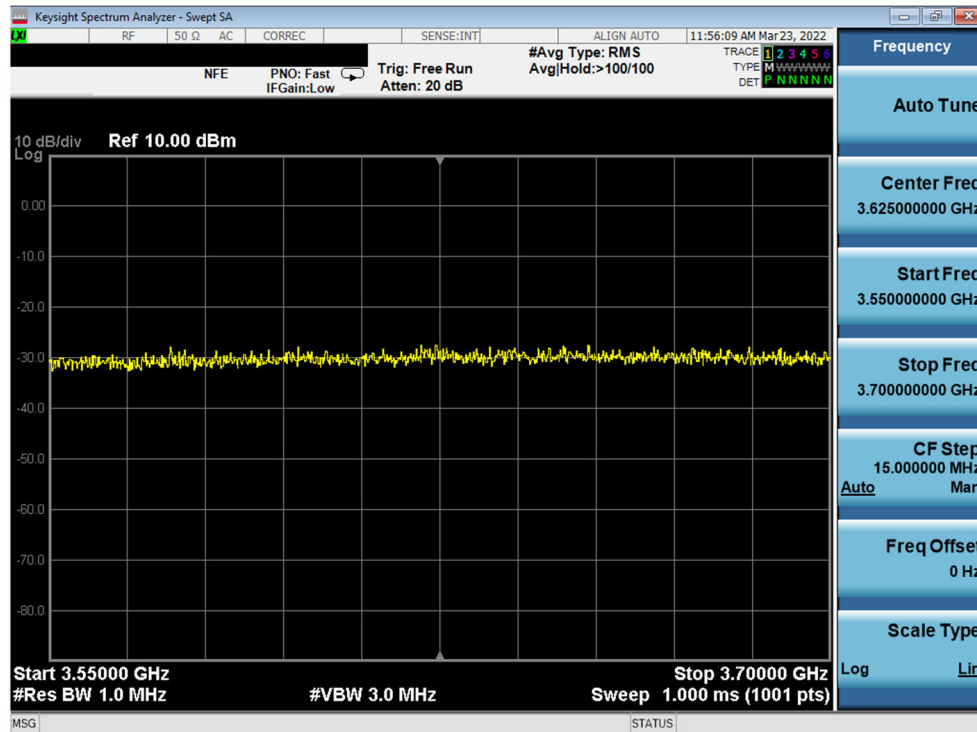
Plot 7. Conducted Measurement – No RF transmission in entire band for 60s of elapsed time (WINNF.FT.C.REG.18)

FCC ID: A3LRT4401-48A1	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2204040047-01.A3L	Test Dates: 3/24/2022 – 3/31/2022	EUT Type: LTE/NR Base Station	Page 19 of 69

## 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: • UUT has registered successfully with SAS Test Harness, with cbsdId = C	--	--
2	UUT sends valid Grant Request.	--	--
3	SAS Test Harness sends a Grant Response message, including • cbsdId=C • responseCode = R	--	--
4	After completion of step 3, SAS Test Harness will not provide any positive response (responseCode=0) to further request messages from the UUT.	--	--
5	Monitor the RF output of the UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify: • UUT shall not transmit RF	<input checked="" type="checkbox"/>	<input type="checkbox"/>

### Test Plots:



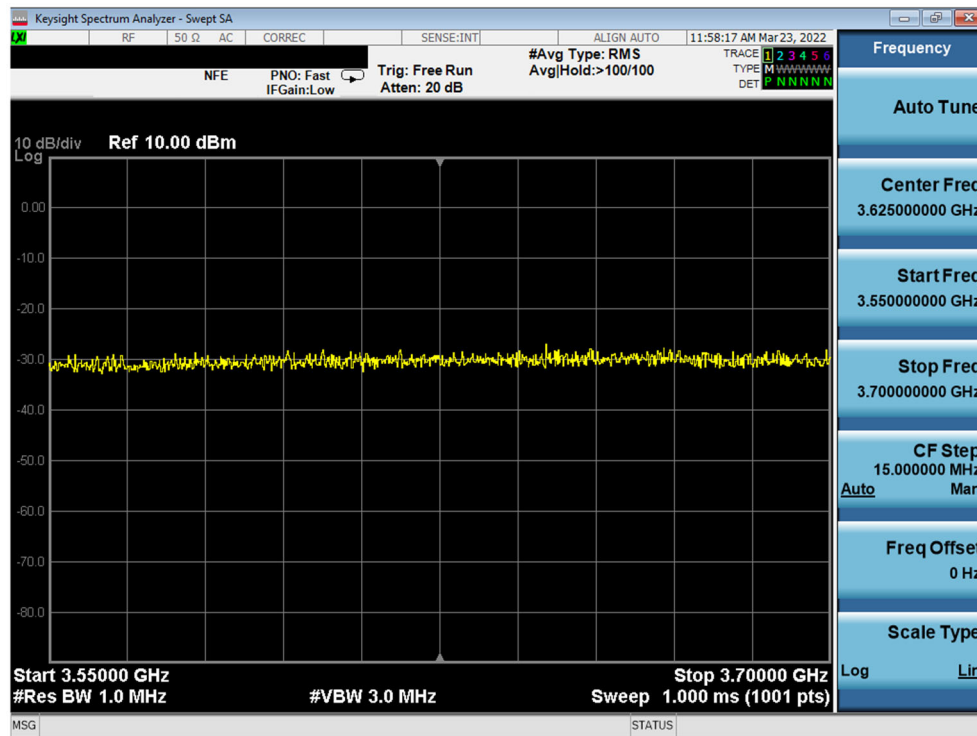
Plot 8. Conducted Measurement – No RF transmission in entire band for 60s of elapsed time (WINNF.FT.C.GRA.1)

FCC ID: A3LRT4401-48A1	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2204040047-01.A3L	Test Dates: 3/24/2022 – 3/31/2022	EUT Type: LTE/NR Base Station	Page 20 of 69

## 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: • UUT has registered successfully with SAS Test Harness, with cbsdId = C	--	--
2	UUT sends valid Grant Request.	--	--
3	SAS Test Harness sends a Grant Response message, including • cbsdId=C • responseCode = R	--	--
4	After completion of step 3, SAS Test Harness will not provide any positive response (responseCode=0) to further request messages from the UUT.	--	--
5	Monitor the RF output of the UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify: • UUT shall not transmit RF	<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)

FCC ID: A3LRT4401-48A1	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2204040047-01.A3L	Test Dates: 3/24/2022 – 3/31/2022	EUT Type: LTE/NR Base Station	Page 21 of 69

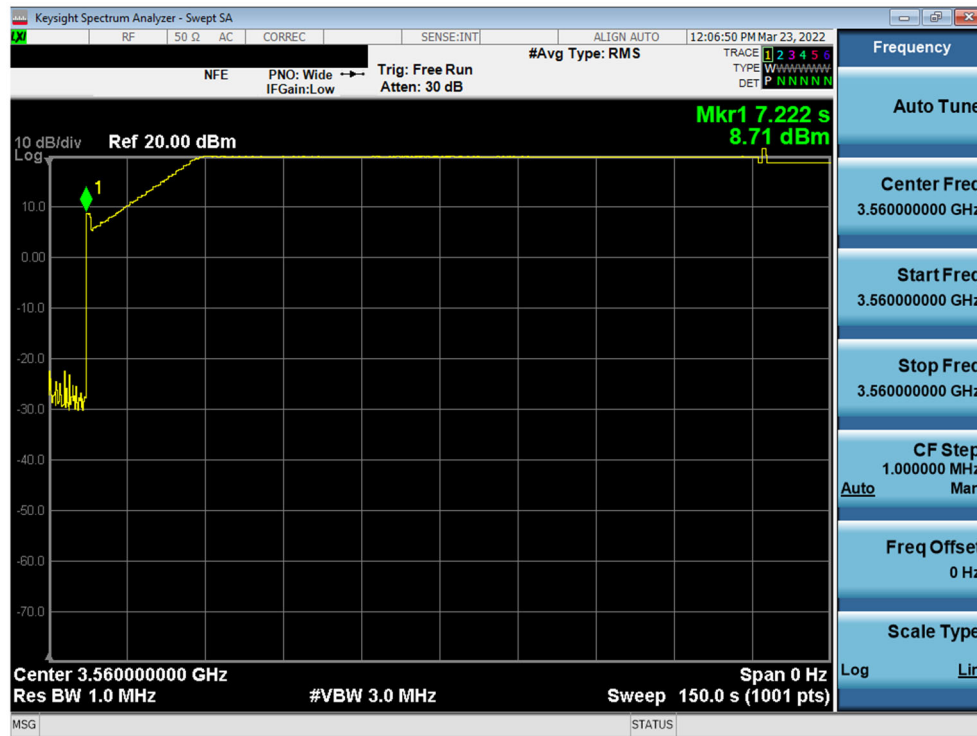
# A10 [WINNF.FT.C.HBT.1] Heartbeat Success Case (first Heartbeat Response)

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

FCC ID: A3LRT4401-48A1	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2204040047-01.A3L	Test Dates: 3/24/2022 – 3/31/2022	EUT Type: LTE/NR Base Station	Page 22 of 69

	<ul style="list-style-type: none"> <li>• grantId = G</li> <li>• transmitExpireTime = current UTC time + 200 seconds</li> <li>• responseCode = 0</li> </ul>		
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"/>

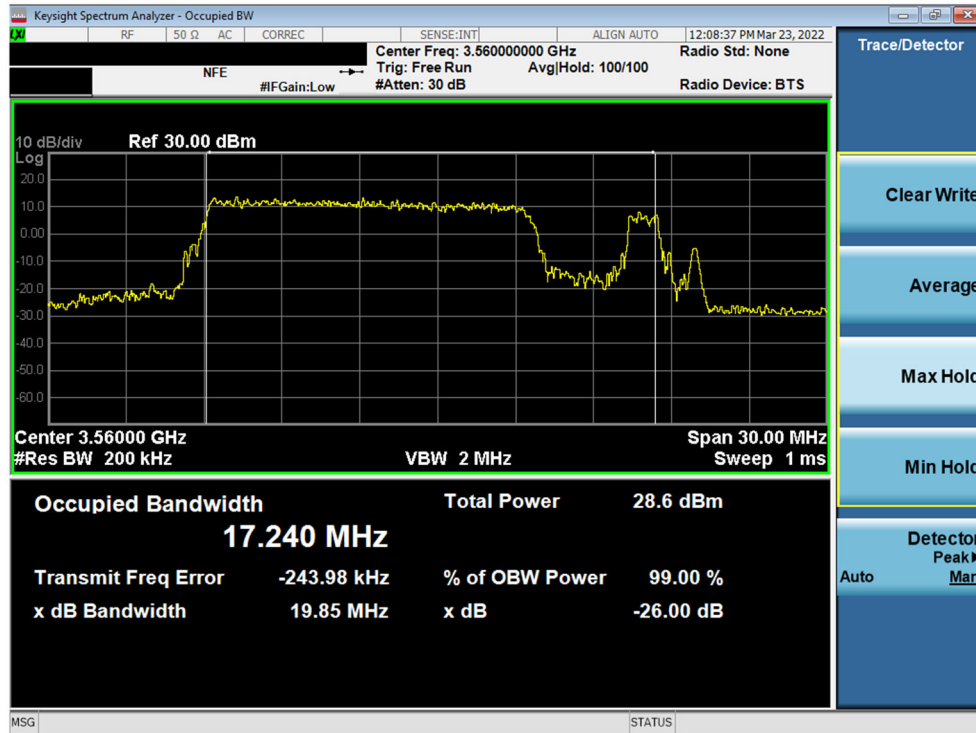
## Test Plots:



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

**Note:** First heartbeat occurred at approximately 7 seconds, transmission did not start until after the first heartbeat response.

FCC ID: A3LRT4401-48A1	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2204040047-01.A3L	Test Dates: 3/24/2022 – 3/31/2022	EUT Type: LTE/NR Base Station	Page 23 of 69



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

FCC ID: A3LRT4401-48A1	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2204040047-01.A3L	Test Dates: 3/24/2022 – 3/31/2022	EUT Type: LTE/NR Base Station	Page 24 of 69

V1.0

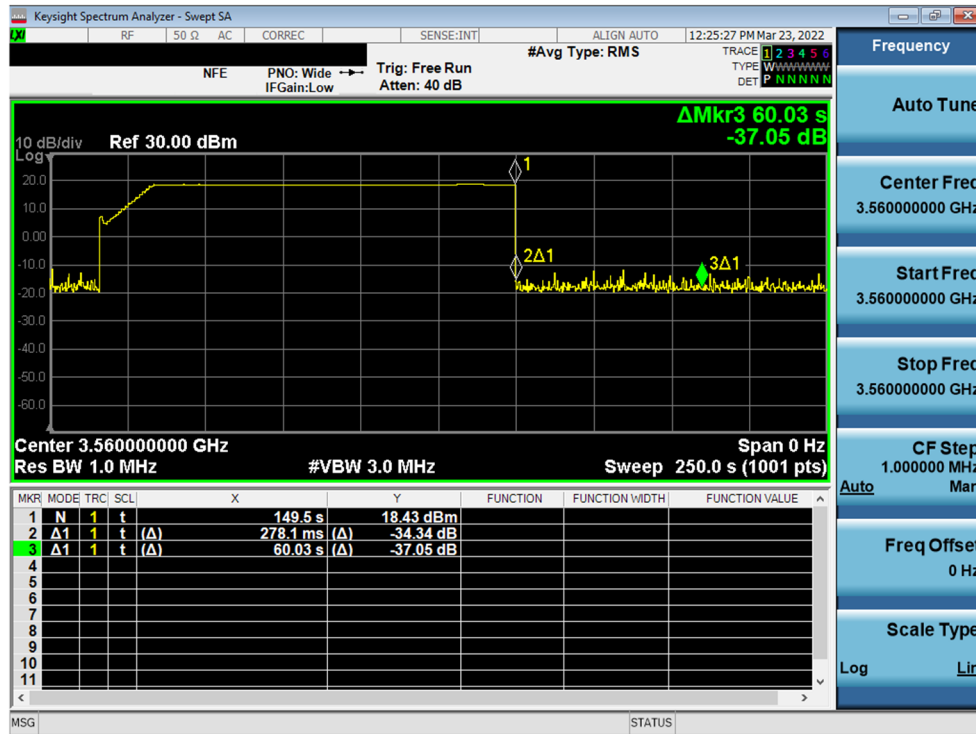


# A11 [WINNF.FT.C.HBT.3] Heartbeat responseCode=105 (DEREGISTER)

	Test Execution Steps	PASS	FAIL
1	Ensure the following conditions are met for test entry: <ul style="list-style-type: none"> <li>• UUT has registered successfully with SAS Test Harness</li> <li>• UUT has a valid single grant as follows:               <ul style="list-style-type: none"> <li>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	UUT sends a Heartbeat Request message. Ensure Heartbeat Request message is sent within Heartbeat Interval specified in the latest Heartbeat Response, and formatted correctly, including: <ul style="list-style-type: none"> <li>• cbsdId = C</li> <li>• grantId = G</li> <li>• operationState = "AUTHORIZED"</li> </ul>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3	SAS Test Harness sends a Heartbeat Response message, including the following parameters: <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	Monitor the RF output of the UUT. Verify: <ul style="list-style-type: none"> <li>• UUT shall stop transmission within (T + 60 seconds) of completion of step 3</li> </ul>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

FCC ID: A3LRT4401-48A1	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2204040047-01.A3L	Test Dates: 3/24/2022 – 3/31/2022	EUT Type: LTE/NR Base Station	Page 25 of 69

## Test Plots:



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

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

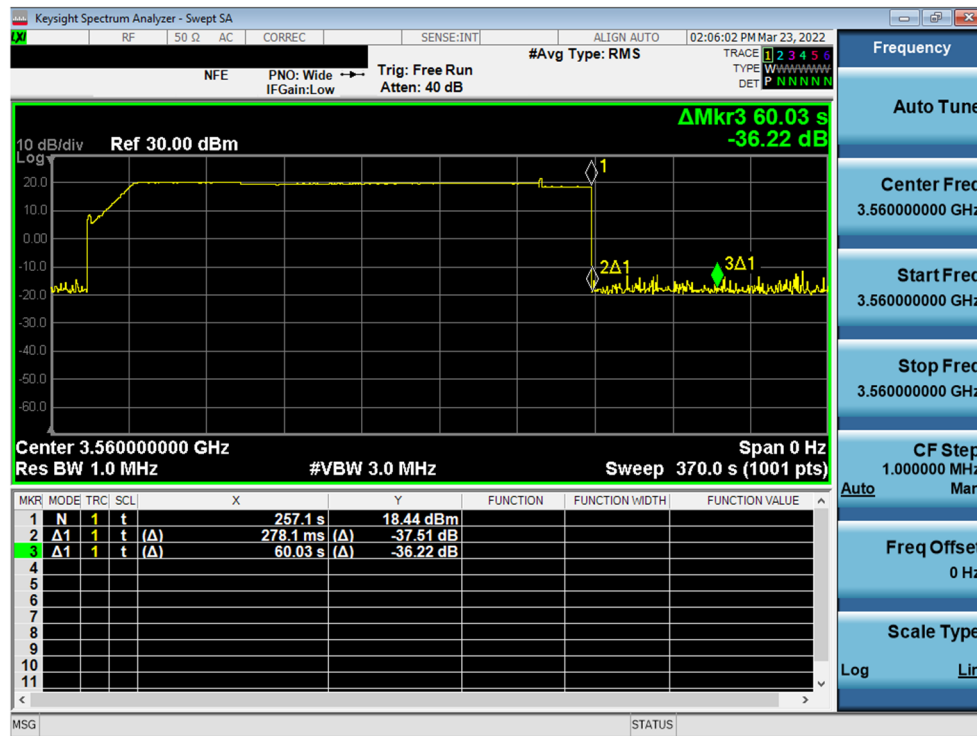
FCC ID: A3LRT4401-48A1	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2204040047-01.A3L	Test Dates: 3/24/2022 – 3/31/2022	EUT Type: LTE/NR Base Station	Page 26 of 69

	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	<p>After completion of step 3, SAS Test Harness shall not allow any further grants to the UUT.</p>	--	--
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"/>

<b>FCC ID:</b> A3LRT4401-48A1	<b>MEASUREMENT REPORT (CERTIFICATION)</b>		<b>Approved by:</b> Quality Manager
<b>Test Report S/N:</b> 1M2204040047-01.A3L	<b>Test Dates:</b> 3/24/2022 – 3/31/2022	<b>EUT Type:</b> LTE/NR Base Station	Page 27 of 69

V1.0

## Test Plots:



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

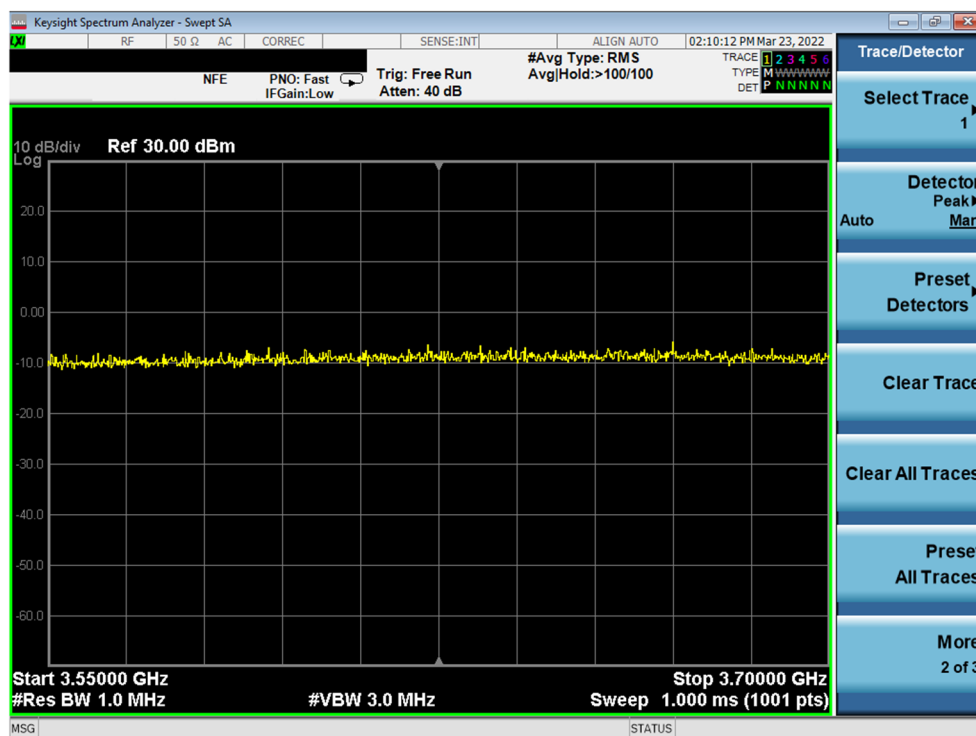
FCC ID: A3LRT4401-48A1	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2204040047-01.A3L	Test Dates: 3/24/2022 – 3/31/2022	EUT Type: LTE/NR Base Station	Page 28 of 69

# 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: A3LRT4401-48A1	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2204040047-01.A3L	Test Dates: 3/24/2022 – 3/31/2022	EUT Type: LTE/NR Base Station	Page 29 of 69

## Test Plots:



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

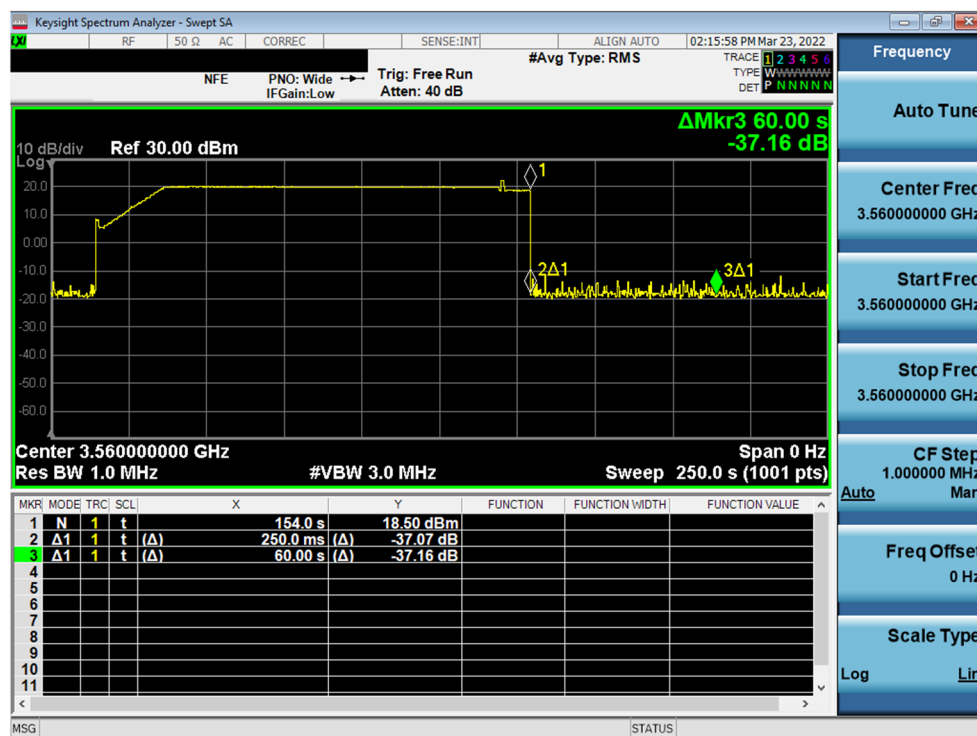
FCC ID: A3LRT4401-48A1	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2204040047-01.A3L	Test Dates: 3/24/2022 – 3/31/2022	EUT Type: LTE/NR Base Station	Page 30 of 69

# 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: A3LRT4401-48A1	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2204040047-01.A3L	Test Dates: 3/24/2022 – 3/31/2022	EUT Type: LTE/NR Base Station	Page 31 of 69

### Test Plots:



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

<b>FCC ID:</b> A3LRT4401-48A1	<b>MEASUREMENT REPORT (CERTIFICATION)</b>		<b>Approved by:</b> Quality Manager
<b>Test Report S/N:</b> 1M2204040047-01.A3L	<b>Test Dates:</b> 3/24/2022 – 3/31/2022	<b>EUT Type:</b> LTE/NR Base Station	Page 32 of 69

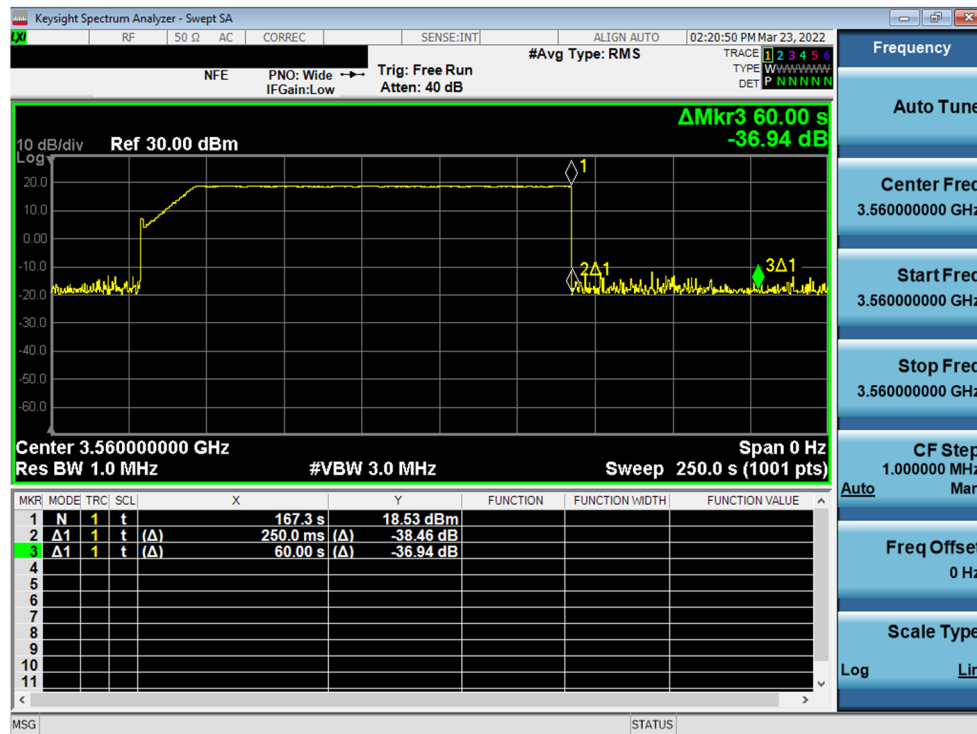


# A15 [WINNF.FT.C.HBT.7] Heartbeat responseCode=502 (UNSYNC\_OP\_PARAM)

	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: A3LRT4401-48A1	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2204040047-01.A3L	Test Dates: 3/24/2022 – 3/31/2022	EUT Type: LTE/NR Base Station	Page 33 of 69

## Test Plots:



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

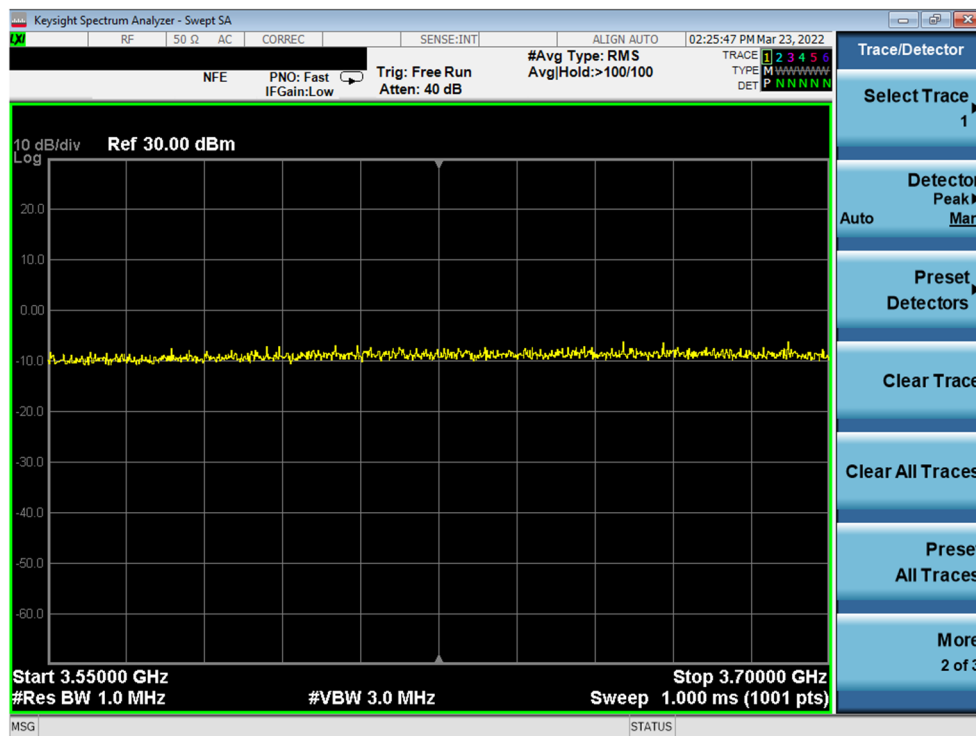
FCC ID: A3LRT4401-48A1	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2204040047-01.A3L	Test Dates: 3/24/2022 – 3/31/2022	EUT Type: LTE/NR Base Station	Page 34 of 69

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

	Test Execution Steps	PASS	FAIL
1	Ensure the following conditions are met for test entry: <ul style="list-style-type: none"> <li>• UUT has registered successfully with SAS Test Harness</li> <li>• UUT has a valid single grant as follows:               <ul style="list-style-type: none"> <li>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	UUT sends a Heartbeat Request message. Ensure Heartbeat Request message is sent within latest specified heartbeatInterval, and is formatted correctly, including: <ul style="list-style-type: none"> <li>• 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	Monitor the RF output of the UUT from start of test to 60 seconds after step 3. Verify: <ul style="list-style-type: none"> <li>• At any time during the test, UUT shall not transmit on RF interface</li> </ul>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

FCC ID: A3LRT4401-48A1	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2204040047-01.A3L	Test Dates: 3/24/2022 – 3/31/2022	EUT Type: LTE/NR Base Station	Page 35 of 69

## Test Plots:



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

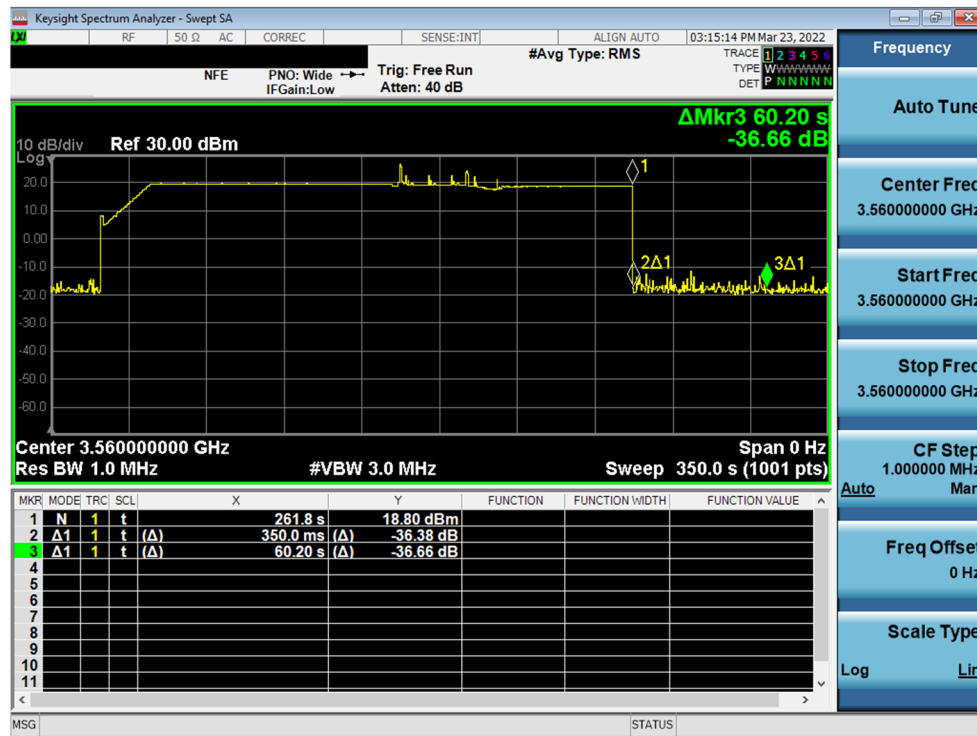
FCC ID: A3LRT4401-48A1	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2204040047-01.A3L	Test Dates: 3/24/2022 – 3/31/2022	EUT Type: LTE/NR Base Station	Page 36 of 69

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

	Test Execution Steps	PASS	FAIL
1	Ensure the following conditions are met for test entry: <ul style="list-style-type: none"> <li>• UUT has registered successfully with SAS Test Harness</li> <li>• UUT has a valid single grant as follows:               <ul style="list-style-type: none"> <li>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	UUT sends a Heartbeat Request message. Verify Heartbeat Request message is sent within the latest specified heartbeatInterval, and is formatted correctly, including: <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	SAS Test Harness sends a Heartbeat Response message, including the following parameters: <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	Monitor the RF output of the UUT. Verify: <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: A3LRT4401-48A1	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2204040047-01.A3L	Test Dates: 3/24/2022 – 3/31/2022	EUT Type: LTE/NR Base Station	Page 37 of 69

## 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)**

FCC ID: A3LRT4401-48A1	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2204040047-01.A3L	Test Dates: 3/24/2022 – 3/31/2022	EUT Type: LTE/NR Base Station	Page 38 of 69

# 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. 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: A3LRT4401-48A1	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2204040047-01.A3L	Test Dates: 3/24/2022 – 3/31/2022	EUT Type: LTE/NR Base Station	Page 39 of 69

## 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"/>

<b>FCC ID:</b> A3LRT4401-48A1	<b>MEASUREMENT REPORT (CERTIFICATION)</b>		<b>Approved by:</b> Quality Manager
<b>Test Report S/N:</b> 1M2204040047-01.A3L	<b>Test Dates:</b> 3/24/2022 – 3/31/2022	<b>EUT Type:</b> LTE/NR Base Station	Page 40 of 69