

Global Product Compliance Laboratory  
600-700 Mountain Avenue  
Room 5B-108  
Murray Hill, New Jersey 07974-0636 USA



TESTING  
NVLAP LAB CODE: 100275-0

# **Spectrum Allocation Server- Citizens Band Radio Service Device Conformity Assessment Test Report**

## Test Standards

**CBRSA-TS-9001 V1.0.0, March 20, 2018**  
**WINNF-TS-0122 Version V1.0.0, December 19, 2017**

## Client

**Nokia Solutions and Network**  
2000 Lucent Lane  
Naperville, Illinois 60563

## Product Evaluated

**Flexi Zone Multiband Micro BTS CBRS Band 48 Module**  
**FW2QMBOM1**  
**FCC ID: 2AD8UFW2QMBOM1**

**GPCL Project Number:**  
**2018-0115**

**Report Number:**  
**TR-2018-0115-CBRS -SAS**

**Date Issued:**  
**8/2/2018**

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## Revisions

Date	Revision	Section	Change
7/6/2018	0		Initial Release
7/9/2018	1		Corrections and Accreditations comments
7/12/2018	2		Corrections for DRG & SCS performance
8/2/2018	3		Correction and addition of Annex A for Log files.

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Prepared By: Walter S. Majkowski NCE

Approved By: Raymond J. Johnson

Signed:  8/2/2018  
 Compliance Engineer

Signed:  8/2/2018  
 Technical Manager

## 1. System Information and Requirements

<b>Company Name</b>	<b>Nokia Solutions and Networks</b> 2000 Lucent Lane Naperville, Illinois 60563 Attention: Terry P. Schwenk
<b>FCC ID: / Grant Date</b>	<b>FCC ID: 2AD8UFW2QMBOM1 / 12/22/2017</b>
<b>Product Name</b>	<b>Flexi Zone Multiband Micro BTS CBRS Band 48 Module</b>
<b>Model Name</b>	<b>FW2QMBOM1</b>
<b>Part No</b>	474444AX31
<b>GPCL Project Number / PRI#</b>	2018-0115 / PRI04781
<b>Serial Numbers</b>	S/N's: EB173411601, EB173410348; EB173410409 & EB173410134
<b>Test Standard(s)</b>	<ul style="list-style-type: none"> <li>• CBRSA-TS-9001 V1.0.0, March 20, 2018</li> <li>• WINNF-TS-0122 Version V1.0.0, December 19, 2017</li> <li>• KDB 940660 D01 Part 96 CBRS Equipment v01</li> </ul>
<b>Reference(s)</b>	<ul style="list-style-type: none"> <li>• 47 CFR FCC Part 2 and Part 96</li> <li>• ANSI C63.26 (2015)</li> <li>• ANSI C63.4 (2014)</li> <li>• KDB 552295 D01 CBP Guidance for 3650 3700 Band v02r02</li> </ul>
<b>Measurement Procedure(s):</b>	FCC-WINN-SAS and FCC-IC-0B
<b>Winn Forum SAS test harness</b>	Version: 1.0.0.2
<b>Frequency Band</b>	CBRS (Tx/Rx: 3550-3700 MHz), E-UTRAN Band 48
<b>Technology</b>	LTE-TDD: 10M0F9W, 15M0F9W, 20M0F9W
<b>Test Frequency Range</b>	3550 – 3700 MHz
<b>Operation Mode(s)</b>	2x2W MIMO
<b>Submission Type</b>	Initial Filing for Part 96 Class II overall.
<b>FCC Part 15 Subpart B</b>	Compliance with Class B
<b>Test Date</b>	June 12, 2018 – June 28, 2018
<b>Product Engineer(s):</b>	Ronald Remy
<b>Test Engineer (s):</b>	W. Steve Majkowski, Raymond J. Johnson
<b>Test Laboratory</b>	Nokia Global Product Compliance Laboratory 600-700 Mountain Avenue, Rm 5B-108 Murray Hill, New Jersey 07974-0636 USA  NVLAP Lab Code: <b>100275-0</b> FCC Registration Number: <b>395774</b> Designation Number: <b>US5302,</b>

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The Nokia Global Product Compliance Laboratories is recognized WInnForum for CBSD Testing and its accreditation for Part 96 is listed on the FCC OET website at:  
[https://apps.fcc.gov/oetcf/eas/reports/ViewTestFirmAccredScopes.cfm?calledFromFrame=N&RequestTimeout=500&regnum\\_specified=N&test\\_firm\\_id=7007](https://apps.fcc.gov/oetcf/eas/reports/ViewTestFirmAccredScopes.cfm?calledFromFrame=N&RequestTimeout=500&regnum_specified=N&test_firm_id=7007)

## 1.1 Introduction

This Spectrum Access Server (SAS) Conformity Assessment Report applies to the **Nokia Flexi Zone Multiband Outdoor Micro Base Station CBRS (MBO-CBRS)** with Long Term Evolution (LTE) Technology (PRIO4781), hereinafter referred to as the Equipment Under Test (EUT) or the Citizens Broadband Radio Service Device (**CBSD**).

The EUT operates in the Citizens Broadband Radio Service (**CBRS**) domestic 3550-3700 MHz band (3.5 GHz Band), i.e., E-UTRAN band 48, with TDD-LTE technologies. It is a Nokia designed product and is designed with TDD\_LTE technology with capability for 10, 15 and 20 MHz carrier bandwidths.

This report documents the digital interface conformance and operational interaction between the SAS and the CBSD.

This professionally installed Category B CBSD uses the protocol developed by WInnForum. The testing herein demonstrates compliance to WInnForum Standards™ Interface Specifications, and affirm that the device will conform to the communications security methods used by the SAS. The testing performed herein uses the SAS emulator developed by Wireless Innovation Forum (“WInnForum”) to demonstrate compliance.

The demonstration of compliance to the WInnForum Interface Specification must use a test lab that has been recognized by WInnForum. Nokia’s Global Product Compliance Laboratory is the first accredited WInnForum CBRS Approved Lab and is a CBRS Alliance Authorized Test Lab

The RF output of this CBSD has a maximum power is 2W (33.0dBm) per transmit port with 2x MIMO operation for one or two carriers. Total power for two ports is 4W (36.0 dBm). The RF performance of the product is documented in the separate Part 96 Radio Filing Test Report.

## 1.2 Purpose and Scope

The purpose of this document is to documents the digital interface conformance and operational interaction between the SAS and the CBSD.

This test data required for qualifying the EUT CBDS in compliance with FCC Part 96 requirements for certification under FCC Part 2, measured in accordance with the procedures set out in Section 2.1033 (c) (14) of the Rules and per KDB Publication 940660 D01.

## 1.3 EUT Description

The **Nokia Flexi Zone Multiband Outdoor Micro Base Station (MBO)** is a small cell that consists of a common digital system module (host) and up to three LTE (Long Term Evolution) RF transceiver modules in various combinations. Each RF transceiver module supports 2 Tx/Rx branches.

The **FCC ID: 2AD8UFW2QMBOM1 CBRS RF Module (MBO) was previously certified for Band 48 operation**. The EUT supports LTE-TDD operation with 10, 15 and 20 MHz carrier bandwidths and has a maximum RF power output capability of 2W at each of its 2 MIMO transmit port outputs. The **MBO B48** transceiver module, the subject of this application, is always collocated with an MBO digital system (host) module.

## 1.4 Test Rational

The hardware of the CBSD / MBO-Band 48 is identical to that of the previously certified Band 48 product. There were no hardware changes. Since there were no changes to the basic frequency determining and stabilizing circuitry, frequency multiplication stages, basic modulator circuit or maximum power level, a FCC Class II permissive approval is needed for supporting LTE-TDD operation over the extended 3550-3700 MHz band (3.5 GHz Band), i.e., E-UTRAN band 48. This RF performance is reported in a separate test report.

The operation of the CBSD product with the SAS evaluation is evaluated herein.

### 1.4.1 Test Requirements

The test requirements are described in CFR47 Part 2 and WInnForum Standards™ Each required measurement is listed below:

WINNF-TS-0122	Paragraph 6.1	CBSD Registration Process
WINNF-TS-0122	Paragraph 6.2	CBSD Spectrum Inquiry Process
WINNF-TS-0122	Paragraph 6.3	CBSD Spectrum Grant Process
WINNF-TS-0122	Paragraph 6.4	CBSD Heart Beat Process
WINNF-TS-0122	Paragraph 6.5	CBSD Measurement Report
WINNF-TS-0122	Paragraph 6.6	CBSD Relinquishment Process
WINNF-TS-0122	Paragraph 6.7	CBSD Deregistration Process
WINNF-TS-0122	Paragraph 6.8	CBSD Security Validation
WINNF-TS-0122	Paragraph 7	SAS-CBSD/DP Interface Performance Test Specifications
WINNF-TS-0122	Paragraph 7.1	CBSD RF Power Measurement

Section 2.1046  
Section 2.1047

RF Power Output  
Modulation Characteristics



## 1.5 Reference Documents, Test Specifications & Procedures

A list of the applicable documents is provided herein.

### 1.5.1 Reference Documents

A list of the applicable documents is provided herein:

- ETSI TS 136 104 V13.5.0 (2016-10) LTE; Evolved Universal Terrestrial Radio Access (E-UTRA); Base Station (BS) radio transmission and reception (3GPP TS 36.104 version 13.5.0 Release 13)

### 1.5.2 Test Specifications

- CBRS Alliance Certification Test Plan, CBRSA-TS-9001 V1.0.0, 20 March 2018
- Working Document WINNF-TS-0122, Test and Certification for Citizens Broadband Radio Service (CBRS); Conformance and Performance Test Technical Specification; CBSD/DP as Unit Under Test (UUT), Version V1.0.0, 19 December 2017
- Code of Federal Regulations 47, Federal Communications Commission Part 96, Subpart E – Citizens Broadband Radio Services.
- KDB 940660 D01 (Current Version) – Certification and Test Procedures for Citizens Broadband Radio Service Devices Authorized under Part 96 of The Rules, DR01 (Currently in Draft Version)
- KDB 971168 D01 (Current Version) - Measurement Guidance for Certification of Licensed Digital Transmitters

### 1.5.3 Procedures

1. GPCL Procedure FCC-WINN-SAS, Test and Certification for Citizens Broadband Radio Service (CBRS); Conformance and Performance Test Technical Specification; CBSD/DP as Unit Under Test (UUT) Test Procedure
2. GPCL Procedure FCC-IC-OB, Power measurement, Occupied Bandwidth, & Modulation Test Procedure
3. ANSI C63.26 (2015) entitled: “American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services”, American National Standards Institute, Institute of Electrical and Electronic Engineers, Inc., New York, NY 10017-2394, USA.

### 1.5.4 MEASUREMENT UNCERTAINTY

The results of the calculations to estimate uncertainties for the several test methods and standards are shown in the Table below. These are the worst-case values.

**Worst-Case Estimated Measurement Uncertainties**

Standard, Method or Procedure	Condition	Frequency MHz	Expanded Uncertainty (k=2)
a. Classical Emissions, ( <i>e.g.</i> , ANSI C63.4, C63.26, CISPR 11, 14, 22, <i>etc.</i> , using ESHS 30, AR-6 Semi-Anechoic Chamber	Conducted Emissions	10 – 10,000	±3.5 dB

Antenna Port Test	Signal Bandwidth	Frequency Range	Expanded Uncertainty (k=2), Amplitude
Occupied Bandwidth, Edge of Band, Conducted Spurious Emissions	10 Hz 100 Hz 10 kHz to 1 MHz 1MHz	9 kHz to 20 MHz 20 MHz to 1 GHz 1 GHz to 10 GHz 10 GHz to 40 GHz:	1.78 dB
RF Power with Power Meter	10 Hz to 20 MHz	50 MHz to 18 GHz	0.5 dB

## 1.6 Product Equipage

### 1.6.1 System Interconnect Block Diagram

#### Test Configuration

The EUT was fully populated and configured as in a normal installation and intended operation. See the attached FCC Test Report for details.

## 1.7 Executive Summary

### RESULTS:

1. **COMPLIES** - Passed all applicable tests.
2. **N/A** – Not Applicable.
3. **NT** – Not Tested.

WINNF-TS-0122	Paragraph 6.1	CBSD Registration Process	Date Tested	Result
WINNF-TS-0122	Paragraph 6.2	CBSD Spectrum Inquiry Process	6/13/18	<b>Complies</b>
WINNF-TS-0122	Paragraph 6.3	CBSD Spectrum Grant Process	6/13/18	<b>Complies</b>
WINNF-TS-0122	Paragraph 6.4	CBSD Heart Beat Process	6/13-15/18	<b>Complies</b>
WINNF-TS-0122	Paragraph 6.5	CBSD Measurement Report	6/15/18	<b>Complies</b>
WINNF-TS-0122	Paragraph 6.6	CBSD Relinquishment Process	6/18/18	<b>Complies</b>
WINNF-TS-0122	Paragraph 6.7	CBSD Deregistration Process	6/18/18	<b>Complies</b>
WINNF-TS-0122	Paragraph 6.8	CBSD Security Validation	6/20/18	<b>Complies</b>
WINNF-TS-0122	Paragraph 7	SAS-CBSD/DP Interface Performance Test Specifications	Not Tested	<b>NT</b>
WINNF-TS-0122	Paragraph 7.1	CBSD RF Power Measurement	6/20-27/18	<b>Complies</b>

## 2. Detailed Results

The results of the individual test cases are detailed in below. Documentation of specific data items follow.

### 2.1 CBSD Registration Process

#### 2.1.1 WINNF.FT.C.REG.1

Test Case Title	Result P/F / (NT)	Log File Name	Comment
Multi-Step registration	Pass	WINNF.FT.C.REG.1_2018-06-13T15.49.19Z.log	Log and screen034

#### 2.1.2 WINNF.FT.C.REG.3

Test Case Title	Result P/F / (NT)	Log File Name	Comment
Single-Step registration for Category A CBSD	Pass	WINNF.FT.C.REG.3_2018-06-13T15.56.34Z	

#### 2.1.3 WINNF.FT.C.REG.5

Test Case Title	Result P/F / (NT)	Log File Name	Comment
Single-Step registration for CBSD with CPI signed data	Pass	WINNF.FT.C.REG.5_2018-06-13T16.14.42Z	

#### 2.1.4 WINNF.FT.C.REG.7

Test Case Title	Result P/F / (NT)	Log File Name	Comment
Registration due to change of an installation parameter	Pass	WINNF.FT.C.REG.7_2018-06-13T16.23.15Z	Log and screen036

#### 2.1.5 WINNF.FT.C.REG.8

Test Case Title	Result P/F / (NT)	Log File Name	Comment
Missing Required parameters (responseCode 102)	Pass	WINNF.FT.C.REG.8_2018-06-13T16.53.42Z	Log and screen038

#### 2.1.6 WINNF.FT.C.REG.10

Test Case Title	Result P/F / (NT)	Log File Name	Comment
Pending registration (responseCode 200)	Pass	WINNF.FT.C.REG.10_2018-06-13T17.01.07Z	Log and screen039

#### 2.1.7 WINNF.FT.C.REG.12

Test Case Title	Result P/F / (NT)	Log File Name	Comment
Invalid parameter (responseCode 103)	Pass	WINNF.FT.C.REG.12_2018-06-13T17.08.20Z	Log and screen040

#### 2.1.8 WINNF.FT.C.REG.14

Test Case Title	Result P/F / (NT)	Log File Name	Comment
Blacklisted CBSD (responseCode 101)	Pass	WINNF.FT.C.REG.14_2018-06-13T17.16.48Z	Log and screen041

#### 2.1.9 WINNF.FT.C.REG.16

Test Case Title	Result P/F / (NT)	Log File Name	Comment
Unsupported SAS protocol version (responseCode 100)	Pass	WINNF.FT.C.REG.16_2018-06-13T17.22.47Z	Log and screen042

### 2.1.10 WINNF.FT.C.REG.18

Test Case Title	Result P/F / (NT)	Log File Name	Comment
Group Error (responseCode 201)	Pass	WINNF.FT.C.REG.18_2018-06-13T17.26.36Z	Log and screen043

### 2.1.11 WINNF.FT.C.REG.20

Test Case Title	Result P/F / (NT)	Log File Name	Comment
Category A CBSD location update	NT	N/A	N/A for Category B

## 2.2 CBSD Spectrum Inquiry Process

### 2.2.1 Successful response from SAS Test Harness

Test Case Title	Result P/F / (NT)	Log File Name	Comment
Successful response from SAS Test Harness (6.2.4.1)	NT	N/A	N/A for CBSD

### 2.2.2 Successful spectrum Inquiry response from SAS

Test Case Title	Result P/F / (NT)	Log File Name	Comment
Successful spectrum Inquiry response from SAS (6.2.4.1.1)	NT	N/A	N/A for CBSD

## 2.3 CBSD Spectrum Grant Process

### 2.3.1 WINNF.FT.D.GRA.1

Test Case Title	Result P/F / (NT)	Log File Name	Comment
Unsuccessful Grant responseCode=400 (INTERFERENCE)	Pass	WINNF.FT.C.GRA.1_2018-06-13T17.37.15Z	Log and screen044

### 2.3.2 WINNF.FT.C.GRA.2

Test Case Title	Result P/F / (NT)	Log File Name	Comment
Unsuccessful Grant responseCode=401 (GRANT_CONFLICT)	Pass	WINNF.FT.C.GRA.2_2018-06-13T17.43.40Z	Log and screen045

## 2.4 CBSD Heart Beat Process

### 2.4.1 WINNF.FT.C.HBT.1

Test Case Title	Result P/F / (NT)	Log File Name	Comment
Heartbeat Success Case (first Heartbeat Response)	Pass	WINNF.FT.C.HBT.1_2018-06-21T04.25.21Z	Log and screen046-049

### 2.4.2 WINNF.FT.C.HBT.3

Test Case Title	Result P/F / (NT)	Log File Name	Comment
Heartbeat responseCode=105 (DEREGISTER)	Pass	WINNF.FT.C.HBT.3_2018-06-14T19.54.09Z	Log and screen

### 2.4.3 WINNF.FT.C.HBT.4

Test Case Title	Result P/F / (NT)	Log File Name	Comment
Heartbeat responseCode=500 (TERMINATED_GRANT)	Pass	WINNF.FT.C.HBT.4_2018-06-27T19.14.46Z	

### 2.4.4 WINNF.FT.C.HBT.5

Test Case Title	Result P/F / (NT)	Log File Name	Comment
Heartbeat responseCode=501 (SUSPENDED_GRANT) in First Heartbeat Response	Pass	WINNF.FT.C.HBT.5_2018-06-15T03.31.09Z	

### 2.4.5 WINNF.FT.C.HBT.6

Test Case Title	Result P/F / (NT)	Log File Name	Comment
Heartbeat responseCode=501 (SUSPENDED_GRANT) in Subsequent Heartbeat Response	Pass	WINNF.FT.C.HBT.6_2018-06-27T19.40.13Z	

### 2.4.6 WINNF.FT.C.HBT.7

Test Case Title	Result P/F / (NT)	Log File Name	Comment
Heartbeat responseCode=502 (UNSYNC_OP_PARAM)	Pass	WINNF.FT.C.HBT.7_2018-06-21T05.29.52Z	

### 2.4.7 WINNF.FT.C.HBT.9

Test Case Title	Result P/F / (NT)	Log File Name	Comment
Heartbeat Response Absent (First Heartbeat)	Pass	WINNF.FT.C.HBT.9_2018-06-15T16.16.44Z	Log and screen069

### 2.4.8 WINNF.FT.C.HBT.10

Test Case Title	Result P/F / (NT)	Log File Name	Comment
Heartbeat Response Absent (Subsequent Heartbeat)	Pass	WINNF.FT.C.HBT.10_2018-06-15T16.28.54Z	Log and screen070-071

### 2.4.9 WINNF.FT.C.HBT.11

Test Case Title	Result P/F / (NT)	Log File Name	Comment
Successful Grant Renewal in Heartbeat Test Case	Pass	WINNF.FT.C.HBT.11_2018-06-15T17.06.24Z	Log and screen072

## 2.5 CBSD Measurement Report

### 2.5.1 WINNF.FT.C.MES.1

Test Case Title	Result P/F / (NT)	Log File Name	Comment
Registration Response contains measReportConfig	Pass	WINNF.FT.C.MES.1_2018-06-15T17.38.06Z	

### 2.5.2 WINNF.FT.C.MES.3

Test Case Title	Result P/F / (NT)	Log File Name	Comment
Grant Response contains measReportConfig	Pass	WINNF.FT.C.MES.3_2018-06-18T14.09.25Z	

### 2.5.3 WINNF.FT.C.MES.4

Test Case Title	Result P/F / (NT)	Log File Name	Comment
Heartbeat Response contains measReportConfig	Pass	WINNF.FT.C.MES.4_2018-06-18T14.28.22Z	

## 2.6 CBSD Relinquishment Process

### 2.6.1 WINNF.FT.C.RLQ.1

Test Case Title	Result P/F / (NT)	Log File Name	Comment
Successful Relinquishment	Pass	WINNF.FT.C.RLQ.1_2018-06-19T00.40.56Z	Screen075,076

### 2.6.2 WINNF.FT.C.RLQ.3

Test Case Title	Result P/F / (NT)	Log File Name	Comment
Unsuccessful Relinquishment, responseCode=102	Pass	WINNF.FT.C.RLQ.3_2018-06-19T00.50.13Z	Log and screen077-078

### 2.6.3 WINNF.FT.C.RLQ.5

Test Case Title	Result P/F / (NT)	Log File Name	Comment
Unsuccessful Relinquishment, responseCode=103	Pass	WINNF.FT.C.RLQ.5_2018-06-19T01.01.50Z	Log and screen079-080

## 2.7 CBSD Deregistration Process

### 2.7.1 WINNF.FT.C.DRG.1

Test Case Title	Result P/F / (NT)	Log File Name	Comment
Successful Deregistration	Pass	WINNF.FT.C.DRG.1_2018-06-19T01.13.16Z	Log and screen081-082

### 2.7.2 WINNF.FT.C.DRG.3

Test Case Title	Result P/F / (NT)	Log File Name	Comment
Deregistration responseCode=102	Pass	WINNF.FT.C.DRG.3_2018-06-19T01.41.51Z	Log & screen088, 090, Tx off 16 sec. post Trig

### 2.7.3 WINNF.FT.C.DRG.5

Test Case Title	Result P/F / (NT)	Log File Name	Comment
Deregistration responseCode=103	Pass	WINNF.FT.C.DRG.5_2018-06-19T01.56.41Z	Log and screen091-092, Tx off 6 sec. post Trig

## 2.8 CBSD Security Validation

### 2.8.1 WINNF.FT.C.SCS.1

Test Case Title	Result P/F / (NT)	Log File Name	Comment
Successful TLS connection between UUT and SAS Test Harness	Pass	SCS.1_TLSv1.2_Positive-2reset	

### 2.8.2 WINNF.FT.C.SCS.2

Test Case Title	Result P/F / (NT)	Log File Name	Comment
TLS failure due to revoked certificate	Pass	SCS.2_TLSv1.2_NegativeCRLExtension-2	There was no Tx

### 2.8.3 WINNF.FT.C.SCS.3

Test Case Title	Result P/F / (NT)	Log File Name	Comment
TLS failure due to expired server certificate	Pass	SCS.3_TLSv1.2_NegativeExpired-2	There was no Tx

### 2.8.4 WINNF.FT.C.SCS.4

Test Case Title	Result P/F / (NT)	Log File Name	Comment
TLS failure when SAS Test Harness certificate is issue by unknown CA	Pass	SCS.4_TLSv1.2_NegativeUnknown-2	There was no Tx

### 2.8.5 WINNF.FT.C.SCS.5

Test Case Title	Result P/F / (NT)	Log File Name	Comment
TLS failure when certificate at the SAS Test Harness is corrupted	Pass	SCS.5_TLSv1.2_NegativeCorrupted	There was no Tx

## 2.9 SAS-CBSD/DP Interface Performance Test Specifications

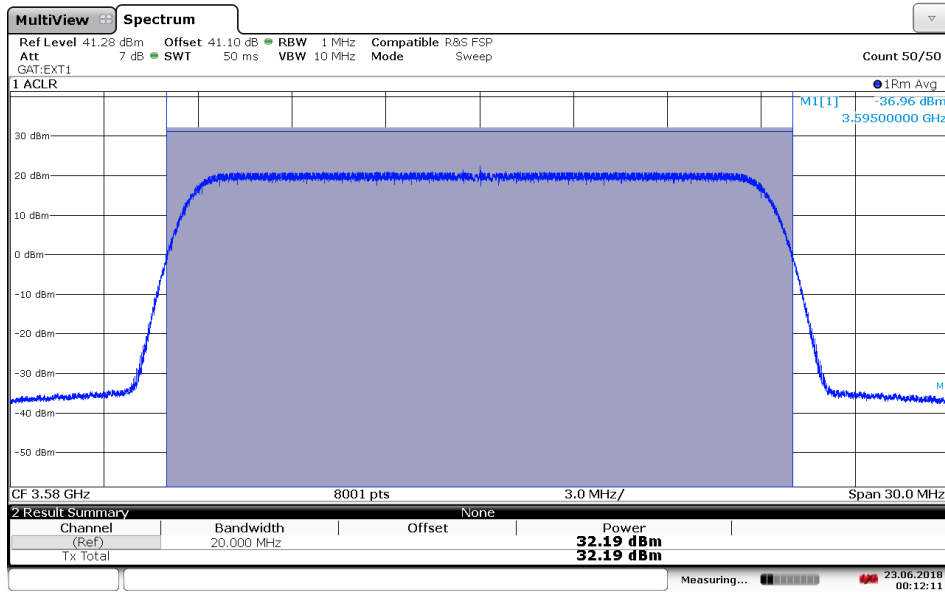
Not Tested



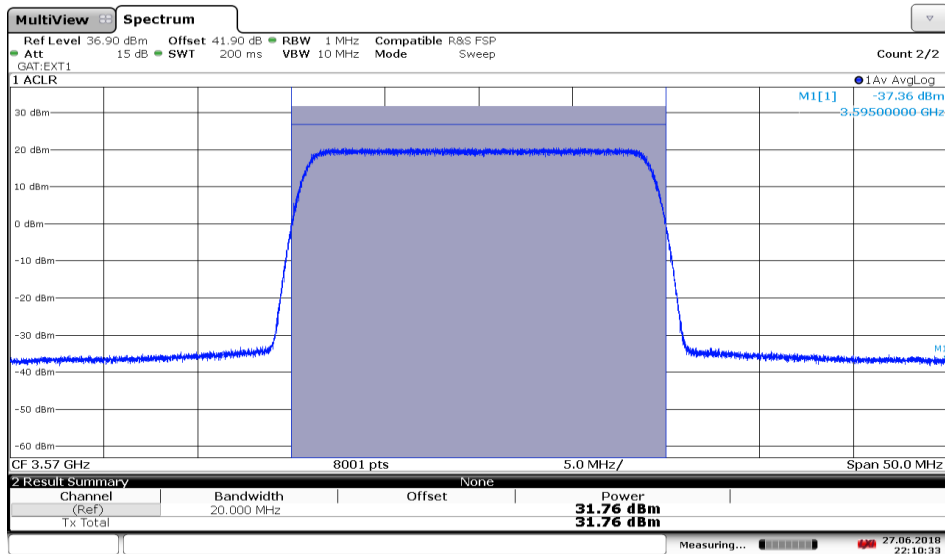
## 2.10 CBSD RF Power Measurement

### 2.10.1 WINNF.PT.C.HBT

Test Case Title	Result P/F / (NT)	Log File Name	Comment or Plot Data Reference
UUT RF Transmit Power Measurement	Pass	WINNF.PT.C.HBT.1_2018-06-22T21.58.25Z 33 -20dBm_Tx1  WINNF.PT.C.HBT.1_2018-06-21T06.14.41Z-Tx2 33dBm RF PWR	TX1 = 32.19 dBm/20 MHz TX2 = 31.76 dBm/20 MHz  32.19 dBm/20MHz x 2 carriers = 32.19 dBm/10MHz 32.19 dBm/10MHz + 6dBi Gain = 38.19 dBm/10MHz EIRP ≤ 47dBm/10MHz Limit PASS



00:12:12 23.06.2018



22:10:33 27.06.2018

### 3. List of Test Equipment

The Equipment used for performance of the tests results are listed below.

**Asset ID Manufacturer Type Description Model Serial Calibration Date Calibration Due Calibration Type Status**

Asset ID ^	Manufacturer	Type	Description	Model	Serial	Calibration Date	Calibration Due
<a href="#">P339</a>	Control Company	Electronic Stopwatch		1051	181179959	2018-05-12	2020-05-12
<a href="#">E950</a>	Agilent Technologies	Power Meter	P-Series	N1921A	MY45101984	2018-03-29	2020-03-29
<a href="#">E949</a>	Agilent Technologies	Power Sensor	-35 - +20 dBm 50 MHz -18 GHz	N1921A	MY45242502	2018-04-02	2020-04-02
<a href="#">E1260</a>	Rohde & Schwarz	Spectrum Analyzer	10 Hz-67 GHz	FSW67	104007	2018-02-12	2020-02-12
<a href="#">P324</a>	Extech	Data Logger	Pres/Humidity/Temp Data Logger	SD700	Q679346	2016-06-26	2018-06-26
GPCL-LAP-231	Lenova	Thinkpad	GPCL-LAP-231			N/A	N/A
FWQA-LMTS	Nokia	Trigger Buffer	Timing Trigger buffer	FWQA-LMTS U81B051.00	EC163610199	N/A	N/A

#### 4. NVLAP Certificate of Accreditation

United States Department of Commerce  
National Institute of Standards and Technology



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**Certificate of Accreditation to ISO/IEC 17025:2005**

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NVLAP LAB CODE: 100275-0

**Nokia, Global Product Compliance Lab**  
Murray Hill, NJ

*is accredited by the National Voluntary Laboratory Accreditation Program for specific services,  
listed on the Scope of Accreditation, for:*

**Electromagnetic Compatibility & Telecommunications**

*This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005.  
This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality  
management system (refer to joint ISO-ILAC-IAF Communique dated January 2009).*

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2017-08-17 through 2018-09-30  
*Effective Dates*





  
*For the National Voluntary Laboratory Accreditation Program*


## 5. Appendix A WinnForum Log Files


The following Log files are a record of WinnForum here tests performed. SCS Log files are not recorded here due to their large file size. This Appendix will be supplied to the FCC as a MSWord file.


  
WINNF.FT.C.DRG.1\_2018-06-19T01.13.16Z.log

  
WINNF.FT.C.DRG.5\_2018-06-19T01.56.41Z.log


  
WINNF.FT.C.GRA.2\_2018-06-13T17.43.40Z.log


  
WINNF.FT.C.HBT.3\_2018-06-14T19.54.09Z.log


  
WINNF.FT.C.HBT.5\_2018-06-15T03.31.09Z.log


  
WINNF.FT.C.HBT.7\_2018-06-21T05.29.52Z.log

  
WINNF.FT.C.HBT.10\_2018-06-15T16.28.54Z.log

  
WINNF.FT.C.REG.1\_2018-06-13T15.49.19Z.log

  
WINNF.FT.C.REG.16\_2018-06-13T17.22.47Z.log


  
WINNF.FT.C.RLQ.1\_2018-06-19T00.40.56Z.log


  
WINNF.FT.C.RLQ.5\_2018-06-19T01.01.50Z.log


  
WINNF.FT.C.DRG.3\_2018-06-19T01.41.51Z.log

  
WINNF.FT.C.GRA.1\_2018-06-13T17.37.15Z.log


  
WINNF.FT.C.HBT.1\_2018-06-21T04.25.21Z.log


  
WINNF.FT.C.HBT.4\_2018-06-27T19.14.46Z.log

  
WINNF.FT.C.HBT.6\_2018-06-27T19.40.13Z.log

  
WINNF.FT.C.HBT.9\_2018-06-15T16.16.44Z.log

  
WINNF.FT.C.HBT.11\_2018-06-15T17.06.24Z.log

  
WINNF.FT.C.REG.3\_2018-06-13T15.56.34Z.log

  
WINNF.FT.C.REG.18\_2018-06-13T17.26.36Z.log

  
WINNF.FT.C.RLQ.3\_2018-06-19T00.50.13Z.log