

TEST REPORT
CBSD-SAS Interoperability**Applicant Name:**Netcomm Wireless Limited
18-20 Orion Road
Lane Cove NSW 2066,
Sydney Australia**Date of Testing:**

11/14 – 11/19/2019

Test Site/Location:

PCTEST Lab. Columbia, MD, USA

Test Report Serial No.:

1M1911140186.XIA

FCC ID:**XIA-IFWA661****APPLICANT:****NETCOMM WIRELESS LIMITED****Application Type:**

Class II Permissive Change

Model:

IFWA-661,

Additional Model:

OWAR1-35

EUT Type:

Outdoor LTE Router

Frequency Range:

3550 – 3700 MHz

FCC Classification:

Citizens Band Category A and B Devices (CBD)

FCC Rule Part(s):

Part 96

Class II Perm. Change:

Please see Change Document

Test Procedure(s):

KDB 940660 D01 v02, KDB 940660 D02 v01, WINNF-TS-0122-V1.0.0, CBRSA-TS-9001 V.1.0.0, [WINNF-19-IN-00033] CBRs CPE-CBSD as UUT Test Guidelines Version V1.0

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.


Randy Ortanez
President

FCC ID: XIA-IFWA661	 MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1911140186.XIA	Test Dates: 11/14-11/19/2019	EUT Type: Outdoor LTE Router	Page 1 of 13

T A B L E O F C O N T E N T S

1.0	INTRODUCTION.....	3
1.1	Scope.....	3
1.2	PCTEST 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 – UUT RF Transmit power measurement.....		11
APPENDIX B – TEST LOGS.....		13

FCC ID: XIA-IFWA661		MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1911140186.XIA	Test Dates: 11/14-11/19/2019	EUT Type: Outdoor LTE Router	Page 2 of 13	

1.0 INTRODUCTION

1.1 Scope

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

1.2 PCTEST Test Location

These measurement tests were conducted at the PCTEST Engineering Laboratory, Inc. facility located at 7185 Oakland Mills Road, Columbia, MD 21046.

1.3 Test Facility / Accreditations

Measurements were performed at PCTEST Engineering Lab located in Columbia, MD 21046, U.S.A.

- PCTEST is a CBRS Alliance (OnGo) Approved Test Lab
- PCTEST is a WinnForum Approved Test Lab
- PCTEST is an ISO 17025-2005 accredited test facility under the American Association for Laboratory Accreditation (A2LA) with Certificate number 2041.01 for CBRS Alliance Test Plan and WinnForum Conformance and Performance Test Technical Standard.
- PCTEST is an ISO 17025-2005 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.
- PCTEST 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).
- PCTEST facility is a registered (2451B) test laboratory with the site description on file with ISSED.

FCC ID: XIA-IFWA661		MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1911140186.XIA	Test Dates: 11/14-11/19/2019	EUT Type: Outdoor LTE Router		Page 3 of 13

2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the Netcomm Wireless Limited Residential Gateway **FCC ID: XIA-IFWA661**. The test data contained in this report pertains only to CBSD-SAS interoperability. The EUT is not a Domain Proxy. The EUT will register with a SAS when operating below 23dBm.

Test Device Serial Number(s): 25JUL-1

Test Device Hardware Version: 1.4

Test Device Software Version: 1.1.26.29

2.2 Device Capabilities

This device contains the following capabilities:

LTE Band 30, 48

This device supports the following conditional features:

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

Table 2-1. Conditional Features

2.3 Test Configuration

Test configuration is setup per [WINNF-19-IN-00033] CBRS CPE-CBSD as UUT Test Guidelines Version V1.0. The EUT was connected to the SAS Test Harness developed by WINNF WG4-CBSD. The BTS-CBSD used is the Ruckus Q710 (FCC ID: S9GQ910US00). The latest version of the SAS Test Harness (V1.0.0.2) provided by CBRS Alliance was used for BTS-CBSD and CPE-CBSD. The SAS Test Harnesses are synchronized to UTC time.

2.4 Modifications

No modifications were made to EUT during testing.

FCC ID: XIA-IFWA661		MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1911140186.XIA	Test Dates: 11/14-11/19/2019	EUT Type: Outdoor LTE Router		Page 4 of 13

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	N9030A	PXA Signal Analyzer	6/12/2019	Annual	6/12/2020	MY52350166
Dell	Latitude 5580	Test Harness Laptop	N/A	N/A	N/A	N/A
AA-MCS	PWD-2W-0.5-6G-10W-SF	2-Way Power Divider/Combiner	2/20/2019	Annual	2/20/2020	1020 - 004
Weinschel	4T-20	20dB Attenuator	2/20/2019	Annual	2/20/2020	N/A
Seekonk	NC-100	Torque Wrench	5/4/2018	2 year	5/4/2020	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

FCC ID: XIA-IFWA661	 MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)			Approved by: Quality Manager
Test Report S/N: 1M1911140186.XIA	Test Dates: 11/14-11/19/2019	EUT Type: Outdoor LTE Router		Page 5 of 13

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).

FCC ID: XIA-IFWA661		MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1911140186.XIA	Test Dates: 11/14-11/19/2019	EUT Type: Outdoor LTE Router		Page 6 of 13

5.0 EVALUATION PROCEDURE

The measurement procedure described in KDB 940660 D01 v01 and WINNF-TS-0122-V1.0.0 was used in the measurement of the EUT.

Deviation from measurement procedure.....None

FCC ID: XIA-IFWA661		MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1911140186.XIA	Test Dates: 11/14-11/19/2019	EUT Type: Outdoor LTE Router		Page 7 of 13

6.0 TEST SUMMARY

6.1 Summary

Company Name: Netcomm Wireless Limited

FCC ID: XIA-IFWA661

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.5 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	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	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.5 WINNF.FT.C.HBT.6 WINNF.FT.C.HBT.7 WINNF.FT.C.HBT.9 WINNF.FT.C.HBT.10 WINNF.FT.C.RLQ.1 WINNF.FT.C.DRG.1	Pass

FCC ID: XIA-IFWA661		MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1911140186.XIA	Test Dates: 11/14-11/19/2019	EUT Type: Outdoor LTE Router		Page 8 of 13

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.HBT.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 (± 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.HBT.1	Pass
96E	12	When CBSDs communicate through a management system, confirm compliance with all requirements	N/A	Pass
96.39	13	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.
- The changes implemented on the EUT for this C2PC:
 1. Does not impact the EUT’s ability to transmit within the authorized band as set up by the BTS-CBSD.
 2. Does not impact the EUT’s transmission level during SAS registration prior to SAS grant.
- Please see Appendices for test data.

FCC ID: XIA-IFWA661		MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1911140186.XIA	Test Dates: 11/14-11/19/2019	EUT Type: Outdoor LTE Router		Page 9 of 13

7.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the Netcomm Wireless Limited Residential Gateway **FCC ID: XIA-IFWA661** has been tested to show compliance with Part 96 and KDB 940660.

FCC ID: XIA-IFWA661	 PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	 NetComm	Approved by: Quality Manager
Test Report S/N: 1M1911140186.XIA	Test Dates: 11/14-11/19/2019	EUT Type: Outdoor LTE Router	Page 10 of 13	

APPENDIX A – UUT RF TRANSMIT POWER MEASUREMENT

	Test Execution Steps	PASS	FAIL
1	Ensure the following conditions are met for test entry: • UUT has successfully completed SAS Discovery and Authentication with the SAS Test Harness • UUT has registered with the SAS, with CBSdId = C • 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 <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>	--	--
2	UUT and SAS Test Harness perform a series of Heartbeat Request/Response cycles, which continues until the other test steps are complete. Messaging for each cycle is as follows: • UUT sends Heartbeat Request, including: - o cbsdId = C - o grantId = G • SAS Test Harness responds with Heartbeat Response, including: - o cbsdId = C - o grantId = G - o transmitExpireTime = current UTC time + 200 seconds - o responseCode = 0	--	--
3	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. <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>	☒	☐

FCC ID: XIA-IFWA661		MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1911140186.XIA	Test Dates: 11/14-11/19/2019	EUT Type: Outdoor LTE Router		Page 11 of 13

Testing is performed per KDB 971168 D01 and across the transmit dynamic range of 32dBm/MHz to 14dBm/MHz for 20MHz Bandwidth.

Using a CMW500, the UUT was configured to transmit at maximum power from the main antenna. The EIRP was calculated by summing the conducted power level and antenna gain.

Frequency [MHz]	Bandwidth [MHz]	SAS Granted maxEIRP [dBm/MHz]	Conducted PSD [dBm/MHz]	Ant Gain [dBi]	Calculated EIRP [dBm/MHz]	Margin [dB]
3625 (mid)	20	32	9.62	19.00	28.62	-3.38
3625 (mid)	20	22	0.04	19.00	19.04	-2.96
3625 (mid)	20	14	-7.52	19.00	11.48	-2.52
3560 (low)	20	32	9.75	19.00	28.75	-3.25
3690 (High)	20	32	8.06	19.00	27.06	-4.94

Table A-1 RF Output Power Measurements (WINNF.PT.C.HBT.1)

FCC ID: XIA-IFWA661	 MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)			Approved by: Quality Manager
Test Report S/N: 1M1911140186.XIA	Test Dates: 11/14-11/19/2019	EUT Type: Outdoor LTE Router		Page 12 of 13

APPENDIX B – TEST LOGS

Logs are available upon request

 winnf.ft.c.drg.1_2019-11-14T19.55.46Z.log Text Document	 winnf.ft.c.gra.1_2019-11-14T19.58.10Z.log Text Document
 winnf.ft.c.gra.2_2019-11-14T19.59.25Z.log Text Document	 winnf.ft.c.hbt.1_2019-11-14T20.00.57Z.log Text Document
 winnf.ft.c.hbt.3_2019-11-14T20.07.46Z.log Text Document	 winnf.ft.c.hbt.4_2019-11-14T20.12.52Z.log Text Document
 winnf.ft.c.hbt.5_2019-11-14T20.19.25Z.log Text Document	 winnf.ft.c.hbt.6_2019-11-14T20.22.47Z.log Text Document
 winnf.ft.c.hbt.7_2019-11-14T20.28.44Z.log Text Document	 winnf.ft.c.hbt.9_2019-11-14T20.38.58Z.log Text Document
 winnf.ft.c.hbt.10_2019-11-14T21.03.54Z.log Text Document	 winnf.ft.c.reg.1_2019-11-14T18.59.56Z.log Text Document
 winnf.ft.c.reg.5_2019-11-14T19.35.38Z.log Text Document	 winnf.ft.c.reg.8_2019-11-14T19.38.17Z.log Text Document
 winnf.ft.c.reg.10_2019-11-14T19.39.27Z.log Text Document	 winnf.ft.c.reg.12_2019-11-14T19.40.50Z.log Text Document
 winnf.ft.c.reg.14_2019-11-14T19.41.49Z.log Text Document	 winnf.ft.c.reg.16_2019-11-14T19.42.52Z.log Text Document
 winnf.ft.c.reg.18_2019-11-14T19.44.05Z.log Text Document	 winnf.ft.c.rlq.1_2019-11-15T18.11.05Z.log Text Document

FCC ID: XIA-IFWA661		MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1911140186.XIA	Test Dates: 11/14-11/19/2019	EUT Type: Outdoor LTE Router		Page 13 of 13