

TEST REPORT

CBSD-SAS Interoperability

Applicant Name:
SEOWON INTECH
69, LS-ro 115beon-gil, Gunpo-si
Gyeonggi-do,
Korea
15809

Date of Testing:
2/11 – 2/28/2020
Test Site/Location:
PCTEST Lab. Columbia, MD, USA
Test Report Serial No.:
1M1912230222-02.V7M

FCC ID:	V7MBSLC-120T42OGA
APPLICANT:	SEOWON INTECH

Application Type:	Certification
Model:	SLC-120T42OGA
EUT Type:	Outdoor LTE Router
Frequency Range:	3550 – 3700 MHz
FCC Classification:	Citizens Band Category A and B Device (CBD)
FCC Rule Part(s):	Part 96
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: V7MBSLC-120T42OGA	 MEASUREMENT REPORT (CERTIFICATION)	 SEOWON INTECH	Approved by: Quality Manager
Test Report S/N: 1M1912230222-02.V7M	Test Dates: 2/13 – 2/28-2020	EUT Type: Outdoor LTE Router	Page 1 of 14

TABLE OF CONTENTS

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 – TEST RESULT AND DATA		11
APPENDIX B – CPE-CBSD INITIAL SAS COMMUNICATIONS duty cycle (x OF y)		12
APPENDIX C – TEST LOGS.....		14

FCC ID: V7MBSLC-120T42OGA		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1912230222-02.V7M	Test Dates: 2/13 – 2/28-2020	EUT Type: Outdoor LTE Router	Page 2 of 14	

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, LLC 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 Certification 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: V7MBSLC-120T42OGA		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1912230222-02.V7M	Test Dates: 2/13 – 2/28-2020	EUT Type: Outdoor LTE Router		Page 3 of 14

2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the Seowon Intech LTE Outdoor CPE **FCC ID: V7MBSLC-120T42OGA**. The test data contained in this report pertains only to CBSD-SAS interoperability. The EUT is not a Domain Proxy.

Test Device Serial Number(s): KRS0113C120T42OGA-00001

Test Device Hardware Version: 1.0

Test Device Software Version: 1.10.4

2.2 Device Capabilities

This device contains the following capabilities:

LTE Band 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: V7MBSLC-120T42OGA		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1912230222-02.V7M	Test Dates: 2/13 – 2/28-2020	EUT Type: Outdoor LTE Router		Page 4 of 14

3.0 TEST EQUIPMENT CALIBRATION DATA

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

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Agilent	N9020A	MXA Signal Analyzer	4/20/2019	Annual	4/20/2020	US46470561
Dell	Latitude 5580	Test Harness Laptop	N/A	N/A	N/A	N/A
Mini-Circuits	ZN4PD1-63W-S+	250-6000 MHz Power Splitter	N/A	N/A	N/A	SF259501217
Rohde & Schwarz	CMW500	Wideband Radio Communication Tester	6/6/2019	Annual	6/6/2020	161662
Seekonk	NC-100	Torque Wrench	5/4/2018	2 year	5/4/2020	N/A
Ruckus	P01-Q710-US00	BTS-CBSD	N/A	N/A	N/A	511729000096
Dell	Latitude E6540	BTS-CBSD Laptop	N/A	N/A	N/A	N/A
N/A	LTE X1	RF cable set with Coupler	6/4/2019	Annual	6/4/2020	N/A

Table 3-1 Annual Test Equipment Calibration Schedule

FCC ID: V7MBSLC-120T42OGA		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1912230222-02.V7M	Test Dates: 2/13 – 2/28-2020	EUT Type: Outdoor LTE Router		Page 5 of 14

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: V7MBSLC-120T42OGA		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1912230222-02.V7M	Test Dates: 2/13 – 2/28-2020	EUT Type: Outdoor LTE Router		Page 6 of 14

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: V7MBSLC-120T42OGA		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1912230222-02.V7M	Test Dates: 2/13 – 2/28-2020	EUT Type: Outdoor LTE Router	Page 7 of 14	

6.0 TEST SUMMARY

6.1 Summary

Company Name: SEOWON INTECH

FCC ID: V7MBSLC-120T42OGA

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.7 WINNF.FT.C.REG.8 WINNF.FT.C.REG.10 WINNF.FT.C.REG.12 WINNF.FT.C.REG.12 WINNF.FT.C.REG.14 WINNF.FT.C.REG.16 WINNF.FT.C.REG.18 WINNF.FT.D.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.7 WINNF.FT.C.REG.8 WINNF.FT.C.REG.10 WINNF.FT.C.REG.12 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: V7MBSLC-120T42OGA		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1912230222-02.V7M	Test Dates: 2/13 – 2/28-2020	EUT Type: Outdoor LTE Router	Page 8 of 14	

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

96.39 (c)	9	Confirm that the device sends measurements data in response to the command from the SAS.	WINNF.FT.C.MES.1	N/A
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.MES.1	N/A
	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.
- During testing, the device was configured to output only on the main antenna output. This port was monitored during testing.
- Please see Appendices for test data.

FCC ID: V7MBSLC-120T42OGA		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1912230222-02.V7M	Test Dates: 2/13 – 2/28-2020	EUT Type: Outdoor LTE Router	Page 9 of 14	

7.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the Seowon Intech LTE Outdoor CPE **FCC ID: V7MBSLC-120T42OGA** has been tested to show compliance with Part 96 and KDB 940660.

FCC ID: V7MBSLC-120T42OGA		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1912230222-02.V7M	Test Dates: 2/13 – 2/28-2020	EUT Type: Outdoor LTE Router		Page 10 of 14

© 2020 PCTEST

V1.0

All rights reserved. Unless otherwise specified, no part of this report may be reproduced or utilized in any part, form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from PCTEST. If you have any questions about this international copyright or have an enquiry about obtaining additional rights to this report or assembly of contents thereof, please contact INFO@PCTEST.COM.

APPENDIX A – TEST RESULT AND DATA

Testing is performed per KDB 971168 D01.

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

Frequency [MHz]	Bandwidth [MHz]	SAS Granted maxEIRP [dBm/MHz]	Conducted PSD [dBm/MHz]	Antenna Gain [dBi]	Calculated EIRP [dBm/MHz]	Margin [dB]
3560	20	24	13.03	10.50	23.53	-0.47
3625	20	24	13.43	10.50	23.93	-0.07
3690	20	24	12.37	10.50	22.87	-1.13

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

FCC ID: V7MBSLC-120T42OGA		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1912230222-02.V7M	Test Dates: 2/13 – 2/28-2020	EUT Type: Outdoor LTE Router		Page 11 of 14

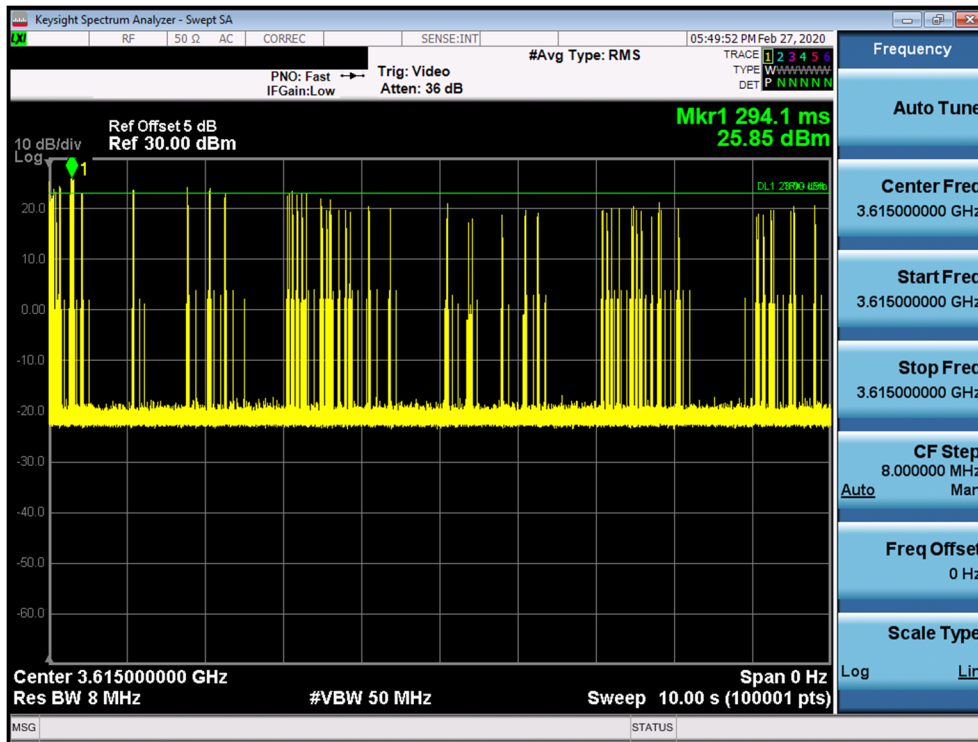
APPENDIX B – CPE-CBSD INITIAL SAS COMMUNICATIONS DUTY CYCLE (X OF Y)

Testing is performed per [WINNF-19-IN-00033] CBRS CPE-CBSD as UUT Test Guidelines Version V1.0. Using spectrum analyzer, time domain sweeps were performed at each time duration: 10s, 300s, and 3600s..

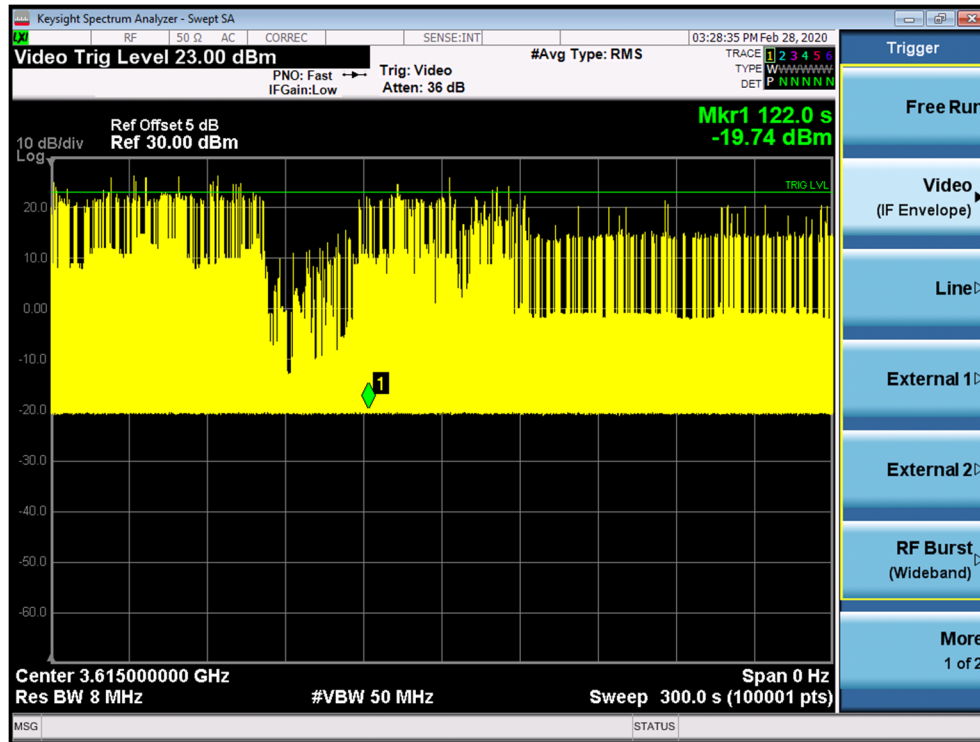
Time allowed per KDB	Aggregate amount of time > 23dBm
1s of 10s period	0.02s
10s of 300s period	0.48s
20s of 3600s period	3.6s

Table B-1 Duty Cycle (X of Y) Measurements

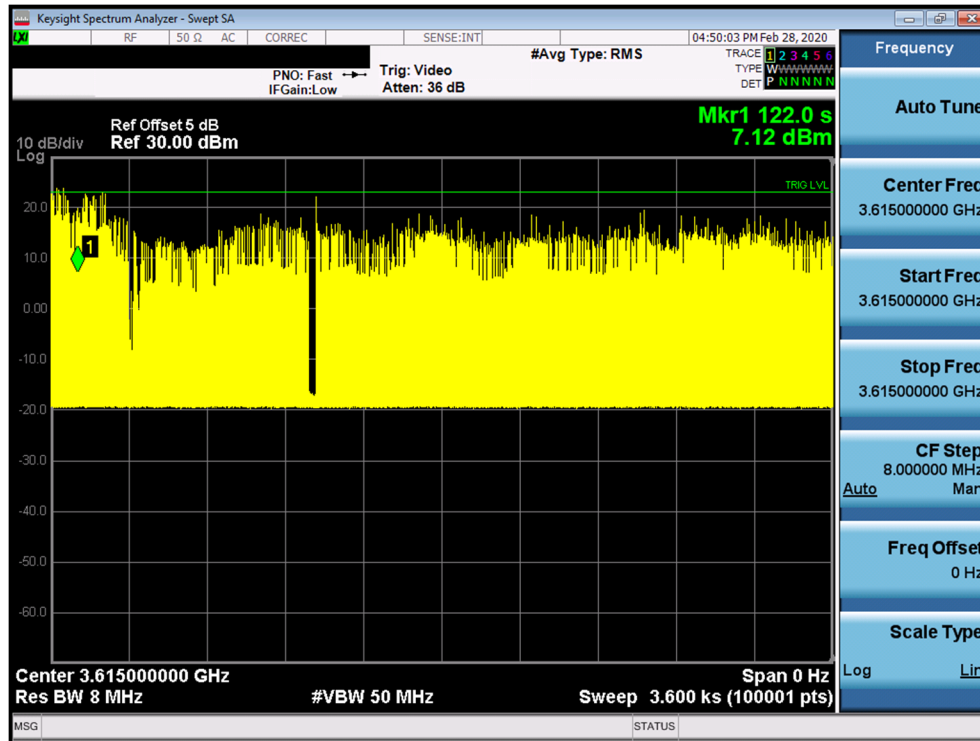
Test Plots:



FCC ID: V7MBSLC-120T42OGA	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	SEOWON INTECH	Approved by: Quality Manager
Test Report S/N: 1M1912230222-02.V7M	Test Dates: 2/13 – 2/28-2020	EUT Type: Outdoor LTE Router		Page 12 of 14



Plot 2. 300s Time Domain Sweep



Plot 3. 3600s Time Domain Sweep

FCC ID: V7MBSLC-120T42OGA	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	SEOWON INTECH	Approved by: Quality Manager
Test Report S/N: 1M1912230222-02.V7M	Test Dates: 2/13 – 2/28-2020	EUT Type: Outdoor LTE Router		Page 13 of 14

APPENDIX C – TEST LOGS

Logs are available upon request

 WINNF.FT.C.DRG.1_2020-02-14T15.06.04Z.log	 WINNF.FT.C.GRA.1_2020-02-13T23.07.52Z.log
 WINNF.FT.C.GRA.2_2020-02-13T23.10.12Z.log	 WINNF.FT.C.HBT.1_2020-02-13T23.12.05Z.log
 WINNF.FT.C.HBT.3_2020-02-13T23.18.07Z.log	 WINNF.FT.C.HBT.4_2020-02-14T14.06.43Z.log
 WINNF.FT.C.HBT.5_2020-02-14T14.24.40Z.log	 WINNF.FT.C.HBT.6_2020-02-14T14.26.20Z.log
 WINNF.FT.C.HBT.7_2020-02-14T14.38.41Z.log	 WINNF.FT.C.HBT.9_2020-02-14T14.42.13Z.log
 WINNF.FT.C.HBT.10_2020-02-14T14.48.58Z.log	 WINNF.FT.C.REG.1_2020-02-13T22.37.50Z.log
 WINNF.FT.C.REG.7_2020-02-13T22.42.31Z.log	 WINNF.FT.C.REG.8_2020-02-13T22.46.20Z.log
 WINNF.FT.C.REG.10_2020-02-13T22.51.02Z.log	 WINNF.FT.C.REG.12_2020-02-13T22.54.19Z.log
 WINNF.FT.C.REG.14_2020-02-13T22.55.31Z.log	 WINNF.FT.C.REG.16_2020-02-13T23.02.18Z.log
 WINNF.FT.C.REG.18_2020-02-13T23.06.29Z.log	 WINNF.FT.C.RLQ.1_2020-02-14T15.03.46Z.log
 WINNF.FT.C.SCS.1_2020-02-25T14.40.15Z.log	 WINNF.FT.C.SCS.2_2020-02-25T14.29.20Z.log
 WINNF.FT.C.SCS.3_2020-02-25T14.49.12Z.log	 WINNF.FT.C.SCS.4_2020-02-25T14.53.53Z.log
 WINNF.FT.C.SCS.5_2020-02-25T14.59.42Z.log	

FCC ID: V7MBSLC-120T42OGA		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1912230222-02.V7M	Test Dates: 2/13 – 2/28-2020	EUT Type: Outdoor LTE Router		Page 14 of 14

© 2020 PCTEST

All rights reserved. Unless otherwise specified, no part of this report may be reproduced or utilized in any part, form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from PCTEST. If you have any questions about this international copyright or have an enquiry about obtaining additional rights to this report or assembly of contents thereof, please contact INFO@PCTEST.COM.

V1.0