



Compliance Certification Services (Kunshan) Inc.

Report No.: KSCR221000201303

Page: 1 of 17

TEST REPORT

Application No.: KSCR2205000769AT
FCC ID: WBKRU4370
Applicant: BTI Wireless
Address of Applicant: 14600 Industry Circle La Mirada, CA 90638
Manufacturer: BTI Wireless
Address of Manufacturer: 14600 Industry Circle La Mirada, CA 90638
Factory: Sunwave Communications Co., Ltd
Address of Factory: 581 Huoju Avenue, Binjiang District Hangzhou China
Equipment Under Test (EUT):
EUT Name: Remote Radio Unit
Model No.: RU4370
Trade Mark:



Standard(s): CBRSA-TS-9001-V1.0.0
WINNF-TS-0122-V1.0
FCC 47 CFR Part 96
KDB 940660 D01 V03

Date of Receipt: 2022-10-25
Date of Test: 2022-10-25 to 2022-11-02
Date of Issue: 2022-11-02

Test Result:	Pass*
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* In the configuration tested, the EUT complied with the standards specified above.

Eric Lin
Laboratory Manager



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Revision Record				
Version	Chapter	Date	Modifier	Remark
00	Original	2022-11-02		/

Authorized for issue by:			
		Damon Zhou	
		Damon Zhou / Project Engineer	
		Eric Lin	
		Eric Lin / Reviewer	



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2 Test Summary

Item	Standard	Test Case ID	Result
UUT RF Transmit Power Measurement	WINNF-TS-0122-V1.0.2	WINNF.PT.C.HBT	Pass
SAS Version: 1.0.0.3			

The UUT is a CPE-CBSD product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

Test standards:

CBRSA-TS-9001-V1.0.0

CBRS Alliance Certification Test Plan

WINNF-TS-0122-V1.0.2

Test and Certification for Citizens Broadband Radio Service (CBRS); Conformance and Performance Test Technical Specification; CBSD/DP as Unit Under Test (UUT)

KDB 940660 D01 Part 96 CBRS Eqpt v03



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4 General Information

4.1 Details of E.U.T.

Description of EUT:	This is a Distributed base station systems which contains RRU and BBU. Model No. of RRU is RU4370 and BBU is sCELL-G52091NAX. To comply with CBRS SAS requirement RU4370 must works with sCELL-G52091NAX.
Power supply:	RRU: DC 36V~60V; BBU: DC 36V~60V;
Sample Type:	Fixed device
CBSD Class:	Category B CBSD (Base Station)
Transmitter Frequency Band:	n48 n78(3550-3700MHz)
Transmitter Frequency Range:	3550~3700MHz
RRU Hardware Version:	SWR78202106C
RRU Software Version:	VC1.2
BBU Hardware Version:	1.0.0.0
BBU Software Version:	Ax.tdd.fr1.2.2.3.800312
Test sample:	C0214921000004S (S/N)
Antenna Gain:	15dBi
MIMO Type:	4T4R MIMO

Note:

- (1) The EUT enable n78(3550-3700MHz) operation via embedded software.
- (2) The manufacturer declared that the two frequency bands N48 and N78(3550-3700MHz) have the same SAS mechanism.
- (3) The test data reuse report KSCR220500076903.



4.2 Description of CBSD/DP Support Features

Condition	Feature Description	Supported
C1	Mandatory for UUT which supports multi-step registration message.	Y
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.	Y
C3	Mandatory for UUT which supports single-step registration containing CPI-signed data in the registration message.	Y
C4	Mandatory for UUT which supports RECEIVED_POWER_WITHOUT_GRANT measurement report type.	Y
C5	Mandatory for UUT which supports RECEIVED_POWER_WITH_GRANT measurement report type.	Y
C6	Mandatory for UUT which supports parameter change being made at the UUT and prior to sending a deregistration.	Y

Y: Supported

N: Not supported

4.3 Summary of Test Results

WINNF-TS-0122			
Classes	Test Case Items	Pass Items	Pass Rate (%)
PT (CBSD, DP/CBSD)	1	1	100
Total	1	1	100

Note:

1. Functional Test (FT): Test to validate the conformance of the Protocols and functionalities implemented in the CBSD/DP UUT to the requirements developed by WinnForum and supporting FCC/DoD requirements.
2. Field/Performance Test (PT): Test to check the capability of the CBSD/DP UUT to support various traffic models and actual operations in the field.

4.4 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Radio Frequency	$\pm 7.25 \times 10^{-8}$
2	RF conducted power	$\pm 0.75\text{dB}$
3	Temperature test	$\pm 1^{\circ}\text{C}$
4	Humidity test	$\pm 3\%$
5	Supply voltages	$\pm 1.5\%$



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6	Time	± 3%
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4.5 Description of Support Units

Description	Manufacturer	Model No.	Serial No.
5GC	astir	astir_5GC	/
Wireless Router	Smawave	CP60X	/
Base Band Unit	BTI	sCELL- G52091NAX	/



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Compliance Certification Services (Kunshan) Inc.
EMC Laboratory

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4.6 Test Location

All tests were performed at:

Compliance Certification Services (Kunshan) Inc.

No.10 Weiye Rd, Innovation park, Eco&Tec, Development Zone, Kunshan City, Jiangsu, China.

Tel: +86 512 5735 5888

Fax: +86 512 5737 0818

No tests were sub-contracted.

4.7 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **CNAS (No. CNAS L4354)**

CNAS has accredited Compliance Certification Services (Kunshan) Inc. to ISO/IEC 17025:2017 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

- **A2LA (Certificate No. 2541.01)**

Compliance Certification Services (Kunshan) Inc. is accredited by the American Association for Laboratory Accreditation (A2LA). Certificate No. 2541.01.

- **FCC (Designation Number: CN1172)**

Compliance Certification Services (Kunshan) Inc. has been recognized as an accredited testing laboratory.

Designation Number: CN1172.

- **ISED (CAB identifier: CN0072)**

Compliance Certification Services (Kunshan) Inc. has been recognized by Innovation, Science and Economic Development Canada (ISED) as an accredited testing laboratory.

Company Number: 2324E

- **VCCI (Member No.: 1938)**

The 3m and 10m Semi-anechoic chamber and Shielded Room of Compliance Certification Services (Kunshan) Inc. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-20134, R-11600, C-11707, T-11499, G-10216 respectively.

4.8 Deviation from Standards

None

4.9 Abnormalities from Standard Conditions

None



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5 Equipment List

Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. Date (yyyy-mm-dd)	Cal. Due date (yyyy-mm-dd)
Laptop	Lenovo	Y510P	HFL000026	N/A	N/A
Spectrum Analyzer	KEYSIGHT	N9020A	MY55370209	08/22/2022	08/21/2023
Shield Room	Revoltek	N/A	KS301115-2	N/A	N/A
Coaxial Cable	Thermax	N/A	/	04/15/2022	04/14/2023
Attenuator	Mini-Circuits	NAT-6-2W	15542-1	N.C.R.	N.C.R.
Humidity / Temperature Indicator	Anymetre	RS-WS-N01-6J	1032844	04/15/2022	04/14/2023



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6 Test Method and Environment

6.1 CBSD/DP Conformance and Performance

Test Requirement: CBRS CBSD Test Specification WINNF-TS-0122-V1.0.2
 Test Method: CBRS CBSD Test Specification WINNF-TS-0122-V1.0.2
 WINNF-IN-0156_WInnForum_SAS_Test_Harness_CBSD_UUT_Tutorial_v1_0_0_1

6.2 CBSD Test Procedure

- Connect the UUT to SAS Test Harness system and RF Test instruments via the CBSD interface and RF components. The highest level is set to test configuration.
- UUT shall be UTC time synchronized
- The frequency band is granted and set as UUT supported Modulation and Channels, transmitted power of the UUT according to it granted parameters from the SAS TestHarness.
- Each test case results were recorded and validated by SAS Test Harness system and RF instruments test cases was recorded test results from SAS Test Harness system.



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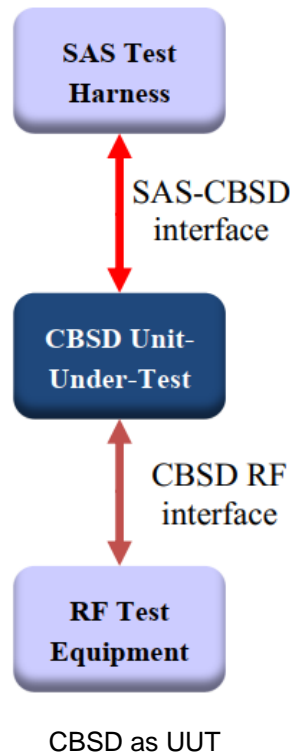
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6.3 Test Environment

Test Harness Version: V1.0.0.3
 Operating System: Microsoft Windows 10
 TLS Version: 1.2
 Python Version: 2.7.13
 Environmental Conditions: 25deg. C, 65%RH

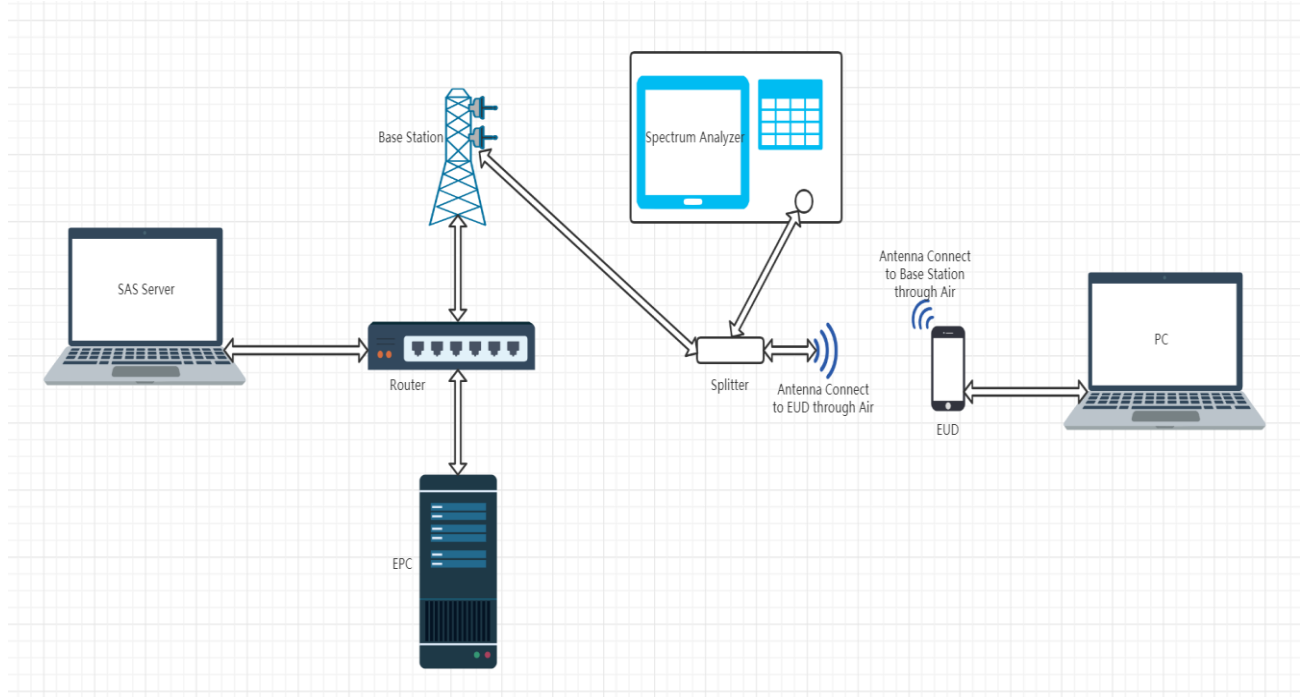
6.4 Test Setup



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Test setup diagram for WINNF.PT.C.HBT Test case



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7 Test Data

7.1 CBSD RF Power Measurement

7.1.1 WINNF.PT.C.HBT

#	Test Execution Steps	Results	
1	<p>Ensure the following conditions are met for test entry:</p> <ul style="list-style-type: none"> UUT has successfully completed SAS Discovery and Authentication with the SAS Test Harness UUT has registered with the SAS, with CBSD ID = 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 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 	--	--
2	<p>UUT and SAS Test Harness perform a series of Heartbeat Request/Response cycles, which continues until the other test steps are complete. Messaging for each cycle is as follows:</p> <ul style="list-style-type: none"> UUT sends Heartbeat Request, including: <ul style="list-style-type: none"> cbsdId = C grantId = G SAS Test Harness responds with Heartbeat Response, including: <ul style="list-style-type: none"> cbsdId = C grantId = G transmitExpireTime = current UTC time + 200 seconds responseCode = 0 	--	--
3	<p>Tester performs power measurement on RF interface(s) of UUT, and verifies it complies with the maxEirp setting, Pi. The RF measurement method is out of scope of this document, but may include additional configuration of the UUT, as required, to fulfill the requirements of the power measurement method.</p> <p>A. 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.</p>	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail



RF measurement plot for Test Case:

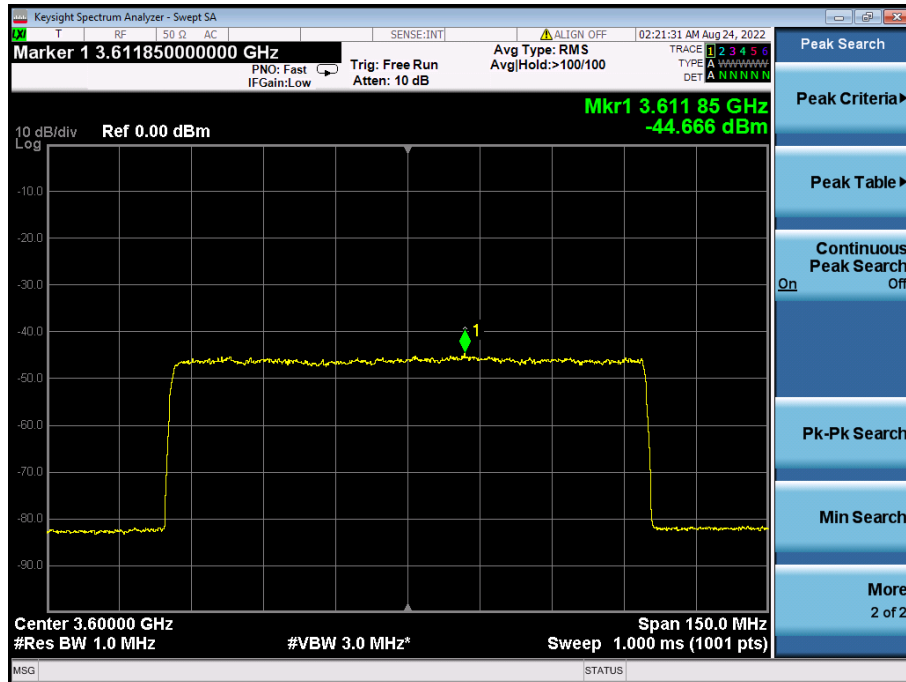
- Tester performs power measurement on RF interface(s) of UUT, and verifies it complies with the maxEirp setting, Pi. The RF measurement method is out of scope of this document, but may include additional configuration of the UUT, as required, to fulfill the requirements of the power measurement method.

Frequency (MHz)	Channel Bandwidth (MHz)	Granted Max EIRP (dBm/MHz)	Conducted PSD (dBm/MHz)	Antenna Gain (dBi)	Directional Gain (dB)	Cable Loss (dB)	maxEIRP (dBm/MHz)
			Ant. 0				
3600	100	37	-44.666	15	6.02	46.8	23.154
3600	100	25	-47.552	15	6.02	46.8	20.268
3600	100	15	-57.759	15	6.02	46.8	10.061

Note:

- 1.maxEIRP= Conducted PSD+ Antenna Gain+ Directional Gain+ Cable loss
2. Directional Gain=10log(n), n=4 for this test case.

Target Power: 37 dBm/MHz



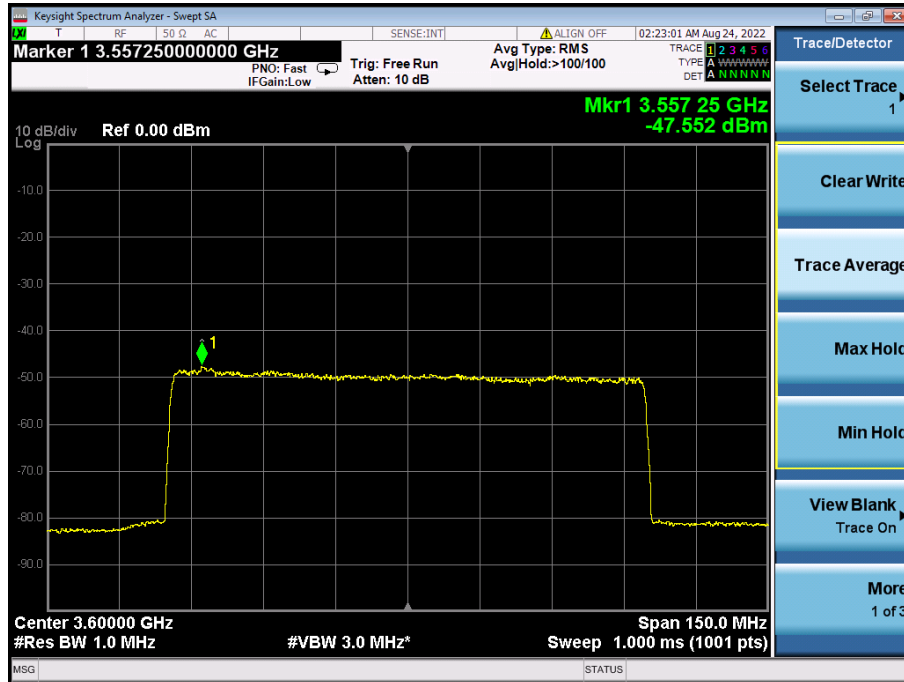
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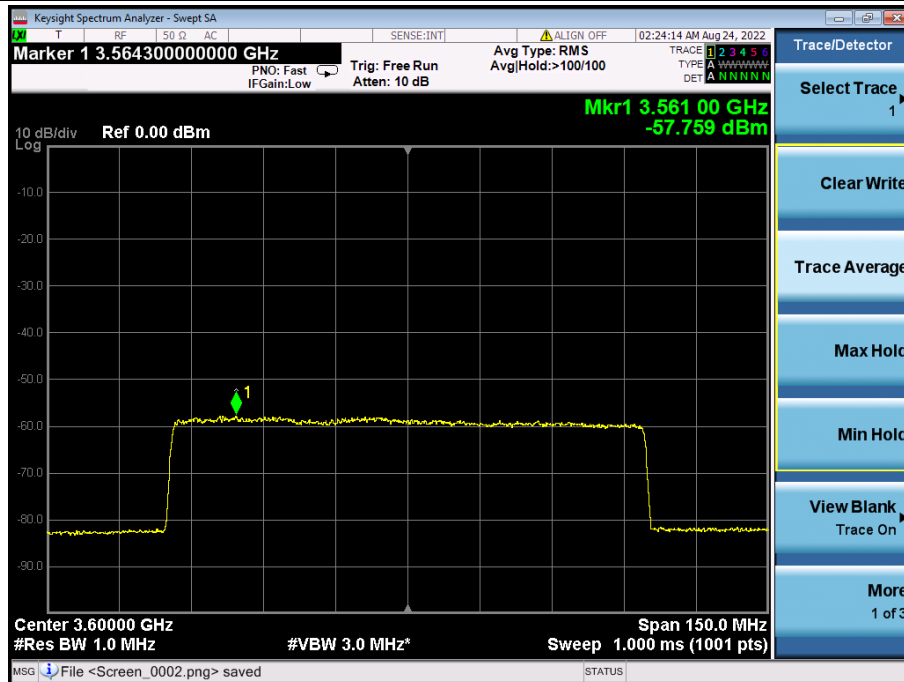
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Target Power: 25 dBm/MHz



Target Power: 15 dBm/MHz



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8 Test Data Log

Test data log refer to log files (Log files appendix).



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9 Photographs

9.1 EUT Constructional Details (EUT Photos)

Please Refer to Integral and internal photos for details.

- End of the Report -



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