DEKRA Certification, Inc
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Test Lab
Cert 2764.01

Test report No:
NIE: 02538RCB.001A1

Test report
Test and Certification for Citizens Broadband Radio Service (CBRS)

Identification of item tested	CBRS Outdoor Small Cell
Trademark	Qucell
Model and /or type reference	SC-220
Other identification of the product	FCCID : 2AS48SC-220
Features	CBSD Category: A CBSD with Domain Proxy
Manufacturer	QUCELL Networks Co., Ltd. Innowireless B/D-5F, 190 Seohyoen-ro, Bundang-gu, Seongnam-si, Gyeonggi-do, Korea.
Test method requested, standard	WINNF-TS-0122
Final HW version	0000
Final SW version	CBSD: 0.6.1.4 Domain Proxy: 1.1.0
Summary	IN COMPLIANCE
Approved by (name / position & signature)	Gonzalo Casado (Lab Manager)
Date of issue	2019-07-22
Report template No	FDT08_22

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Competences and guarantees

DEKRA Certification Inc. is a testing laboratory competent to carry out the tests described in this report.

DEKRA Certification Inc. is a testing laboratory accredited by A2LA (The American Association for Laboratory Accreditation) to perform the test indicated in the Certificate 2764.01.

DEKRA Certification Inc. is a CBSD testing laboratory approved by WinnForum and CBRS Alliance.

In order to assure the traceability to other national and international laboratories, DEKRA Certification has a calibration and maintenance program for its measurement equipment.

DEKRA Certification guarantees the reliability of the data presented in this report, which is the result of the measurements and the tests performed to the item under test on the date and under the conditions stated on the report and, it is based on the knowledge and technical facilities available at DEKRA Certification at the time of performance of the test.

DEKRA Certification is liable to the client for the maintenance of the confidentiality of all information related to the item under test and the results of the test.

The results presented in this Test Report apply only to the particular item under test established in this document.

General conditions

1. This report is only referred to the item that has undergone the test.
2. This report does not constitute or imply on its own an approval of the product by the Certification Bodies or competent Authorities.
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Abbreviations

Abbreviation	Meaning
CBRS	Citizens Broadband Radio Services
CBSD	Citizens Broadband Radio Service Device
DP	Domain Proxy
DUT	Device Under Test
SAS	Spectrum Access System
UUT	Unit Under Test
CPI	Certified Professional Installer
N/A	Not Applicable

Uncertainty

Uncertainty (factor k=2) was calculated according to the DEKRA Certification internal document PODT000.

Data provided by the client

DEKRA declines any responsibility with respect to the information provided by the client and that may affect the validity of results.

Usage of samples

Samples undergoing test have been selected by: the client

Sample M/01 is composed of the following elements:

Control Nº	Description	Model	Serial Nº	Date of reception
2538.01	CBSD	SC-220	1ED191100008	2019-May-08
2538.02	CBSD	SC-220	1ED191100013	2019-May-08
2538.03	Domain Proxy (SW)	Not provided	N/A	2019-May-08

1. Sample M/01 has undergone the test(s) specified in Appendix A.

Supported 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.	N
C3	Mandatory for UUT which supports single-step registration containing CPI-signed data in the registration message.	N

Condition	Feature Description	Supported
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
DP	CBSD with Domain Proxy	Y

Identification of the client

Same as manufacturer

Testing period and place

Test Location	DEKRA Certification Inc 405 Glenn Drive, Suite 12, Sterling, Virginia, USA, 20164
Date (start)	2019-05-10
Date (finish)	2019-05-14

Document history

Report number	Date	Description
02538RCB.001	2019-06-10	First release
02538RCB.001A1	2019-07-15	Second Release. Addition of Appendix B adding additional information: Test Setup, requirement to test case mapping, test data for test case WINNF.PT.C.HBT

Remarks and comments

Testing has been performed by Indusha Chitepu

Test steps are described in document Test and Certification for Citizens Broadband Radio Service (CBRS); Conformance and Performance Test Technical Specification; CBSD/DP as Unit Under Test (UUT) Working Document WINNF-TS-0122

Testing verdicts

Not applicable :	N/A
Pass :	P
Fail :	F
Not measured :	N/M

Summary

Test Cases Verdicts	Number of Test Cases
Not applicable :	21
Pass :	34
Fail :	0
Not measured :	0
Total Number of Test Cases	55

List of equipment used during the test

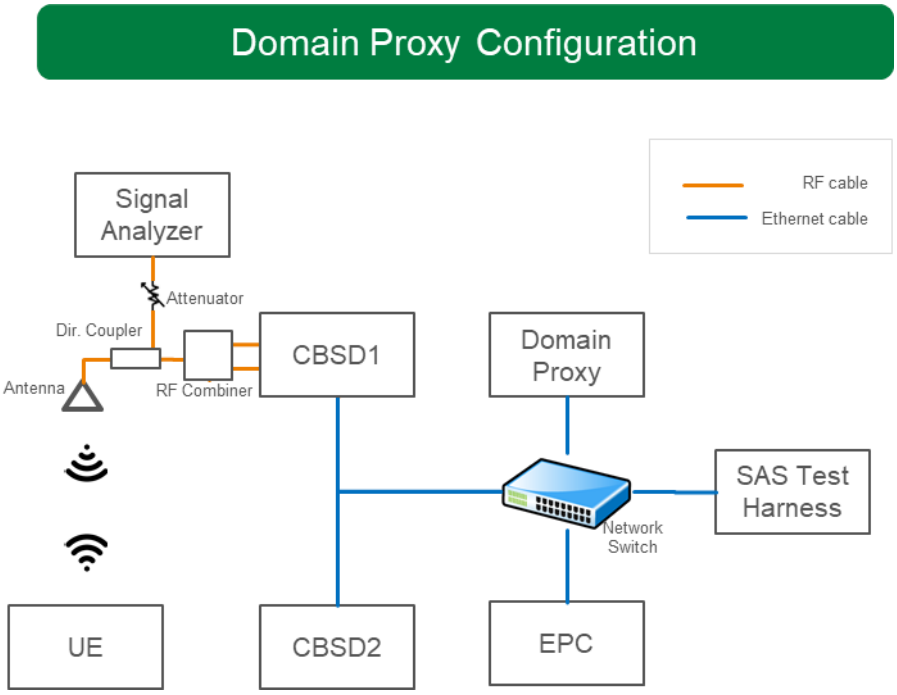
Test Equipment				
Description	Model	Control Number	SW Version	Serial Number
Signal Analyzer	MXA N9020A	0382	A.04.26	R9-L2D1V
Test SAS Harness	N/A	Laptop: CTC-5233-K	Test Harness:1.0.0.3 Laptop OS: Windows7	N/A

Appendix A: Test results

Test Case Name	Applicability	CBSD	DP	Verdict	Comments	Date	Sample
WINNF.FT.C.REG.1	C1	X	--	N/A		-	-
WINNF.FT.D.REG.2	C1	--	X	PASS		5/10/2019	M/01
WINNF.FT.C.REG.3	C2	X	--	N/A		-	-
WINNF.FT.D.REG.4	C2	--	X	N/A		-	-
WINNF.FT.C.REG.5	C3	X	--	N/A		-	-
WINNF.FT.D.REG.6	C3	--	X	N/A		-	-
WINNF.FT.C.REG.7	C6	X	X	PASS		5/14/2019	M/01
WINNF.FT.C.REG.8	M	X	--	N/A		-	-
WINNF.FT.D.REG.9	M	--	X	PASS		5/10/2019	M/01
WINNF.FT.C.REG.10	M	X	--	N/A		-	-
WINNF.FT.D.REG.11	M	--	X	PASS		5/10/2019	M/01
WINNF.FT.C.REG.12	M	X	--	N/A		-	-
WINNF.FT.D.REG.13	M	--	X	PASS		5/10/2019	M/01
WINNF.FT.C.REG.14	M	X	--	N/A		-	-
WINNF.FT.D.REG.15	M	--	X	PASS		5/10/2019	M/01
WINNF.FT.C.REG.16	M	X	--	N/A		-	-
WINNF.FT.D.REG.17	M	--	X	PASS		5/10/2019	M/01
WINNF.FT.C.REG.18	M	X	--	N/A		-	-
WINNF.FT.D.REG.19	M	--	X	PASS		5/10/2019	M/01
WINNF.FT.C.REG.20	C2	X	X	N/A		-	-
WINNF.FT.C.GRA.1	M	X	X	PASS		5/10/2019	M/01
WINNF.FT.C.GRA.2	M	X	X	PASS		5/10/2019	M/01
WINNF.FT.C.HBT.1	M	X	--	N/A		-	-
WINNF.FT.D.HBT.2	M	--	X	PASS		5/13/2019	M/01
WINNF.FT.C.HBT.3	M	X	X	PASS		5/13/2019	M/01
WINNF.FT.C.HBT.4	M	X	--	N/A		-	-
WINNF.FT.C.HBT.5	M	X	X	PASS		5/13/2019	M/01
WINNF.FT.C.HBT.6	M	X	X	PASS		5/13/2019	M/01
WINNF.FT.C.HBT.7	M	X	X	PASS		5/13/2019	M/01
WINNF.FT.D.HBT.8	M	--	X	PASS		5/13/2019	M/01
WINNF.FT.C.HBT.9	M	X	X	PASS		5/13/2019	M/01
WINNF.FT.C.HBT.10	M	X	X	PASS		5/13/2019	M/01
WINNF.FT.C.HBT.11	O	X	X	PASS		5/14/2019	M/01
WINNF.FT.C.MES.1	C4	X	--	N/A		-	-
WINNF.FT.D.MES.2	C4	--	X	PASS		5/10/2019	M/01
WINNF.FT.C.MES.3	C5	X	X	PASS		5/10/2019	M/01
WINNF.FT.C.MES.4	C5	X	--	N/A		-	-
WINNF.FT.D.MES.5	C5	--	X	PASS		5/10/2019	M/01
WINNF.FT.C.RLQ.1	M	X	--	N/A		-	-
WINNF.FT.D.RLQ.2	M	--	X	PASS		5/13/2019	M/01
WINNF.FT.C.RLQ.3	O	X	--	N/A		-	-
WINNF.FT.D.RLQ.4	O	--	X	PASS		5/14/2019	M/01
WINNF.FT.C.RLQ.5	O	X	--	N/A		-	-
WINNF.FT.D.RLQ.6	O	--	X	PASS		5/14/2019	M/01
WINNF.FT.C.DRG.1	M	X	--	N/A		-	-
WINNF.FT.D.DRG.2	M	--	X	PASS		5/14/2019	M/01
WINNF.FT.C.DRG.3	O	X	--	N/A		-	-
WINNF.FT.D.DRG.4	O	--	X	PASS		5/14/2019	M/01
WINNF.FT.C.DRG.5	O	X	X	PASS		5/14/2019	M/01
WINNF.FT.C.SCS.1	M	X	X	PASS		5/10/2019	M/01
WINNF.FT.C.SCS.2	M	X	X	PASS		5/10/2019	M/01
WINNF.FT.C.SCS.3	M	X	X	PASS		5/10/2019	M/01
WINNF.FT.C.SCS.4	M	X	X	PASS		5/10/2019	M/01
WINNF.PT.C.HBT	M	X	X	PASS		5/14/2019	M/01

Appendix B: Additional Information

Test Setup Diagram



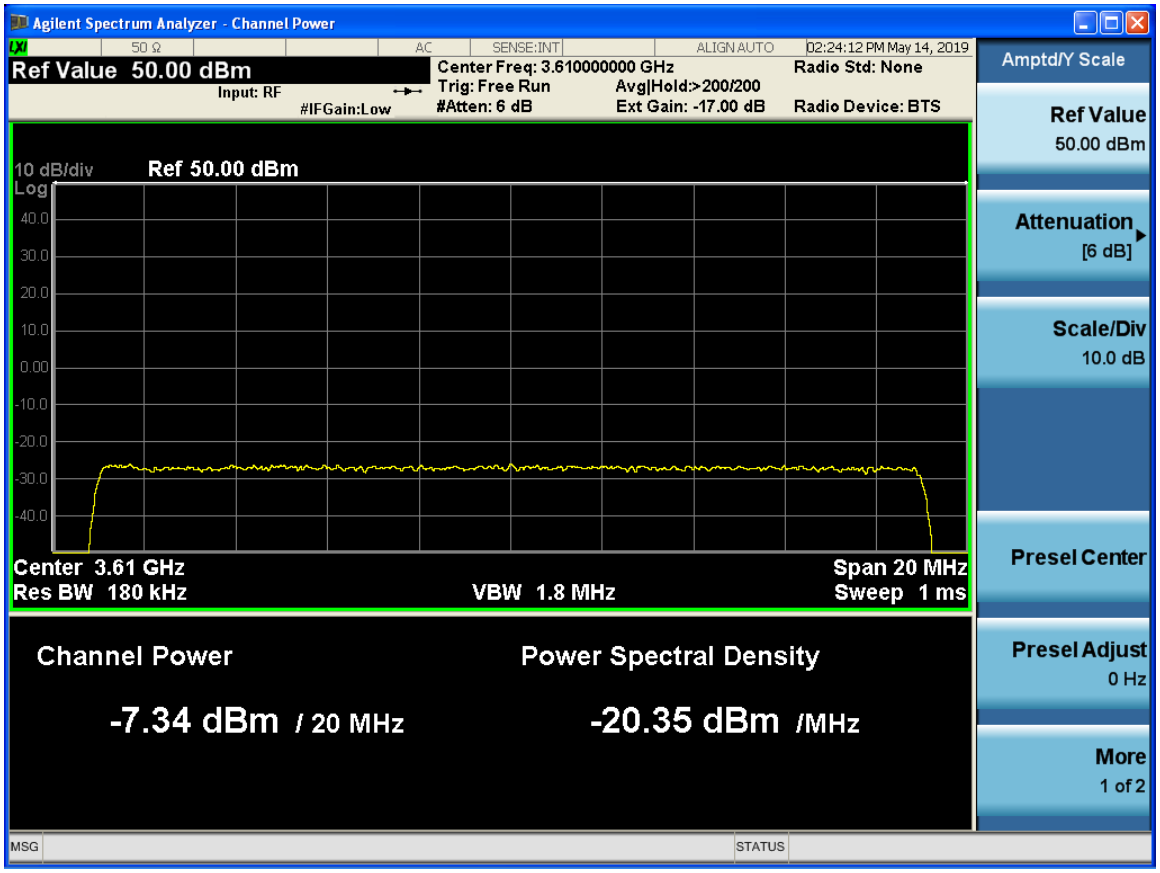
WINNF.PT.C.HBT Data

WINNF.PT.C.HBT has been tested for the below maxEIRP (dBm/MHz) values:

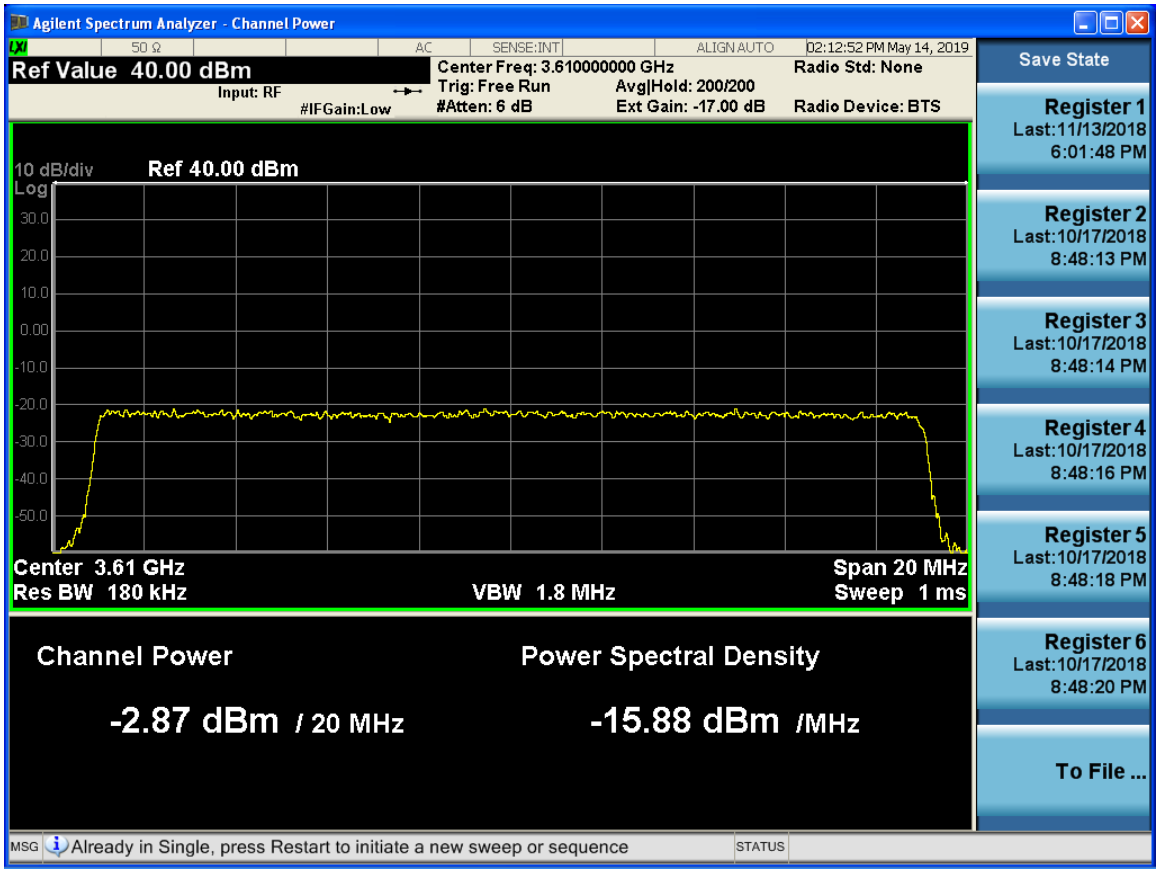
maxEirp (dBm/MHz)	Measured PSD at DUT RF port (dBm/MHz)	Measured EIRP (dBm/MHz)
15	-15.88	-1.88
10	-20.35	-6.35

Notes:

- Measured EIRP (dBm / MHz) = Measured PSD at DUT RF port (dBm/MHz) + DUT Antenna Gain
- Declared Antenna gain = 14dB
- RF Path loss between DUT RF port and Signal Analyzer RF port is 17dB. This path loss is already considered in Signal Analyzer measurement.



Signal Analyzer Screenshot of 10 dBm/MHz max EIRP Test Condition



Signal Analyzer Screenshot of 15 dBm/MHz max EIRP Test Condition

Test Equipment Screenshots

Requirement	Verified in TC
The device will only transmit after it receives authorization from a SAS	WINNF.FT.D.HBT.2
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.D.REG.2 WINNF.FT.D.REG.9 WINNF.FT.D.REG.11 WINNF.FT.D.REG.13 WINNF.FT.D.REG.15 WINNF.FT.D.REG.17 WINNF.FT.D.REG.19
The device changes its operating power and/or channel in response to a command from the SAS	WINNF.PT.C.HBT
The device correctly configures based on the different license classes	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
The device transmits at a power level less than or equal to the maximum power level approved by the SAS	WINNF.PT.C.HBT
The device transmits with a bandwidth less than or equal to the SAS specified bandwidth.	WINNF.PT.C.HBT
The device transmits on the SAS specified frequency	WINNF.FT.D.HBT.2, 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.D.HBT.8, WINNF.FT.C.HBT.9, WINNF.FT.C.HBT.10, WINNF.FT.C.HBT.11, WINNF.PT.C.HBT
The device stops transmission in response to a command from the SAS, within a period as required by Part 96	WINNF.FT.D.RLQ.2, WINNF.FT.D.RLQ.4, WINNF.FT.D.RLQ.6, WINNF.FT.D.DRG.2, WINNF.FT.D.DRG.4, WINNF.FT.C.DRG.5
the device sends measurements data in response to the command from the SAS.	WINNF.FT.C.MES.3, WINNF.FT.D.MES.5
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 as Condition C2 is not supported by device
the device is capable of reporting the signal level (measurement data) and frequency to SAS	WINNF.FT.C.MES.3, WINNF.FT.D.MES.5
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 as DUT is not category A
Loss of communication with SAS behavior	WINNF.FT.C.HBT.9, WINNF.FT.C.HBT.10, WINNF.FT.D.RLQ.4, WINNF.FT.D.RLQ.6, WINNF.FT.D.DRG.4, WINNF.FT.C.DRG.5
Heartbeat loss behavior	WINNF.FT.C.HBT.10

Requirement	Verified in TC
When CBSDs communicate through a management system, confirm compliance with all requirements	The tested product has a Domain Proxy implementation; hence all relevant test cases mentioned in the above bullets are selected as such