AFC Device (DUT) Test Report

FCC ID : 2ABOF-G1RN6AHB012

Equipment : Remote Node (RN)
Brand Name : Tarana Wireless
Model Name : G1RN6AHB012
Applicant : Tarana Wireless

590 Alder Dr, Milpitas, CA 95035

Manufacturer : Tarana Wireless

590 Alder Dr, Milpitas, CA 95035

Standard : FCC Part 15.407

The product was received on Aug. 31, 2023 and testing was performed from Aug. 31, 2023 to Sep. 13, 2023. We, Sporton International (USA) Inc., would like to declare that the tested sample has been evaluated in accordance with the test procedures given in WiFi Alliance AFC Device (DUT) Compliance Test Plan Version 1.5 and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International (USA) Inc., the test report shall not be reproduced except in full.

Approved by: Abi Lin

rifin

Sporton International (USA) Inc.

1175 Montague Expressway, Milpitas, CA 95035

TEL: 408-904-3300 Page Number : 1 of 33
Issue Date : Nov. 01, 2023

Report Version : 03

Table of Contents

1.	Adm	inistration Data	4
	1.1	Testing Laboratory	4
	1.2	Applicant	4
	1.3	Manufacturer	4
	1.4	Applied Standard	5
2.	Gene	eral Information	5
	2.1	Description of Device Under Test (DUT)	5
	2.2	Protocol Test Summary	7
	2.3	Support Equipment	9
	2.4	Measuring Equipment List	9
	2.5	Measurement Uncertainty	9
3.	Meas	surement Environment	10
	3.1	Test configuration	10
4.	Prote	ocol Test Results	11
	4.1	Successful registration and spectrum access request	11
	4.1.	AFCD.RSA Test Vector	15
	4.1.2	2 AFCD.RSA RF Transmit Power Measurement	15
	4.2	Unsuccessful spectrum access request	19
	4.2.	AFCD.USA Test Vectors	20
	4.3	Successful spectrum access update	21
	4.3.	AFCD.SAU Test Vectors	25
	4.3.2	2 AFCD.SAU RF Transmit Power Measurement	26
	4.4	Unsuccessful spectrum access update	28
	4.4.	AFCD.UAU Test Vectors	31
	4.5	Unsuccessful server validation	32
	4.5.	AFCD.USV Test Vectors	33

Appendix A. Setup Photographs

Appendix B. AFC DUT Test Logs and Tool Report

TEL: 408-904-3300 Page Number : 2 of 33 Issue Date : Nov. 01, 2023

Report Version : 03

History of this test report

Report No.	Version	Description	Issue Date
FR230713001-02	01	Initial issue of report	Oct. 03, 2023
FR230713001-02	02	Revise cover page, Applied Standard, General Information, Protocol Test Results and Appendix B This report is an updated version, replacing the report issued on Oct. 03, 2023	Oct. 05, 2023
FR230713001-02	03	Add spectrum analyzer result to SAU test case This report is an updated version, replacing the report issued on Oct. 05, 2023	Nov. 01, 2023

Conformity Assessment Condition:

The test results (PASS/FAIL) with all measurement uncertainty excluded are presented against the regulation limits or in accordance with the requirements stipulated by the applicant/manufacturer who shall bear all the risks of noncompliance that may potentially occur if measurement uncertainty is taken into account.

Disclaimer:

The product specifications of the DUT presented in the test report that may affect the test assessments are declared by the manufacturer who shall take full responsibility for the authenticity.

Reviewed by: Thomas Chen Report Producer: Josie Hsu

TEL: 408-904-3300 Page Number : 3 of 33
Issue Date : Nov. 01, 2023

Report Version : 03

1. Administration Data

1.1 Testing Laboratory

Test Site	Sporton International (USA) Inc.
Test Site Location	1175 Montague Expressway, Milpitas, CA 95035 TEL: (408) 904-3300
Test Site No.	Sporton Site No.
rest site No.	TH01-CA
Test Engineer	Thomas Chen and David Hung
Temperature	21 ~ 24 ℃
Relative Humidity	48 ~ 53 %

FCC Designation No.: US1250

1.2 Applicant

Company Name	Tarana Wireless
Address	590 Alder Dr, Milpitas, CA 95035

1.3 Manufacturer

Company Name	Tarana Wireless
Address	590 Alder Dr, Milpitas, CA 95035

TEL: 408-904-3300 Page Number : 4 of 33 Issue Date : Nov. 01, 2023

Report Version : 03

1.4 Applied Standard

According to the specifications declared by the manufacturer, the DUT must comply with the requirement of the following standards:

	[n.1]. FCC Part 15.407
	[n.2]. FCC KDB 987594 D01 U-NII 6GHz General Requirements v02r02
	[n.3]. FCC KDB 987594 D05 AFC DUT Test Harness Testing v01r01
Cton doudo	[n.4]. WiFi Alliance AFC System to AFC Device Interface Specification v1.5, 5 May
Standards	2023
	[n.5]. WiFi Alliance AFC Device (DUT) Compliance Test Plan v1.5, 27 Jun 2023
	[n.6]. WiFi Alliance AFC Device (DUT) Compliance Test Vectors v1.2, 27 Jun 2023
	[n.7]. ANSI C63.10-2013

Remark: All the test items were validated and recorded in accordance with the standards without any modification during the testing.

2. General Information

2.1 Description of Device Under Test (DUT)

Product Feature & Specification				
EUT Type	Remote Node (RN)			
Brand Name	Tarana Wireless			
Model Name	G1RN6AHB012			
FCC ID	2ABOF-G1RN6AHB012			
Device Under Test Type	□ Standard Power Access Point ■ Fixed Client			
Domain Proxy support	■ with Domain Proxy□ without Domain Proxy			
Deployment	☐ Indoor ■ Outdoor			
DUT HW Version	31-0173-301.2.1			
DUT FW Version	SYS.A3.R10.XXX.1.200.032.00			
DUT Serial Number	M173M1232800024			
Domain Proxy SW Version	20230831120103-2c5af85c-devel			

TEL: 408-904-3300 Page Number : 5 of 33 Issue Date : Nov. 01, 2023

Report Version : 03

AFC DUT general capabilities declaration						
Item	Question	Vendor response				
		☐ Standard Power Access Point (6SD)				
1	AFC DUT Type.	■ Fixed Client (6FC)				
		■ Domain Proxy				
2	Does the AFC DUT support sending an Available Spectrum	No				
2	Inquiry Request based on the inquiredFrequencyRange field	(Yes/No)				
3	Does the AFC DUT support sending an Available Spectrum	Yes				
3	Inquiry Request based on the inquired Channels fields?	(Yes/No)				
4	If the Answer to Items 2 and 3 is "Yes", what is AFC DUT's	☐ Frequency based				
4 (For 2, 3)	·	Channel based				
(1 01 2, 3)	default inquiry type?	□ Both				
5	Does the AFC DUT need to be supplied with BSS configuration	No				
5	parameters?	(Yes/No)				
6	Does the AFC DUT manufacturer attest to AFC DUT	No				
0	compliance with rules for LPI operation?	(Yes/No)				
	Does the AFC DUT need to be supplied with mandatory	No				
7	registration information to formulate an Available Spectrum					
	Inquiry Request	(Yes/No)				
8	If the Answer to Item 7 is "Yes". What is the geographic	■ Ellipse				
(For 7)	Supported by the AFC DUT?	□ Linear Polygon				
(1 01 1)	Supported by the Air C DOT!	☐ Radial Polygon				
9	Does the AFC DUT support 160 MHz channel width operation?	No (Yes/No)				
10	Which method does AFC DUT acting as a Fixed Client uses for	■ In-band				
10	sending an Available Spectrum Inquiry Request?	□ Out-of-band				

TEL: 408-904-3300 Page Number : 6 of 33 Issue Date : Nov. 01, 2023

Report Version : 03

2.2 Protocol Test Summary

Section	Test Case ID	Test Description	FCC Requirement	Short Description	Test Result
4.1	Successful registration		47 CFR Section 15.407(k)(1) 47 CFR Section 15.407(k)(8)(i) 47 CFR Section 15.407(k)(8)(ii) 47 CFR Section 15.407(k)(8)(iii) 47 CFR Section 15.407(l)(iii) 47 CFR Section 15.407(l)(iii)	Transmit only as instructed by AFC System Register with AFC System prior to initial transmission Provide required registration parameters Registration either directly or via proxy Determination of appropriate channel configuration implied by AFC System response Must contact an AFC system at least once per day to obtain the latest list of available frequencies and the maximum permissible power	PASS
4.2	Unsuccessful registration 4.2 AFCD.USA and spectrum access request		47 CFR Section 15.407(k)(1) 47 CFR Section 15.407(k)(8)(i) 47 CFR Section 15.407(k)(8)(ii) 47 CFR Section 15.407(k)(8)(iii)	Transmit only as instructed by AFC System Register with AFC System prior to initial transmission Provide required registration parameters Registration either directly or via proxy	PASS

TEL: 408-904-3300 Page Number : 7 of 33
Issue Date : Nov. 01, 2023

Report Version : 03

Section	Test Case ID	Test Description	FCC Requirement	Short Description	Test Result
			47 CFR Section 15.407(k)(8)(i)	Register with AFC System after change of location	
4.3	AFCD.SAU	Successful spectrum access	47 CFR Section 15.407(k)(8)(ii)	Update AFC System upon change of registration parameters	
		update	47 CFR Section 15.407(k)(9)(i)	Report location and uncertainty from power-off condition	DAGG
	AFCD.UAU Unsuccessful spectrum access update 47 CFR Section 15.407(k)(8)(i) 47 CFR Section 15.407(k)(8)(ii) 47 CFR Section 15.407(k)(9)(i)	FCD.UAU spectrum		Register with AFC System after change of location	PASS
4.4				Update AFC System upon change of registration parameters	
			Report location and uncertainty from power-off condition		
4.5	AFCD.USV	Unsuccessful server validation	47 CFR Section 15.407(k)(8)(v)	Incorporate adequate security measurements to prevent it from accessing AFC systems not approved by the FCC	PASS

Note: For Protocol Test Results, please find the Appendix B for AFC Test Logs.

TEL: 408-904-3300 Page Number : 8 of 33 Issue Date : Nov. 01, 2023

Report Version : 03

2.3 Support Equipment

Name	Manufacturer	Type/Model	Serial Number	FCC ID
Base Node (BN)	Tarana Wireless	G1BN6ASI002	S174F2224810253	2ABOF- G1BN6ASI002

2.4 Measuring Equipment List

Nama	Manufacturer	Type/Model	Serial Number	Calibration	
Name				Last Cal.	Due Date
Spectrum Analyzer	Rohde & Schwarz	FSW	101042	Dec. 11, 2022	Dec. 10, 2023

2.5 Measurement Uncertainty

Uncertainty of Conducted Power Measurement

95% $(U = 2uc(y))$

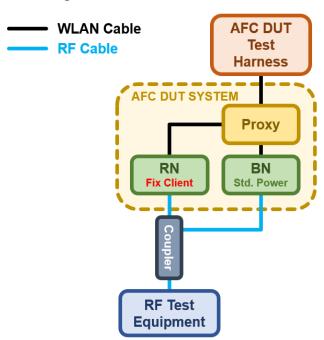
TEL: 408-904-3300 Page Number : 9 of 33
Issue Date : Nov. 01, 2023

Report Version : 03

3. Measurement Environment

Measurement Environment Information		
AFC DUT Test Harness	AFC DUT Test Harness Version (2.0.65.148)	
Operating System	Ubuntu 22.04	
TLS version	V 1.2	

3.1 Test configuration



Proxy representing Standard Power Access Point (BN) and Fixed Client Device (RN) Test Setup

TEL: 408-904-3300 Page Number : 10 of 33 Issue Date : Nov. 01, 2023

Report Version : 03

4. Protocol Test Results

4.1 Successful registration and spectrum access request

#	Description	Results
1	If the AFC DUT is Standard Power Access Point, go to Step 2, else go to	Go to
I	Step 12	step 12
	AFC DUT set to Initial Pre-test State.	
	If needed (see Table 5 declaration), configure the AFC DUT with BSS	
	parameters per Table 9 and a temporary test regulatory identifier (e.g., FCC	Not
2	ID), geographic coordinates, antenna height, and uncertainty parameters.	applicable
	Configure the AFC DUT with AFC System URL and server root certificate.	
	Trigger the AFC DUT to send to the AFC DUT Test Harness an Available	
	Spectrum Inquiry Request.	
3	AFC DUT sends a valid Available Spectrum Inquiry Request containing the	Not
3	inquiredFrequencyRange and/or the inquiredChannels fields*.	applicable
4	AFC DUT Test Harness validates the presence of mandatory registration	Not
4	information	applicable
	AFC DUT Test Harness sends an Available Spectrum Inquiry Response	
5	containing a list of available frequency ranges and/or channels and the	Not
٥	maximum permissible transmit power in the availableFrequencyInfo and/or	applicable
	availableChannelInfo fields.	

TEL: 408-904-3300 Page Number : 11 of 33
Issue Date : Nov. 01, 2023

Report Version : 03

#	Description			
	Throughout Step 1 to Step 4, RF Test Equipment monitors the output of the			
	AFC DUT to confirm that the AFC DUT does not transmit:			
	 In the band if the AFC DUT supports only SP operation 			
	Or			
	 Above LPI limits for AFC DUT whose manufacturer attests to its 			
	compliance with rules for LPI operation			
	Wait for 60 seconds			
6	RF Test Equipment monitors any transmission by the AFC DUT conforms to the following:	Not		
	 For SP only operation, AFC DUT conforms to the conditions contained 	applicable		
	in the Available Spectrum Inquiry Response and does not exceed			
	emissions limits in adjacent frequencies.			
	 For AFC DUT whose manufacturer attests to its compliance with rules 			
	for LPI operation, AFC DUT transmit power in the band is less than			
	CEILING [LPI limits, SP limits contained in the Available Spectrum			
	Inquiry Response] and does not exceed emissions limits in adjacent			
	frequencies.			
7	Trigger the AFC DUT to send to the AFC DUT Test Harness an Available	Not		
,	Spectrum Inquiry Request.	applicable		
8	AFC DUT sends a valid Available Spectrum Inquiry Request containing the	Not		
0	inquiredFrequencyRange and/or the inquiredChannels fields*.	applicable		
9	AFC DUT Test Harness validates the presence of mandatory registration	Not		
9	information	applicable		
	AFC DUT Test Harness sends an Available Spectrum Inquiry Response			
10	containing a list of available frequency ranges and/or channels and the	Not		
10	maximum permissible transmit power in the availableFrequencyInfo and/or	applicable		
	availableChannelInfo fields which are significantly different from Step 5.			

TEL: 408-904-3300 Page Number : 12 of 33
Issue Date : Nov. 01, 2023

Report Version : 03

#	Description	Results		
	Wait for 5 minutes (configurable)			
	RF Test Equipment monitors any transmission by the AFC DUT conforms to			
	the following:			
	For SP only operation, AFC DUT conforms to the conditions contained			
	in the latest Available Spectrum Inquiry Response and does not exceed	Not		
11	emissions limits in adjacent frequencies.	applicable		
	 For AFC DUT whose manufacturer attests to its compliance with rules 	арріісаріе		
	for LPI operation, AFC DUT transmit power in the band is less than			
	CEILING [LPI limits, SP limits contained in the latest Available Spectrum			
	Inquiry Response] and does not exceed emissions limits in adjacent			
	frequencies.			
12	If the AFC DUT is Fixed Client, go to Step 13 else Stop the test	Go to step		
12	if the Al C DOT is tiked client, go to step 13 else stop the test	13		
13	The AFC DUT set to Initial Pre-test State.	Done		
14	If needed (see Table 5 declaration), configure the AFC DUT with a temporary			
	test regulatory identifier (e.g., FCC ID), geographic coordinates, antenna			
	height, and uncertainty parameters.			
14	Configure the AFC DUT with AFC System URL and server root certificate.			
	Trigger the AFC DUT to send to the AFC DUT Test Harness an Available			
	Spectrum Inquiry Request using either In-band or Out-of-band methods.			
15	AFC DUT sends a valid Available Spectrum Inquiry Request containing the	PASS		
13	inquiredFrequencyRange and/or the inquiredChannels fields*	FAGG		
16	AFC DUT Test Harness validates the presence of mandatory registration	PASS		
10	information	FAGG		
	AFC DUT Test Harness sends an Available Spectrum Inquiry Response			
17	containing a list of available frequency ranges and/or channels and the	Done		
	maximum permissible transmit power in the availableFrequencyInfo and/or			
	availableChannelInfo fields.			
	If AFC DUT used Out-of-band method, initiate connection procedure between			
18	AFC DUT and SP Access Point by following instructions provided by the AFC	Done		
	DUT Vendor			

TEL: 408-904-3300 Page Number : 13 of 33
Issue Date : Nov. 01, 2023

Report Version : 03

#	Description	Results	
	Wait for 60 seconds		
19	RF Test Equipment monitors any transmission by the AFC DUT conforms to		
	the conditions contained in the Available Spectrum Inquiry Response and	PASS	
	does not exceed emissions limits in adjacent frequencies		
20	Trigger the AFC DUT to send to the AFC DUT Test Harness an Available	Done	
20	Spectrum Inquiry Request using either In-band or Out-of-band methods	Done	
21	AFC DUT sends a valid Available Spectrum Inquiry Request containing the	PASS	
21	inquiredFrequencyRange and/or the inquiredChannels fields*	F A00	
22	AFC DUT Test Harness validates the presence of mandatory registration	PASS	
22	information	1 700	
	AFC DUT Test Harness sends an Available Spectrum Inquiry Response		
23	containing a list of available frequency ranges and/or channels and the	Done	
20	maximum permissible transmit power in the availableFrequencyInfo and/or		
	availableChannelInfo fields which are significantly different from Step 17.		
	If AFC DUT used Out-of-band method, initiate connection procedure between		
24	AFC DUT and SP Access Point by following instructions provided by the AFC	Done	
	DUT Vendor		
25	Wait for 60 seconds (configurable)		
	RF Test Equipment monitors any transmission by the AFC DUT conforms to	PASS	
20	the conditions contained in the latest Available Spectrum Inquiry Response	1 700	
	and does not exceed emissions limits in adjacent frequencies		

TEL: 408-904-3300 Page Number : 14 of 33
Issue Date : Nov. 01, 2023

Report Version : 03

4.1.1 AFCD.RSA Test Vector

Test Vector	Test Category	Results
AFCD.RSA	Successful registration and spectrum access request	PASS

4.1.2 AFCD.RSA RF Transmit Power Measurement

Center Frequency [MHz]	BW [MHz]	DUT Internal Loss [dB]	Duty Cycle Factor [dB]	MIMO Factor [dB]	Directional Gain [dBi]	SA Reading Power [dBm]	Total EIRP [dBm]	AFC EIRP Limit [dBm]
6005	40	24.63			17.91	-25.68	26.75	33.72
6805		25.59	6 00	2.04	18.01	-26.59	26.90	35.00
6325		24.59	6.88	3.01	17.91	-24.14	28.25	36.00
6765		25.81			18.01	-20.62	33.09	35.25

Note 1: DUT will transmit on two of available channels which has highest allowed power based on response from AFC system. During testing, both channels were validated to ensure each channel's EIRP power does not exceed allowed power from AFC.

Note 2: UNII-5 Antenna Gain = 14.9dBi.

The device is driving cross-polarized antenna, which has 4 horizontal polarization antenna and 4 vertical polarization antenna.

Directional Gain (4H/4V) = 14.9dBi + 10log(Ntx = 4 / Nss = 2) = 17.91dBi

Note 3: UNII-7 Antenna Gain = 15dBi.

The device is driving cross-polarized antenna, which has 4 horizontal polarization antenna and 4 vertical polarization antenna.

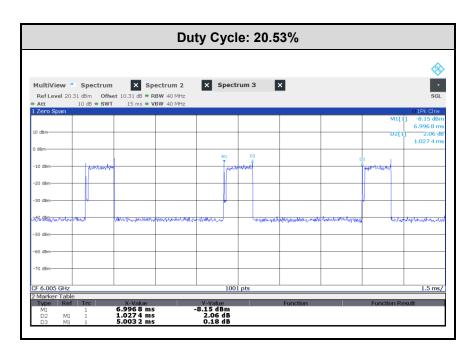
Directional Gain (4H/4V) = 15dBi + 10log(Ntx = 4 / Nss = 2) = 18.01dBi

- Note 4: Conducted power were measured on sum of 4 horizontal polarization output ports. MIMO factor 3.01 is considered to calculate total conducted output power.
- Note 5: The path loss between the DUT and the Spectrum Analyzer has been offset and configured in the Spectrum Analyzer.
- Note 6: The duty cycle factor, calculated as 10log(1/duty cycle) and listed in the table above, is used to compute the average power during continuous transmission.

TEL: 408-904-3300 Page Number : 15 of 33 Issue Date : Nov. 01, 2023

Report Version : 03



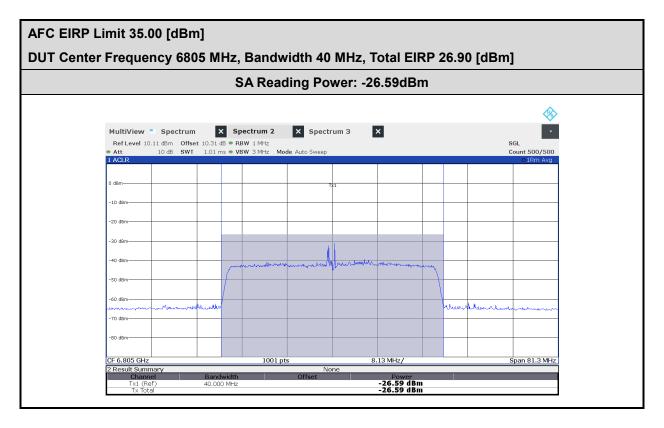


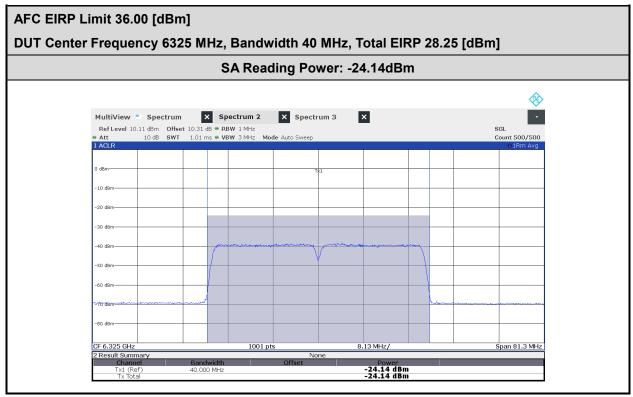


TEL: 408-904-3300 Page Number : 16 of 33 Issue Date : Nov. 01, 2023

Report Version : 03

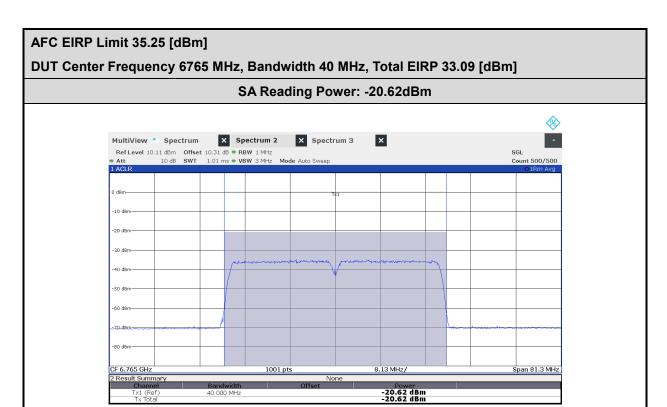
AFC Device (DUT) Test Report





TEL: 408-904-3300 Page Number : 17 of 33 : Nov. 01, 2023 Issue Date

> Report Version : 03



TEL: 408-904-3300 Page Number : 18 of 33 Issue Date : Nov. 01, 2023

Report Version : 03

4.2 Unsuccessful spectrum access request

#	Description	Results	
4	If the AFC DUT is Standard Power Access Point, go to Step 2, else go to	Go to	
1	Step 7	step 7	
	AFC DUT set to Initial Pre-test State.		
	If needed (see Table 5 declaration), configure the AFC DUT with BSS		
	parameters per Table 9 and a temporary test regulatory identifier (e.g., FCC	Not	
2	ID), geographic coordinates, antenna height, and uncertainty parameters.	applicable	
	Configure the AFC DUT with AFC System URL and server root certificate.	арріісавіе	
	Trigger the AFC DUT to send to the AFC DUT Test Harness an Available		
	Spectrum Inquiry Request.		
3	AFC DUT sends a valid Available Spectrum Inquiry Request containing the	Not	
	inquiredFrequencyRange and/or the inquiredChannels fields*.	applicable	
4	AFC DUT Test Harness validates mandatory registration information.	Not	
4		applicable	
5	AFC DUT Test Harness sends an Available Spectrum Inquiry Response	Not	
5	indicating that no frequency ranges and/or channels are available.	applicable	
	Throughout Step 2 to Step 5 and subsequent to Step 5, RF Test Equipment		
	monitors the output of the AFC DUT to confirm the following:	Not	
6	 For SP only operation, AFC DUT does not transmit in the band. 	applicable	
	 For AFC DUT whose manufacturer attests to its compliance with rules 	арріісаріе	
	for LPI operation, the AFC DUT does not transmit above LPI limits.		
7	If the AFC DUT is Fixed Client, go to Step 8 else Stop the test	Go to step	
	in the 7th of De 1 in the definition of the close close the test	8	
8	The AFC DUT set to Initial Pre-test State.	Done	
	If needed (see Table 5 declaration), configure the AFC DUT with a temporary		
9	test regulatory identifier (e.g., FCC ID or IC ID), geographic coordinates,		
	antenna height, and uncertainty parameters.	Done	
	Configure the AFC DUT with AFC System URL and server root certificate.	Done	
	Trigger the AFC DUT to send to the AFC DUT Test Harness an Available		
	Spectrum Inquiry Request.		
10	AFC DUT sends a valid Available Spectrum Inquiry Request containing the	PASS	
	inquiredFrequencyRange and/or the inquiredChannels fields*.	17.00	
11	AFC DUT Test Harness validates mandatory registration information.	PASS	

TEL: 408-904-3300 Page Number : 19 of 33 Issue Date : Nov. 01, 2023

Report Version : 03

#	Description	
12	AFC DUT Test Harness sends an Available Spectrum Inquiry Response	
	indicating that no frequency ranges and/or channels are available using either	Done
	In-band or Out-of-band methods.	
13	If AFC DUT used Out-of-band method, initiate connection procedure between	
	Fixed Client and SP Access Point by following instructions provided by the	Done
	AFC DUT Vendor	
	Wait for 60 seconds	
14	RF Test Equipment monitors that the AFC DUT does not transmit above	PASS
	maximum transmit power limits advertised by the Standard Power Access	PASS
	Point for Standard Client Devices in the channel.	

4.2.1 AFCD.USA Test Vectors

Test Vector	Test Category	Results
AFCD.USA	Unsuccessful spectrum access request	PASS

TEL: 408-904-3300 Page Number : 20 of 33 Issue Date : Nov. 01, 2023

Report Version : 03

4.3 Successful spectrum access update

#	Description	Results		
1	If the AFC DUT is Standard Power Access Point, go to Step 2, else go to	Go to step		
I	Step 12	12		
	AFC DUT set to Initial Pre-test State.			
	If needed (see Table 5 declaration), configure the DUT with BSS parameters			
	per Table 9 and a temporary test regulatory identifier (e.g., FCC ID),	Not		
2	geographic coordinates, antenna height, and uncertainty parameters.	applicable		
	Configure the AFC DUT with AFC System URL and server root certificate.			
	Trigger the AFC DUT to send to the AFC DUT Test Harness an Available			
	Spectrum Inquiry Request.			
3	AFC DUT sends a valid Available Spectrum Inquiry Request containing the	Not		
3	inquiredFrequencyRange and/or the inquiredChannels fields*.	applicable		
	AFC DUT Harness validates mandatory registration information.			
4				
	AFC DUT Test Harness sends an Available Spectrum Inquiry Response			
_	containing a list of available frequency ranges and/or channels and the	Not		
5	maximum permissible transmit power in the availableFrequencyInfo and/or	applicable		
	availableChannelInfo fields.			

TEL: 408-904-3300 Page Number : 21 of 33
Issue Date : Nov. 01, 2023

Report Version : 03

#	Description	Results
	Throughout the preceding steps, RF Test Equipment monitors the output of	
	the AFC DUT to confirm that the AFC DUT does not transmit:	
	In the band if the AFC DUT supports only SP operation	
	Or	
	Above LPI limits for AFC DUT whose manufacturer attests to its	
	compliance with rules for LPI operation	
	Wait for 60 seconds	
	RF Test Equipment monitors any transmission by the AFC DUT conforms to	Not
6	the following:	applicable
	For SP only operation, AFC DUT conforms to the conditions contained	арріїсаріе
	in the Available Spectrum Inquiry Response and does not exceed	
	emissions limits in adjacent frequencies.	
	For AFC DUT whose manufacturer attests to its compliance with rules	
	for LPI operation, AFC DUT transmit power in the band is less than	
	CEILING [LPI limits, SP limits contained in the Available Spectrum	
	Inquiry Response] and does not exceed emissions limits in adjacent	
	frequencies.	
	AFC DUT is power cycled.	
	If needed (see Table 5 declaration), configure the AFC DUT with a	Not
7	temporary test regulatory identifier (e.g., FCC ID), new geographic	applicable
	coordinates, antenna height, and uncertainty parameters.	арріїсавіє
	Configure the AFC DUT with AFC System URL and server root certificate.	
	Wait for 60 seconds	
	If the AFC DUT does not send an Available Spectrum Inquiry Request, RF	
	Test Equipment monitors the output of the AFC DUT to verify the following	
8	and STOP the test	Not
	 For SP only operation, AFC DUT does not transmit in the band. 	applicable
	For AFC DUT whose manufacturer attests to its compliance with rules	арріїодьіс
	for LPI operation, the AFC DUT does not transmit above LPI limits.	
	If the AFC DUT sends an Available Spectrum Inquiry Request, then	
	CONTINUE with Step 9	

TEL: 408-904-3300 Page Number : 22 of 33 Issue Date : Nov. 01, 2023

Report Version : 03

13

The AFC DUT set to Initial Pre-test State.

#	Description	Results
0	AFC DUT Test Harness evaluates validity of mandatory registration	Not
9	information	applicable
	AFC DUT Test Harness waits for 60 seconds before sending an Available	
	Spectrum Inquiry Response containing a list of available frequency ranges	
	and/or channels and the maximum permissible transmit power in the	
	availableFrequencyInfo and/or availableChannelInfo fields which are	
	significantly different from Step 5.	
	During the 60 seconds wait time:	Not
10	■ For AFC DUT whose manufacturer attests to its compliance with	
	rules for LPI operation, RF Test Equipment monitors the output of	applicable
	the AFC DUT to confirm that AFC DUT does not transmit above	
	LPI threshold limits	
	■ For SP only operation, RF Test Equipment monitors the output of	
	the AFC DUT to confirm that AFC DUT doesn't transmit in the	
	band	
	Wait for 60 seconds	
	RF Test Equipment monitors any transmission by the AFC DUT conforms to	
	the following:	
	For SP only operation, AFC DUT conforms to the conditions contained	
	in the Available Spectrum Inquiry Response and does not exceed	Not
11	emissions limits in adjacent frequencies.	
	For AFC DUT whose manufacturer attests to its compliance with rules	applicable
	for LPI operation, AFC DUT transmit power in the band is less than	
	CEILING [LPI limits, SP limits contained in the Available Spectrum	
	Inquiry Response] and does not exceed emissions limits in adjacent	
	frequencies.	
12	If the AEC DUT is Fixed Client, we to Chart 40 also Chart the test	
12	If the AFC DUT is Fixed Client, go to Step 13 else Stop the test	step 13

TEL: 408-904-3300 Page Number : 23 of 33 Issue Date : Nov. 01, 2023

Report Version : 03

Done

#	Description	Results
	If needed (see Table 5 declaration), configure the AFC DUT with a	
	temporary test regulatory identifier (e.g., FCC ID), geographic coordinates,	
14	antenna height, and uncertainty parameters.	Dono
14	Configure the AFC DUT with AFC System URL and server root certificate.	Done
	Trigger the AFC DUT to send to the AFC DUT Test Harness an Available	
	Spectrum Inquiry Request using either In-band or Out-of-band methods.	
15	AFC DUT sends a valid Available Spectrum Inquiry Request containing the	PASS
15	inquiredFrequencyRange and/or the inquiredChannels fields*	PASS
40	AFC DUT Test Harness validates the presence of mandatory registration	DAGG
16	information	PASS
	AFC DUT Test Harness sends an Available Spectrum Inquiry Response	
	containing a list of available frequency ranges and/or channels and the	Done
17	maximum permissible transmit power in the availableFrequencyInfo and/or	
	availableChannelInfo fields.	
	If AFC DUT used Out-of-band method, initiate connection procedure	
18	between AFC DUT and SP Access Point by following instructions provided	Done
	by the AFC DUT Vendor	
	Wait for 60 seconds	
40	RF Test Equipment monitors any transmission by the AFC DUT conforms to	DAGG
19	the conditions contained in the Available Spectrum Inquiry Response and	PASS
	does not exceed emissions limits in adjacent frequencies	
	AFC DUT is power cycled.	
	If needed (see Table 5 declaration), configure the AFC DUT with a	
20	temporary test regulatory identifier (e.g., FCC ID), new geographic	Done
	coordinates, antenna height, and uncertainty parameters.	
	Configure the AFC DUT with AFC System URL and server root certificate	

TEL: 408-904-3300 Page Number : 24 of 33
Issue Date : Nov. 01, 2023

Report Version : 03

#	Description	Results
	Wait for 60 seconds	
	If the AFC DUT does not send an Available Spectrum Inquiry Request, RF	
	Test Equipment monitors the output of the AFC DUT to verify the AFC DUT	
21	does not transmit above maximum transmit power limits advertised by the	Test End
21	Standard Power Access Point for Standard Client Devices in the channel	rest End
	and STOP the test.	
	If the AFC DUT sends an Available Spectrum Inquiry Request, then	
	CONTINUE with Step 21	
22	AFC DUT Test Harness evaluates validity of mandatory registration	Not
22	information	applicable
	AFC DUT Test Harness waits for 60 seconds before sending an Available	
	Spectrum Inquiry Response containing a list of available frequency ranges	
	and/or channels and the maximum permissible transmit power in the	
	availableFrequencyInfo and/or availableChannelInfo fields which are	Not
23	significantly different from step 17.	applicable
	During the 60 seconds wait time, RF Test Equipment monitors the output of	арріісавіе
	the AFC DUT to confirm that the AFC DUT does not transmit above	
	maximum transmit power limits advertised by the Standard Power Access	
	Point for Standard Client Devices in the channel.	
	If AFC DUT used Out-of-band method, initiate connection procedure	Not
24	between AFC DUT and SP Access Point by following instructions provided	applicable
	by the AFC DUT Vendor	арріісаріе
	Wait for 60 seconds	
25	RF Test Equipment monitors any transmission by the AFC DUT conforms to	Not
25	the conditions contained in the Available Spectrum Inquiry Response and	applicable
	does not exceed emissions limits in adjacent frequencies	

4.3.1 AFCD.SAU Test Vectors

Test Vector	Test Category	Results
AFCD.SAU	Successful spectrum access update	PASS

TEL: 408-904-3300 Page Number : 25 of 33
Issue Date : Nov. 01, 2023

Report Version : 03

4.3.2 AFCD.SAU RF Transmit Power Measurement

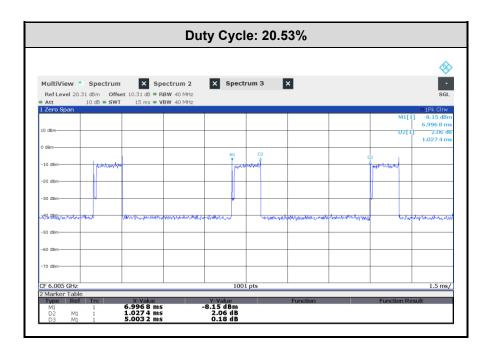
Center Frequency [MHz]	BW [MHz]	DUT Internal Loss [dB]	Duty Cycle Factor [dB]	MIMO Factor [dB]	Directional Gain [dBi]	SA Reading Power [dBm]	Total EIRP [dBm]	AFC EIRP Limit [dBm]
6205	40	23.78	6 00	2.04	17.01	-17.78	33.80	36.00
6005	40	24.63	6.88	3.01	17.91	-21.03	31.40	34.24

- Note 1: DUT will transmit on two of available channels which has highest allowed power based on response from AFC system. During testing, both channels were validated to ensure each channel's EIRP power does not exceed allowed power from AFC.
- Note 2: UNII-5 Antenna Gain = 14.9dBi.

The device is driving cross-polarized antenna, which has 4 horizontal polarization antenna and 4 vertical polarization antenna.

Directional Gain (4H/4V) = 14.9dBi + 10log(Ntx = 4 / Nss = 2) = 17.91dBi

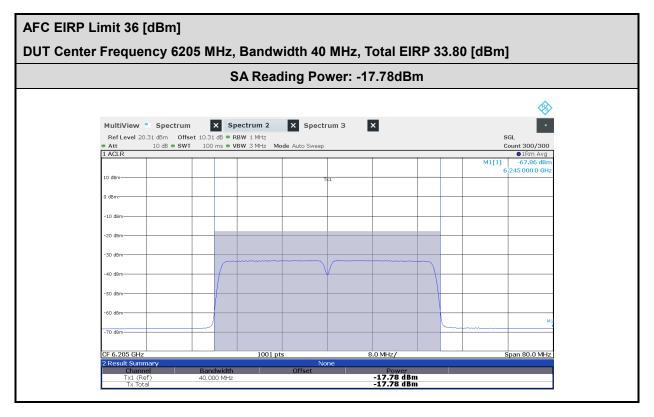
- Note 3: Conducted power were measured on sum of 4 horizontal polarization output ports. MIMO factor 3.01 is considered to calculate total conducted output power.
- Note 4: The path loss between the DUT and the Spectrum Analyzer has been offset and configured in the Spectrum Analyzer.
- Note 5: The duty cycle factor, calculated as 10log(1/duty cycle) and listed in the table above, is used to compute the average power during continuous transmission.



TEL: 408-904-3300 Page Number : 26 of 33 Issue Date : Nov. 01, 2023

Report Version : 03







TEL: 408-904-3300 Page Number : 27 of 33 : Nov. 01, 2023 Issue Date

> Report Version : 03

4.4 Unsuccessful spectrum access update

#	Description	Results
1	If the AFC DUT is Standard Power Access Point, go to Step 2, else go to Step	Go to
'	12	step 12
	AFC DUT set to Initial Pre-test State.	
	If needed (see Table 5 declaration), configure the AFC DUT with BSS	
	parameters per Table 9 and a temporary test regulatory identifier (e.g., FCC	Not
2	ID), geographic coordinates, antenna height, and uncertainty parameters.	applicable
	Configure the DUT with AFC System URL and server root certificate.	арріісаріе
	Trigger the DUT to send to the AFC DUT Test Harness an Available Spectrum	
	Inquiry Request using either In-band or Out-of-band methods.	
3	AFC DUT sends a valid Available Spectrum Inquiry Request containing the	Not
3	inquiredFrequencyRange and/or the inquiredChannels fields.	applicable
4	AFC DUT Test Harness validates mandatory registration information	Not
4		applicable
	AFC DUT Test Harness sends an Available Spectrum Inquiry Response	
5	containing a list of available frequency ranges and/or channels and the	Not
3	maximum permissible transmit power in the availableFrequencyInfo and/or	applicable
	availableChannelInfo fields.	

TEL: 408-904-3300 Page Number : 28 of 33 Issue Date : Nov. 01, 2023

Report Version : 03

#	Description	Results
	Throughout the Step 2 to 5, RF Test Equipment monitors the output of the	
	AFC DUT to confirm that the AFC DUT does not transmit:	
	 In the band if the AFC DUT supports only SP operation 	
	Or	
	 Above LPI limits for AFC DUT whose manufacturer attests to its 	
	compliance with rules for LPI operation	
	Wait for 60 seconds	
6	RF Test Equipment monitors any transmission by the AFC DUT conforms to	Not
6	the following:	applicable
	 For SP only operation, AFC DUT conforms to the conditions contained 	
	in the Available Spectrum Inquiry Response and does not exceed	
	emissions limits in adjacent frequencies.	
	For AFC DUT whose manufacturer attests to its compliance with rules for	
	LPI operation, AFC DUT transmit power in the band is less than CEILING	
	[LPI limits, SP limits contained in the Available Spectrum Inquiry Response]	
	and does not exceed emissions limits in adjacent frequencies	
	AFC DUT is power cycled.	
	If needed (see Table 5declaration), configure the AFC DUT with a temporary	Not
7	test regulatory identifier (e.g., FCC ID), new geographic coordinates,	applicable
	antenna height, and uncertainty parameters.	арріісавіе
	Configure the AFC DUT with AFC System URL and server root certificate.	
	Wait for 60 seconds	
	 If the AFC DUT does not send an Available Spectrum Inquiry Request, 	
	RF Test Equipment monitors the output of the DUT to verify the	
	following and STOP the test:	
8	For SP only operation, AFC DUT does not transmit in the band,	Not
	 For AFC DUT whose manufacturer attests to its compliance with 	applicable
	rules for LPI operation, the AFC DUT does not transmit above	
	LPI limits.	
	 If the AFC DUT sends an Available Spectrum Inquiry Request, then 	
	CONTINUE with Step 8	
9	AFC DUT Test Harness evaluates validity of mandatory registration	Not
3	information.	applicable

TEL: 408-904-3300 Page Number : 29 of 33 Issue Date : Nov. 01, 2023

Report Version : 03

#	Description	Results	
40	AFC DUT Test Harness sends an Available Spectrum Inquiry Response	Not	
10	indicating that no frequency ranges and/or channels are available.	applicable	
	Throughout Step 7 to 10 and subsequent to Step 10 Test Equipment		
	monitors the output of the AFC DUT to confirm that:	Net	
11	For SP only operation, AFC DUT does not transmit in the band.	Not	
	For AFC DUT whose manufacturer attests to its compliance with rules for	applicable	
	LPI operation, the AFC DUT does not transmit above LPI limits.		
12	If the AFC DUT is Fixed Client, go to Step 13 else Stop the test	Go to step 13	
13	The AFC DUT set to Initial Pre-test State.	Done	
	If needed (see Table 5 declaration), configure the DUT with a temporary test		
	regulatory identifier (e.g., FCC ID), geographic coordinates, antenna height,		
4.4	and uncertainty parameters.	Done	
14	Configure the AFC DUT with AFC System URL and server root certificate.		
	Trigger the AFC DUT to send to the AFC DUT Test Harness an Available		
	Spectrum Inquiry Request using either In-band or Out-of-band methods.		
15	AFC DUT sends a valid Available Spectrum Inquiry Request containing the	PASS	
15	inquiredFrequencyRange and/or the inquiredChannels fields*	PASS	
16	AFC DUT Test Harness validates the presence of mandatory registration	PASS	
10	information	PASS	
	AFC DUT Test Harness sends an Available Spectrum Inquiry Response		
17	containing a list of available frequency ranges and/or channels and the	Done	
17	maximum permissible transmit power in the availableFrequencyInfo and/or	Done	
	availableChannelInfo fields.		
	If AFC DUT used Out-of-band method, initiate connection procedure		
18	between AFC DUT and SP Access Point by following instructions provided	Done	
	by the AFC DUT Vendor		
	Wait for 60 seconds		
19	RF Test Equipment monitors any transmission by the AFC DUT conforms to	PASS	
19	the conditions contained in the Available Spectrum Inquiry Response and	FASS	
	does not exceed emissions limits in adjacent frequencies		

TEL: 408-904-3300 Page Number : 30 of 33 Issue Date : Nov. 01, 2023

Report Version : 03

#	Description	Results
	AFC DUT is power cycled.	
	If needed (see Table 5 declaration), configure the AFC DUT with a	
20	temporary test regulatory identifier (e.g., FCC ID or IC ID), new geographic	Done
	coordinates, antenna height, and uncertainty parameters.	
	Configure the AFC DUT with AFC System URL and server root certificate	
	Wait for 60 seconds	
	If the AFC DUT does not send an Available Spectrum Inquiry Request, RF	
	Test Equipment monitors that the AFC DUT does not transmit above	
21	maximum transmit power limits advertised by the Standard Power Access	PASS
	Point for Standard Client Devices in the channel.,	
	If the AFC DUT sends an Available Spectrum Inquiry Request, then	
	CONTINUE with Step 22 else STOP the test	
	AFC DUT Test Harness evaluates validity of mandatory registration	PASS
22	information.	PASS
23	AFC DUT Test Harness sends an Available Spectrum Inquiry Response	Done
23	indicating that no frequency ranges and/or channels are available.	Done
	If AFC DUT used Out-of-band method, initiate connection procedure	
24	between AFC DUT and SP Access Point by following instructions provided	Done
	by the AFC DUT Vendor	
	Wait for 60 seconds	
25	RF Test Equipment monitors that the AFC DUT does not transmit above	DACC
25	maximum transmit power limits advertised by the Standard Power Access	PASS
	Point for Standard Client Devices in the channel.	

4.4.1 AFCD.UAU Test Vectors

Test Vector	Test Category	Results
AFCD.UAU	Unsuccessful spectrum access update	PASS

TEL: 408-904-3300 Page Number : 31 of 33 Issue Date : Nov. 01, 2023

Report Version : 03

4.5 Unsuccessful server validation

#	Description	Results
	The AFC DUT set to Initial Pre-test State.	
	If needed (see Table 5 declaration), configure the AFC DUT with BSS	
	parameters per Table 9 and a temporary test regulatory identifier (e.g., FCC ID),	
	geographic coordinates, antenna height, and uncertainty parameters.	
	Configure the AFC DUT Test Harness with TLS configuration that is the same as	
	the default configuration defined in Section 2.3.1 except for the following:	
	 Run 1: A different server certificate (and private key) with SAN domain 	
	name entry "badafc.com" (i.e. that does not match AFC system URL's	
	domain name); signed by the same root certificate as per Section 2.3.1	
	 Run 2: A different server certificate (and private key) where all attributes 	
	other than Public Key are the same as the server certificate per Section	
	2.3.1, but the certificate is signed by a different root certificate	
	 Run 3: A different server certificate (and private key) with SAN domain 	
	name entry "wfatestorg.org" only (i.e. SAN domain name only matches	
	suffix of AFC server's hostname); signed by the same root certificate as per	
1	Section 2.3.1	Done
'	 Run 4: A different server certificate (and private key) where all attributes 	Done
	other than Public Key are the same as the server certificate per Section	
	2.3.1 signed by the same root certificate as per Section 2.3.1, but the	
	server certificate is revoked as indicated in stapled OCSP response	
	 Run 5: Same configuration as per Section 2.3.1, except OCSP stapling is 	
	disabled and CRL/OCSP servers are not available	
	 Run 6: Same configuration as per Section 2.3.1, except stapled OCSP 	
	response has expired and CRL/OCSP servers are not available	
	 Run 7: Same configuration as per Section 2.3.1, except only the TLS 	
	cipher suite "eNULL" (no encryption) is enabled	
	 Run 8: N/A (same configuration as per Section 2.3.1) 	
	Configure the DUT with the AFC System URL and the following root certificate:	
	 Runs 1-7: Root certificate as per Section 2.3.1 	
	Run 8: No root certificate	
	Trigger the DUT to send to the AFC DUT Test Harness an Available Spectrum	
	Inquiry Request.	

TEL: 408-904-3300 Page Number : 32 of 33 Issue Date : Nov. 01, 2023

Report Version : 03

AFC Device (DUT) Test Report

#	Description	Results	
2	AFC DUT Test Harness waits 10 seconds, and verifies no Available Spectrum		
	Inquiry Request is sent to it.	PASS	
3	Steps 1 and 2 are repeated for each of the remaining Runs	PASS	

4.5.1 AFCD.USV Test Vectors

Test Vector	Test Vector Test Category	
AFCD.USV	Unsuccessful server validation	PASS

TEL: 408-904-3300 Page Number : 33 of 33 Issue Date : Nov. 01, 2023

Report Version : 03

Appendix B. AFC DUT Test Logs and Tool Report

Section	Test Case	Test Description	FCC Requirement	Short Description	Test Result
4.1	AFCD.RSA	Successful registration and spectrum access request	47 CFR Section 15.407(k)(1) 47 CFR Section 15.407(k)(8)(i) 47 CFR Section 15.407(k)(8)(ii) 47 CFR Section 15.407(k)(8)(iii) 47 CFR Section 15.407(k)(8)(iii) 47 CFR Section 15.407(l)(ii)	Transmit only as instructed by AFC System Register with AFC System prior to initial transmission Provide required registration parameters Registration either directly or via proxy Determination of appropriate channel configuration implied by AFC System response Must contact an AFC system at least once per day to obtain the latest list of available frequencies and the maximum permissible power	PASS

Report No.: FR230713001-02

Note: For AFCD.RSA test logs, please refer to following files:

- 1. Tarana RN_RSA31_AFC DUT Compliance Test Report.pdf
- 2. Tarana RN_RSA31_DUT_Available_Spectrum_Inquiry_Request-Response.pdf

TEL: 408-904-3300 Page Number : B1 of B3



AFC DUT Test Logs and Tool Report

Section	Test Case ID	Test Description	FCC Requirement	Short Description	Test Result
	AFCD.USA		47 CFR Section	Transmit only as instructed by	
		Unsuccessful	15.407(k)(1)	AFC System	
		registration	47 CFR Section	Register with AFC System prior	
4.2		and	15.407(k)(8)(i)	to initial transmission	PASS
4.2		spectrum	47 CFR Section	Provide required registration	PASS
		access	15.407(k)(8)(ii)	parameters	
		request	47 CFR Section	Registration either directly or	
			15.407(k)(8)(iii)	via proxy	

Report No.: FR230713001-02

Note: For AFCD.USA test logs, please refer to following files:

- 1. Tarana RN_USA32_AFC DUT Compliance Test Report.pdf
- 2. Tarana RN_USA32_DUT_Available_Spectrum_Inquiry_Request-Response.pdf

Section	Test Case ID	Test Description	FCC Requirement	Short Description	Test Result
	AFCD.SAU	access	47 CFR Section 15.407(k)(8)(i)	Register with AFC System after change of location	
4.3			47 CFR Section 15.407(k)(8)(ii)	Update AFC System upon change of registration parameters	PASS
		update	47 CFR Section 15.407(k)(9)(i)	Report location and uncertainty from power-off condition	

Note: For AFCD.SAU test logs, please refer to following files:

- 1. Tarana RN_SAU33_AFC DUT Compliance Test Report.pdf
- 2. Tarana RN_SAU33_DUT_Available_Spectrum_Inquiry_Request-Response.pdf

TEL: 408-904-3300 Page Number : B2 of B3

AFC DUT Test Logs and Tool Report

Section	Test Case ID	Test Description	FCC Requirement	Short Description	Test Result
	AFCD.UAU	Unsuccessful spectrum access update	47 CFR Section 15.407(k)(8)(i)	Register with AFC System after change of location	
4.4			47 CFR Section 15.407(k)(8)(ii)	Update AFC System upon change of registration parameters	PASS
			47 CFR Section 15.407(k)(9)(i)	Report location and uncertainty from power-off condition	

Report No.: FR230713001-02

Note: For AFCD.UAU test logs, please refer to following files:

- 1. Tarana RN_UAU34_AFC DUT Compliance Test Report.pdf
- 2. Tarana RN_UAU34_DUT_Available_Spectrum_Inquiry_Request-Response.pdf

Section	Test Case ID	Test Description	FCC Requirement	Short Description	Test Result
4.5	AFCD.USV	Unsuccessful server validation	47 CFR Section 15.407(k)(8)(v)	Incorporate adequate security measurements to prevent it from accessing AFC systems not approved by the FCC	PASS

Note: For AFCD.USV test logs, please refer to following files:

1. Tarana RN_USV35_AFC DUT Compliance Test Report.pdf



TEL: 408-904-3300 Page Number : B3 of B3