4.7 Frequency Stability

<u>LIMIT</u>

Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the users manual.

TEST CONFIGURATION



Variable Power Supply

TEST PROCEDURE

Frequency Stability under Temperature Variations:

The equipment under test was connected to an external AC or DC power supply and input rated voltage. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators. The EUT was placed inside the temperature chamber. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 20° C operating frequency as reference frequency. Turn EUT off and set the chamber temperature to -30° C. After the temperature stabilized for approximately 30 minutes recorded the frequency. Repeat step measure with 10° C increased per stage until the highest temperature of $+50^{\circ}$ C reached.

Frequency Stability under Voltage Variations:

Set chamber temperature to 20°C. Use a variable AC power supply / DC power source to power the EUT and set the voltage to rated voltage. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and recorded the frequency.

Reduce the input voltage to specify extreme voltage variation (\pm 15%) and endpoint, record the maximum frequency change.

TEST RESULTS

Record worst case as below:

Reference Frequency: 802.11ac channel=36 frequency=5180MHz							
Voltage (V/)	Tomporaturo (°C)	Frequency error		Limit (nom)	Pooult		
voltage (v)	remperature (C)	Hz	ppm	Linit (ppin)	Result		
	-30	108.42	0.02093				
12.0	-20	117.56	0.02269	. Within the			
	-10	102.39	0.01977				
	0	114.63	0.02213				
	10	121.57	0.02347				
	20	116.71	0.02253	band of	Pass		
	30	105.46	0.02036	operation			
	40	117.92	0.02276				
	50	116.35	0.02246				
13.2	20	104.29	0.02013]			
10.8	20	107.57	0.02077				

Reference Frequency: 802.11ac channel=149 frequency=5745MHz						
Voltago (V/)		Frequency error		Limit (nom)	Deput	
voltage (v)		Hz	ppm	Linit (ppin)	Result	
	-30	120.74	0.02102			
	-20	116.37	0.02026			
	-10	106.96	0.01862			
	0	115.45	0.02010			
12.0	10	122.48	0.02132	Within the		
	20	118.91	0.02070	band of	Pass	
	30	107.68	0.01874	operation		
	40	114.75	0.01997			
	50	116.82	0.02033			
13.2	20	108.94	0.01896			
10.8	20	112.16	0.01952			

4.8 Automatically Discontinue Transmission

Standard Applicable

FCC CFR Title 47 Part 15 Subpart C Section 15.407(c):

The device shall automatically discontinue transmission in case of either absence of information to transmit or operational failure. These provisions are not intended to preclude the transmission of control or signalling information or the use of repetitive codes used by certain digital technologies to complete frame or burst intervals. Applicants shall include in their application for equipment authorization a description of how this requirement is met.

Test Result:

Declared by applicants that the device will automatically discontinue transmission in case of either absence of information to transmit or operational failure.

4.9 Band edge for RF Conducted Emissions

<u>Limit</u>

1) For transmitters operating in the 5.15 – 5.25 GHz band: All emissions outside of the 5.15 – 5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.

2) For transmitters operating solely in the 5.725 - 5.850 GHz band.

All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at 5 MHz above or below the band edge.

Test Procedure

Connect the transmitter output to spectrum analyzer using a low loss RF cable, and set the spectrum analyzer to RBW=100 kHz, VBW= 300 kHz, peak detector , and max hold.

Test Configuration



Test Results

PASS.

Test plot as follows:

Keysight Spectrum Analyzer - Swep	AC SENSE:PULSE	ALIGN AUTO 02:53:17 PM Jun 15, 2024 #Avg Type: RMS TRACE 2 3 4 5	Frequency
	PNO: Fast +++ Trig: Free Run IFGain:Low #Atten: 30 dB	Avg Hold: 300/300 TYPE MWWWW DET PPPP	
Ref Offset 9.78	3 dB	Mkr3 5.149 6 GHz -46.544 dBm	Auto Tune
			Center Fred
0.00			4.850000000 GHz
-10.0			
-30.0		-27.40 alim	Start Freq 4.50000000 GHz
-40.0		3	
-60.0			Stop Freq
-70.0			
Start 4.5000 GHz #Res BW 100 kHz	#VBW 300 kHz	Stop 5.2000 GHz Sweep 66.93 ms (1001 pts)	CF Step 70.000000 MHz
MKR MODE TRC SCL	X Y F	UNCTION FUNCTION WIDTH FUNCTION VALUE	<u>Auto</u> Man
2 N 1 f 3 N 1 f	5.150 0 GHz -48.087 dBm 5.149 6 GHz -46.544 dBm		Freq Offset
4 5 6		E	0 Hz
7			Scale Type
10 11			Log <u>Lin</u>
MSG	III	STATUS	
	11A-518	30-PASS	
Keysight Spectrum Analyzer - Swep	AC SENSE:PULSE	ALIGN AUTO 02:56:19 PM Jun 15, 2024	
Center Freq 5.340000	PNO: Fast +++ Trig: Free Run	#Avg Type: RMS Avg Hold: 300/300 DET P P P P P	Frequency
Ref Offset 9 64	IdB	Mkr3 5.411 76 GHz	Auto Tune
10 dB/div Ref 20.00 d	Bm	-49.522 dBm	
			Center Freq 5.34000000 GHz
-10.0			
-30.0		-27.00 dBm	Start Freq
-40.0		3	
-60.0	กรีสรีสรี (กลุกกรรมที่สาวารสรีมาการสร้างการสร้างการสรายสรรมสร้างสรรมสร้างสร้างสร้างสร้างสร้างสร้างสร้างสร้าง	and a second	Stop Freq
-70.0			5.40000000 GHz
Start 5.2200 GHz #Res BW 100 kHz	#VBW 300 kHz	Stop 5.4600 GHz Sweep 23.00 ms (1001 pts)	CF Step 24.000000 MHz
MKR MODE TRC SCL	X Y F 5.233 68 GHz -0.922 dBm	UNCTION FUNCTION WIDTH FUNCTION VALUE	Auto Man
2 N 1 f 3 N 1 f	5.350 00 GHz -53.034 dBm 5.411 76 GHz -49.522 dBm		Freq Offset
5			0 Hz
8			Scale Type
10			Log <u>Lin</u>
MSG		STATUS	
	110 52/	10 0488	

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5 Test Setup Photos of the EUT



6 Photos of the EUT

Reference to the test report No. GRCTR240602019-01.