

427 West 12800 South Draper, UT 84020

Test Report Certification

FCC ID	SWX-U6MESHP	
IC ID	6545A-U6MESHP	
Equipment Under Test	U6-Mesh-Pro	
Test Report Serial Number	TR8732_01	
Date of Tests	5-6, 11, 14, 20-22 December 2023	
Report Issue Date	17 January 2024	

Test Specification	Applicant
47 CFR FCC Part 15, Subpart C	Ubiquiti Inc.
	685 Third Avenue
	New York, NY 10017
	U.S.A.

WPP R ilac TESTING

NVLAP LAB CODE 600241-0



Certification of Engineering Report

This report has been prepared by Unified Compliance Laboratory (UCL) to document compliance of the device described below with the requirement of Federal Communication Commissions (FCC) Part 15, Subpart C. This report may be reproduced in full. Partial reproduction of this report may only be made with the written consent of the laboratory. The results in this report apply only to the sample tested.

Applicant	Ubiquiti Inc.
Manufacturer	Ubiquiti Inc.
Brand Name	UBIQUITI
Model Number	U6-Mesh-Pro
FCC ID	SWX-U6MESHP
IC ID	6545A-U6MESHP

On this 17th day of January 2024, I individually and for Unified Compliance Laboratory certify that the statements made in this engineering report are true, complete, and correct to the best of my knowledge and are made in good faith.

Although NVLAP has accredited the Unified Compliance Laboratory testing facilities, this report must not be used to claim product certification, approval, or endorsement by NVLAP, NIST or any agency of the U.S. federal government.

Unified Compliance Laboratory

Written By: Kimberly Rodriguez

Reviewed By: Richard L. Winter



Revision History		
Revision Description Date		
01	Original Report Release	17 January 2024



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1 Client Information

1.1 Applicant

Company	Ubiquiti Inc. 685 Third Avenue New York, NY 10017 U.S.A.
Contact Name	Alex Macon
Title	Compliance

1.2 Manufacturer

Company	Ubiquiti Inc. 685 Third Avenue New York, NY 10017 U.S.A.
Contact Name	Alex Macon
Title	Compliance

2 Equipment Under Test (EUT)

2.1 Identification of EUT

Brand Name	UBIQUITI	
Model Number	U6-Mesh-Pro	
Serial Number	1FA1CC	
Dimensions (cm)	34.3 x 18.1 x 6.0	

2.2 Description of EUT

The U6-Mesh-Pro is a four-stream Wi-Fi 6 access point that delivers up to 2.4 Gbps aggregate radio rate with 2X2 5 GHz (DL/UL MU-MIMO) and 2.4 GHz (DL/UL MU-MIMO) radios.

This report covers the circuitry of the device subject to FCC Part 15, Subpart C. The circuitry of the device subject to FCC Part 15 Subpart B was found to be compliant and is covered under a separate Unified Compliance Laboratory test report.

2.3 EUT and Support Equipment

Brand Name Model Number Serial Number	Description	Name of Interface Ports / Interface Cables
BN: UBIQUITI MN: U6-Mesh-Pro (Note 1) SN: 1FA1CC	WiFi Access Point	See Section 2.4
BN: UBIQUITI MN: UPOE-at (Note 1) SN: N/A	PoE Power Adapter	Shielded or Un-Shielded Cat 5e cable (Note 2)
BN: Dell MN: XPS 13 SN: N/A	Laptop PC	Shielded or Un-Shielded Cat 5e cable (Note 2)

The EUT and support equipment used during the test are listed below.

Notes: (1) EUT

(2) Interface port connected to EUT (See Section 2.4)

The support equipment listed above was not modified in order to achieve compliance with this standard.



2.4 Interface Ports on EUT

Name of Ports	No. of Ports Fitted to EUT	Cable Description/Length
Data	1	Shielded Cat 5e cable/8meters
AC (PoE Injector)	1	3 conductor power cord/80cm
LAN (PoE Injector)	1	Un-shielded Cat 5e cable/1
	1	meter

2.5 Operating Environment

Power Supply	120 Volts AC to 48 Volts PoE
AC Mains Frequency	60 Hz
Temperature	21.5 – 23.4 °C
Humidity	17.0 – 24.6 %
Barometric Pressure	1009 mBar

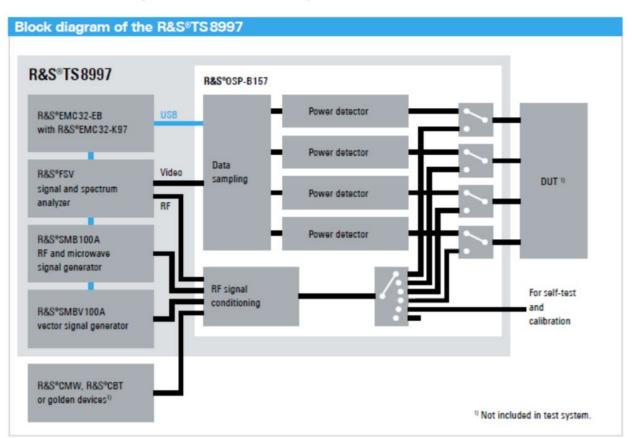
2.6 Operating Modes

The U6-Mesh-Pro was connected to a personal computer laptop and tested using test software in order to enable to constant duty cycle. The measurements within this report are corrected to reference a 100% duty cycle. All emission modes of 802.11 b/g/n/ax were investigated. All measurements are reported with the worst-case mode (802.11ax) unless otherwise stated.

2.7 EUT Exercise Software

EUT firmware version 1.0 was used to operate the transmitter using a constant transmit mode.





2.8 Block Diagram of Test Configuration

Diagram 1: Test Configuration Block Diagram

2.9 Modification Incorporated/Special Accessories on EUT

There were no modifications made to the EUT during testing to comply with the specification.

2.10 Deviation, Opinions Additional Information or Interpretations from Test Standard

There were no deviations, opinions, additional information or interpretations from the test specification.

3 Test Specification, Method and Procedures

3.1 Test Specification

Title47 CFR FCC Part 15, Subpart C 15.203, 15.207 and 15.247 Limits and methods of measurement of radio interference character radio frequency devices.	
Purpose of Test The tests were performed to demonstrate initial compliance	

3.2 Methods & Procedures

3.2.1 47 CFR FCC Part 15 Section 15.203

See test standard for details.

3.2.2 47 CFR FCC Part 15 Section 15.207

See test standard for details.

3.2.3 47 CFR FCC Part 15 Section 15.247

See test standard for details.

3.3 FCC Part 15, Subpart C

3.3.1 Summary of Tests

FCC Section	ISED Section	Environmental Phenomena	Frequency Range (MHZ)	Result					
15.203	N/A	Antenna requirements	Structural Requirement	Compliant					
15.207	RSS-Gen	Conducted Disturbance at Mains Port	0.15 to 30	Compliant					
15.247(a)	RSS-247 § 5.2	Bandwidth Requirement	2412 to 2462	Compliant					
15.247(b)	RSS-247 § 5.4	Peak Output Power	2412 to 2462	Compliant					
15.247(d)	RSS-247 § 5.4	Antenna Conducted Spurious Emissions	0.009 to 40000	N/A					
15.247(d)	RSS-247 § 5.4	Radiated Spurious Emissions	0.009 to 40000	Compliant					
15.247(e)	RSS-247 § 5.2	Peak Power Spectral Density	2412 to 2462	Compliant					
	The testing was performed according to the procedures in ANSI C63.10-2013, KDB 558074 and 47 CFR Part 15. Where applicable, KDB 662911 was followed to sum required measurements.								



3.4 Results

In the configuration tested, the EUT complied with the requirements of the specification.

3.5 Test Location

Testing was performed at the Unified Compliance Laboratory 3-meter and 10-meter chamber located at 427 West 12800 South, Draper, UT 84020. Unified Compliance Laboratory is accredited by National Voluntary Laboratory Accreditation Program (NVLAP); NVLAP Code 600241-0 which is effective until 30 June 2024. This site has also been registered with Innovations, Science and Economic Development (ISED) department and was accepted under Appendix B, Phase 1 procedures of the APEC Tel MRA for Canadian recognition. ISED No.: 25346, effective until 30 June 2024.

Unified Compliance Laboratory has been assigned Designation Number US5037 by the FCC and Conformity Assessment Number US0223 by ISED.



4 Test Equipment

4.1 Conducted Emissions at Mains Ports

Type of Equipment	Manufacturer	Model Number	Asset Number	Date of Last Calibration	Due Date of Calibration
EMI Receiver	AFJ	FFT3010	UCL-2500	7/13/2023	7/13/2024
LISN	AFJ	LS16C/10	UCL-2512	5/26/2023	5/26/2024
ISN	Teseq	ISN T800	UCL-2974	6/27/2022	6/272024
LISN	Com-Power	LIN-120C	UCL-2612	1/24/2023	1/24/2024
AC Power Source	Laplace Instruments	AC1000A	UCL-2857	N/A	N/A
Test Software	UCL	Revision 1	UCL-3107	N/A	N/A

 Table 1: List of equipment used for Conducted Emissions Testing at Mains Port

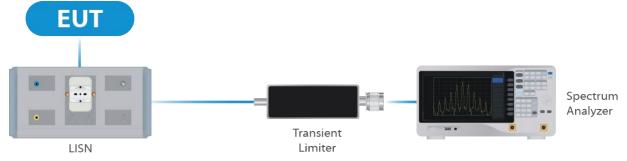


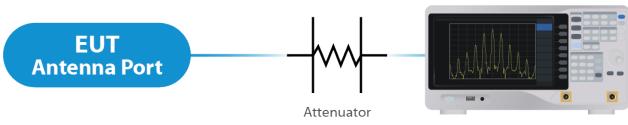
Figure 1: Conducted Emissions Test

4.2 Direct Connect at the Antenna Port Tests

Type of Equipment	Manufacturer	Model Number	Asset Number	Date of Last Calibration	Due Date of Calibration
Spectrum Analyzer	R&S	FSV40	UCL-2861	11/27/2023	11/27/2024
Signal Generator	R&S	SMB100A	UCL-2864	N/A	N/A
Vector Signal Generator	R&S	SMBV100A	UCL-2873	N/A	N/A
Switch Extension	R&S	OSP- B157WX	UCL-2867	2/22/2023	2/22/2024
Switch Extension	R&S	OSP-150W	UCL-2870	2/22/2023	2/22/2024

Table 2: List of equipment used for Direct Connect at the Antenna Port





Spectrum Analyzer

4.3 Radiated Emissions

Type of Equipment	Manufacturer	Model Number	Asset Number	Date of Last Calibration	Due Date of Calibration
EMI Receiver	Keysight	N9038A	UCL-2778	1/27/2023	1/27/2024
Pre-Amplifier 9 kHz – 1 GHz	Sonoma Instruments	310N	UCL-2889	10/7/2021	10/7/2023
Broadband Antenna	Scwarzbeck	VULB 9163	UCL-3062	2/22/2023	2/22/2025
Broadband Antenna	Scwarzbeck	VULB 9163	UCL-3071	1/11/2023	1/11/2025
Double Ridge Horn Antenna	Scwarzbeck	BBHA 9120D	UCL-3065	9/22/2022	9/22/2024
Log Periodic	Scwarzbeck	STLP 9129	UCL-3068	1/27/2023	1/27/2025
15 - 40 GHz Horn Antenna	Scwarzbeck	BBHA 9170	UCL-2487	6/09/2022	6/09/2024
1 – 18 GHz Amplifier	Com-Power	PAM 118A	UCL-3833	12/9/2022	12/9/2023
Test Software	UCL	Revision 1	UCL-3108	N/A	N/A

Table 3: List of equipment used for Radiated Emissions

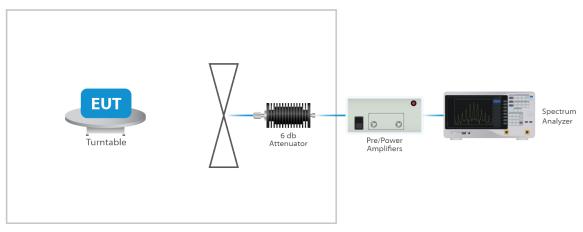


Figure 3: Radiated Emissions Test



4.4 Equipment Calibration

All applicable equipment is calibrated using either an independent calibration laboratory or Unified Compliance Laboratory personnel at intervals defined in ANSI C63.4:2014 following outlined calibration procedures. All measurement instrumentation is traceable to the National Institute of Standards and Technology (NIST). Supporting documentation relative to traceability is on file and is available for examination upon request.

4.5 Measurement Uncertainty

Test	Uncertainty (<u>+</u> dB)	Confidence (%)
Conducted Emissions	1.44	95
Radiated Emissions (9 kHz to 30 MHz)	2.50	95
Radiated Emissions (30 MHz to 1 GHz)	4.38	95
Radiated Emissions (1 GHz to 18 GHz)	4.37	95
Radiated Emissions (18 GHz to 40 GHz)	3.93	95
Direct Connect Tests	K Factor	Value
Emissions Bandwidth	2	2.0%
Output Power	2	1.0 dB
Peak Power Spectral Density	2	1.3 dB
Band Edge	2	0.8 dB
Transmitter Spurious Emissions	2	1.8 dB



5 Test Results

5.1 §15.203 Antenna Requirements

The EUT uses an integral antenna. Per the manufacturer, the Maximum gain of the antenna per chain is 8 dBi. This is an 802.11 device and utilizes CDD as described in KDB 662911 D01. The antenna is not user replaceable. For CDD transmissions, directional gain is calculated as follows.

Array Gain = 10 log(NANT/NSS) dB NANT = number of transmit antennas and NSS = number of spatial streams. NSS = 1 considered worst case.

For power measurements on IEEE 802.11 devices, Array Gain = 0 dB for NANT \leq 4; For PSD measurements when Nss=1: Array Gain = 10 log(NANT/NSS) dB + Antenna Gain (dBi). Or 3.01 dB + 8 dBi = 11.01 dBi.

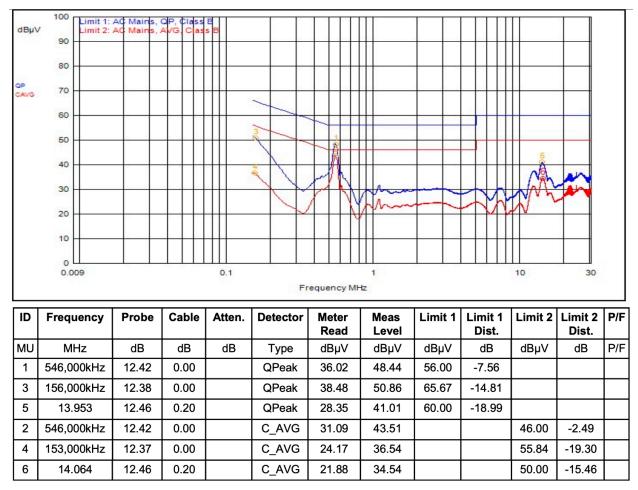
Results

The EUT complied with the specification



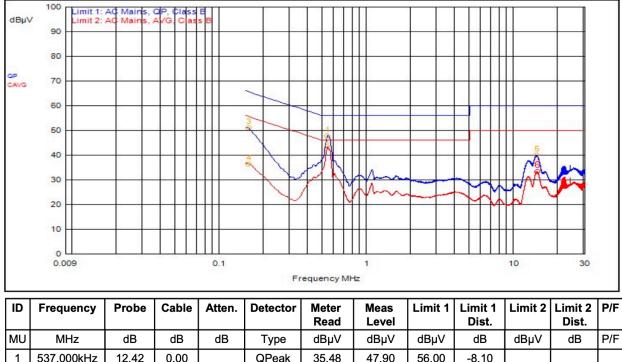
5.2 Conducted Emissions at Mains Ports Data

5.2.1 Line





5.2.2 Neutral



		uD	чD	туре	uDμv	uυμν	uDμν	uВ	uDμv	чD	L' '
1	537,000kHz	12.42	0.00	QPeak	35.48	47.90	56.00	-8.10			
3	156,000kHz	12.38	0.00	QPeak	38.65	51.03	65.67	-14.64			
5	14.085	12.46	0.20	QPeak	27.26	39.92	60.00	-20.08			
2	537,000kHz	12.42	0.00	C_AVG	30.99	43.41			46.00	-2.59	
4	156,000kHz	12.38	0.00	C_AVG	24.10	36.48			55.67	-19.20	
6	14.190	12.47	0.20	C_AVG	20.75	33.42			50.00	-16.58	

Result

The EUT complied with the specification limit.



5.3 §15.247(a)(2) Emissions Bandwidth

All chains were measured under the guidance of KDB 558074 Section 8.2. and KDB 66291 D01. Please see associated annex for details on instrument settings.

Mode	Frequency (MHz)	99% Bandwidth (MHz)	6 dB Bandwidth (MHz)
	2412	13.60	6.80
b	2437	14.70	8.90
	2462	13.60	8.15
	2412	16.50	16.55
g	2437	17.40	16.55
	2462	16.60	16.40
	2412	17.40	16.40
n 20	2437	18.90	15.10
	2462	17.50	16.35
	2422	35.75	31.40
n 40	2437	35.75	35.10
	2452	35.75	26.65
	2412	18.80	11.45
ax 20	2437	19.10	11.85
	2462	18.80	12.20
	2422	37.25	32.05
ax 40	2437	37.25	20.55
	2452	36.75	26.40

Result

All chains were tested and the highest bandwidth per chain is reported above.

In the configuration tested, the 6 dB bandwidth was greater than 500 kHz; therefore, the EUT complied with the requirements of the specification (see spectrum analyzer plot within the Annex).

5.4 §15.247(b)(3) Maximum Average Output Power

All chains were measured and summed under the guidance of KDB 558074 Section 8.3.2.3. and KDB 66291 D01. Please see associated annex for details on instrument settings.

The maximum average RF conducted output power measured for this device was 24.72 dBm or 296.48 mW. The antenna has a gain of 8 dBi.

Modulation (BW)	Frequency (MHz)	Data Rate	TP Setting	Conducted Output Power *	Measured EIRP
	2412	Mcs0	37	20.71	28.71
	2417	Mcs0	39	21.81	29.81
	2422	Mcs0	43	23.69	31.69
	2427	Mcs0	45	24.47	32.47
b 20	2432	Mcs0	46	24.68	32.68
	2437	Mcs0	46	24.72	32.72
	2452	Mcs0	41	22.90	30.90
	2457	Mcs0	40	22.38	30.38
	2462	Mcs0	36	20.37	28.37
	2412	Mcs0	30	16.42	24.42
	2417	Mcs0	32	17.15	25.15
	2422	Mcs0	35	18.56	26.56
	2427	Mcs0	37	19.46	27.46
	2432	Mcs0	40	20.74	28.74
g 20	2437	Mcs0	42	21.07	29.07
	2442	Mcs0	36	19.17	27.17
	2447	Mcs0	34	18.27	26.27
	2452	Mcs0	32	17.39	25.39
	2457	Mcs0	30	16.24	24.24
	2462	Mcs0	24	13.43	21.43
	2412	Mcs0	27	15.55	23.55
	2417	Mcs0	32	17.82	25.82
	2422	Mcs0	36	19.80	27.80
	2427	Mcs0	40	21.64	29.64
n 20	2432	Mcs0	40	21.67	29.67
	2437	Mcs0	41	22.24	30.24
	2442	Mcs0	41	22.28	30.28
	2447	Mcs0	37	20.42	28.42

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	2452	Mcs0	34	18.95	26.95
	2457	Mcs0	33	18.43	26.43
	2462	Mcs0	25	14.25	22.25
	2422	Mcs0	21	12.74	20.74
n 40	2437	Mcs0	28	16.02	24.02
	2452	Mcs0	21	12.76	20.76
	2412	Mcs0	27	15.60	23.60
	2417	Mcs0	31	17.43	25.43
	2422	Mcs0	34	18.78	26.78
	2427	Mcs0	37	20.21	28.21
	2432	Mcs0	40	21.66	29.66
ax 20	2437	Mcs0	40	21.78	29.78
	2442	Mcs0	38	20.85	28.85
	2447	Mcs0	38	20.93	28.93
	2452	Mcs0	34	19.08	27.08
	2457	Mcs0	29	16.50	24.50
	2462	Mcs0	26	14.88	22.88
	2422	Mcs0	23	13.38	21.38
ax 40	2437	Mcs0	26	14.84	22.84
	2452	Mcs0	21	12.52	20.52

Result

In the configuration tested, the maximum average RF output power was less than 1 watt; therefore, the EUT complied with the requirements of the specification (see spectrum analyzer plot within the Annex.

* Gated EIRP shown in the Annex is the conducted measurement

5.5 §15.247(d) Spurious Emissions

5.5.1 Conducted Spurious Emissions

The frequency range from the lowest frequency generated or used in the device to the tenth harmonic of the highest fundamental frequency was investigated to measure any antenna-conducted emissions. The table show the measurement data from spurious emissions noted across the frequency range when transmitting at the lowest frequency, middle frequency and upper frequency. Shown within the Annex are plots with the EUT tuned to the upper and lower channels. These demonstrate compliance with the provisions of this section at the band edges.

The emissions must be attenuated 30 dB below the highest power spectral density level measured within the authorized band as measured with a 100 kHz RBW.

Result

Conducted spurious emissions were attenuated 30 dB or more below the fundamental; therefore, the EUT complies with the specification.

5.5.2 Radiated Spurious Emissions in the Restricted Bands of §15.205

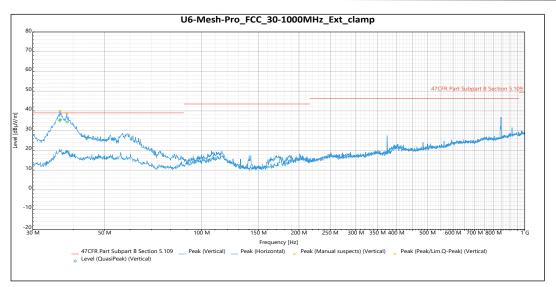
The frequency range from the lowest frequency generated or used in the device to the tenth harmonic of the highest fundamental emissions was investigated to measure any radiated emissions in the restricted bands. The following tables show measurements of any emissions that fell into the restricted bands of §15.205. The tables show the worst-case emissions measured from the EUT. For frequencies above 18.0 GHz, a measurement distance of 1 meter was used. The noise floor was a minimum of 6 dB below the limits. The emissions in the restricted bans must meet the limits specified in §15.209. Tabular data for each of the spurious emissions is shown below for each of the units. Plots of the band edges are also shown.

Correction Factor = Antenna Factor + Cable Loss - Pre-Amplifier Gain, and is added to the Receiver reading.

Result

All emissions in the restricted bands of §15.205 met the limits specified in §15.209; therefore, the EUT complies with the specification.

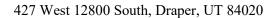




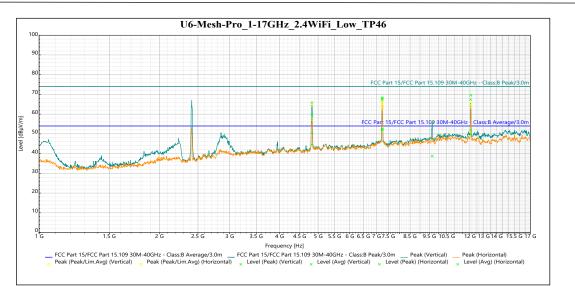
QuasiPeak

Frequency	Level (dBµV/m)	Limit (dBµV/m)	Margin	Azimuth (°)	Height	Pol.	Correction (dB)
36.374 MHz	35.221	39	-3.779	71	1.842	Vertical	-14.833
36.48 MHz	35.51	39	-3.49	63	1.156	Vertical	-14.823
38.328 MHz	34.369	39	-4.631	8	0.998	Vertical	-14.439

Table 4: Spurious Emissions in Low Frequency 30MHz-1GHz







Frequency	SR #	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
4.8244 GHz	Peak	65.865	74	-8.135	314	2.579	Vertical	4.374
7.2361 GHz	Peak	68.316	74	-5.684	4	2.531	Vertical	11.202
9.6576 GHz	Peak	55.72	74	-18.28	1	2.712	Vertical	12.526
12.059 GHz	Peak	69.622	74	-4.378	35	3.247	Vertical	15.545
4.8244 GHz	AVG	50.488	54	-3.512	314	2.579	Vertical	4.374
7.2361 GHz	AVG	52.061	54	-1.939	4	2.531	Vertical	11.202
9.6576 GHz	AVG	38.767	54	-15.233	1	2.712	Vertical	12.526
12.059 GHz	AVG	51.917	54	-2.083	35	3.247	Vertical	15.545
4.8241 GHz	Peak	59.902	74	-14.098	332	2.761	Horizontal	4.375
7.2313 GHz	Peak	67.297	74	-6.703	112	2.583	Horizontal	11.189
7.2402 GHz	Peak	67.934	74	-6.066	121	2.713	Horizontal	11.212
12.053 GHz	Peak	67.396	74	-6.604	27	3.287	Horizontal	15.613
4.8241 GHz	AVG	44.558	54	-9.442	332	2.761	Horizontal	4.375
7.2313 GHz	AVG	52.307	54	-1.693	112	2.583	Horizontal	11.189
7.2402 GHz	AVG	52.472	54	-1.528	121	2.713	Horizontal	11.212
12.053 GHz	AVG	49.726	54	-4.274	27	3.287	Horizontal	15.613

 Table 5: Spurious Emissions 1-17GHz Transmitting at the Lowest Frequency



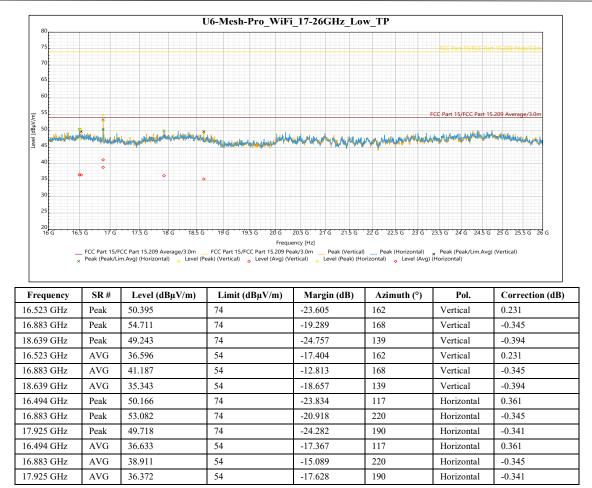
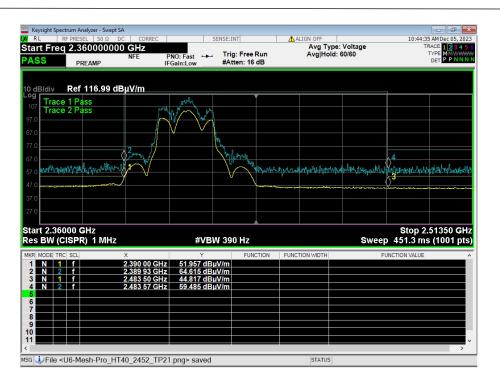
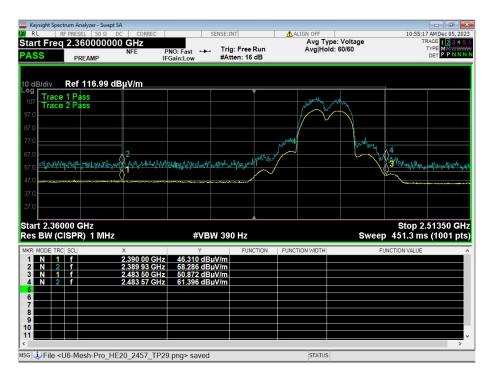


Table 6: Spurious Emissions 17-26GHz Transmitting at the Lowest Frequency





Graph 1: Radiated Lower Band Edge Plot



Graph 2: Radiated Upper Band Edge Plot

5.6 §15.247(e) Maximum Average Power Spectral Density

All chains were measured and summed under the guidance of KDB 558074 Section 8.4. and KDB 66291 D01. Please see associated annex for details on instrument settings.

The maximum average power spectral density conducted from the intentional radiator of the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. The antenna gain is 8 dBi + Array gain of 3.01 dB which is a total of 11.01 dBi.

Mode	Frequency (MHz)	Measurement (dBm)	Criteria (dBm)
b	2412	-8.43	8.0
	2437	-4.52	8.0
	2462	-8.79	8.0
g	2412	-20.53	8.0
	2437	-15.77	8.0
	2462	-23.38	8.0
n 20	2412	-19.59	8.0
	2437	-12.63	8.0
	2462	-20.75	8.0
n 40	2422	-25.09	8.0
	2437	-21.87	8.0
	2452	-24.82	8.0
ax 20	2412	-21.10	8.0
	2437	-14.96	8.0
	2462	-21.92	8.0
ax 40	2422	-25.44	8.0
	2437	-24.20	8.0
	2452	-26.47	8.0

Result

The maximum average power spectral density was less than the limit of 8 dBm; therefore, the EUT complies with the specification.

TR8732_U6-Mesh-Pro_FCC_15.247_WiFi_01



427 West 12800 South, Draper, UT 84020

-- End of Test Report --