UNIFIED COMPLIANCE LABORATORY

427 West 12800 South
Draper, UT 84020

Test Report

Certification

FCC ID	SWX-UX7
IC ID	6545A-UX7
Equipment Under Test	UX7
Test Report Serial Number	TR9494_02
Date of Tests	9, 17-18 September; 8, 14 October 2024
Report Issue Date	12 November 2024

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

NVLAP TESTING ilac-MRA

NVLAP LAB CODE 600241-0

Certification of Engineering Report

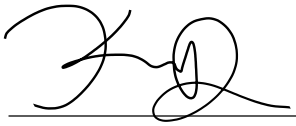
This report has been prepared by Unified Compliance Laboratory (UCL) to document compliance of the device described below with the requirement of Federal Communication Commissions (FCC) Part 15, Subpart C. This report may be reproduced in full. Partial reproduction of this report may only be made with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

Applicant	Ubiquiti Inc.
Manufacturer	Ubiquiti Inc.
Brand Name	UBIQUITI
Model Number	UX7
FCC ID	SWX-UX7
ISED ID	6545A-UX7

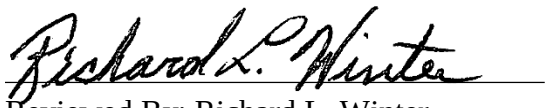
On this 12th day of November 2024, I individually and for Unified Compliance Laboratory certify that the statements made in this engineering report are true, complete, and correct to the best of my knowledge and are made in good faith.

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 DeBole



Reviewed By: Richard L. Winter

Revision History		
Revision	**Description**	**Date**
01	Original Report Release	11/12/24
02	Amend FCC and IC ID	12/3/2024

Table of Contents

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	UX7
Serial Number	942A6F4226AE
Dimensions (cm)	11.7 x 11.7 x 4.3

2.2 Description of EUT

The UX7 is a WiFi 7 access point designed for wide-ranging wireless coverage while maintaining overall network capacity. The UX7 operates in the 2.4 GHz, 5 GHz, and 6 GHz range. The UX7 has a Bluetooth management radio for easy setup and administration of the wireless system. The UX7 is powered from a USB-C connector.

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

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

Brand Name **Model Number** **Serial Number**	**Description**	**Name of Interface Ports / Interface Cables**
BN: UBIQUITI MN: UX7 SN: 942A6F422528	Wireless Access Point	See Section 2.4
BN: UBIQUITI MN: GP-M015-QC SN: N/A	USB C Power Adapter	2 conductor power cord/80 cm
BN: Dell MN: XPS 13 SN: N/A	Laptop Personal Computer	LAN Port / Un-shielded Cat 5e cable (Note 2)

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
AC / USB-C	1	2 conductor power cord/80 cm
LAN	1	Un-shielded Cat 5e cable/5 meter
WAN	1	Un-shielded Cat 5e cable/5 meter

2.5 Operating Environment

Power Supply	240 Volts AC Mains to USB-C Power
AC Mains Frequency	50 Hz
Temperature	21.8 – 23.5 °C
Humidity	25.7 – 41.5 %
Barometric Pressure	1019 mBar

2.6 Operating Modes

The UX7was connected to a personal computer laptop and tested using test software in order to enable to constant duty cycle greater or equal to 98% of the WiFi transceiver. 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

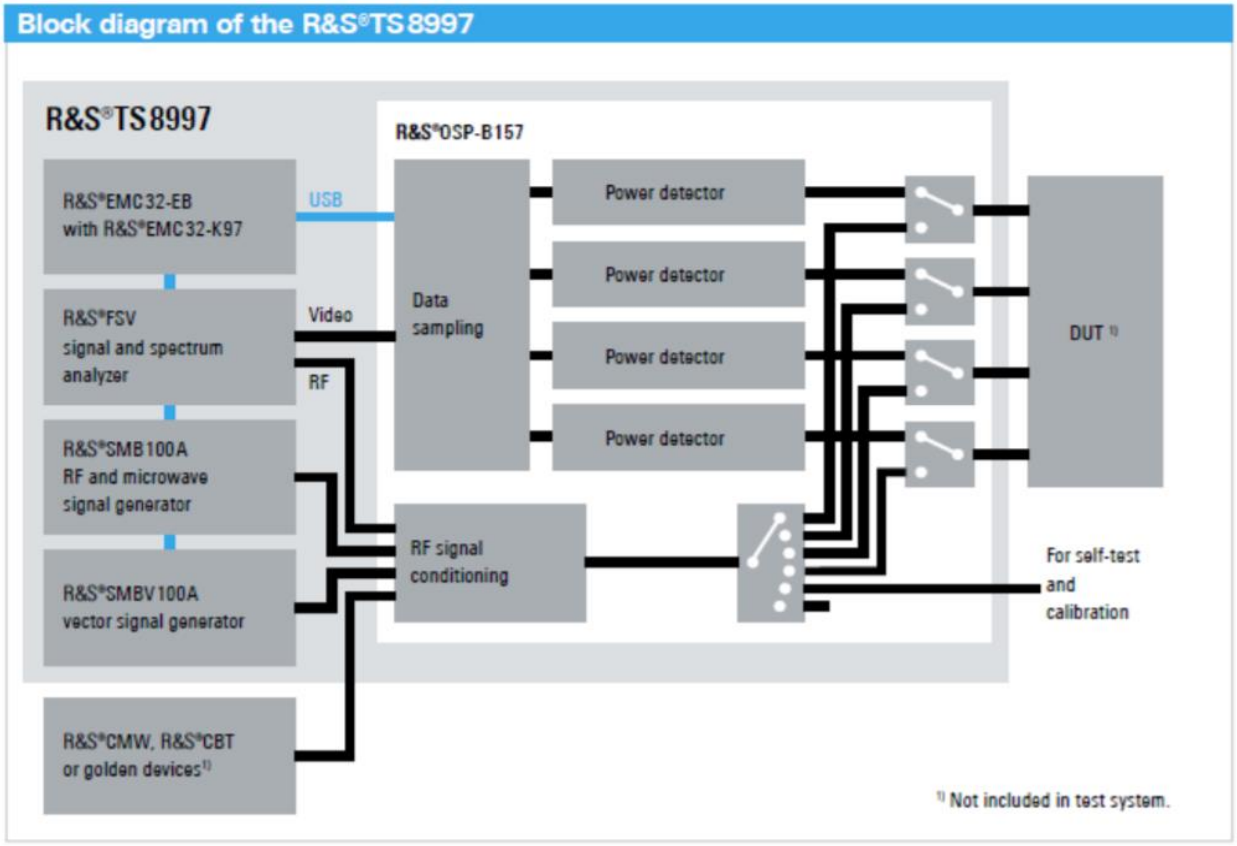


Diagram 1: Test Configuration Block Diagram

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

Title	47 CFR FCC Part 15, Subpart C 15.203, 15.207 and 15.247 Limits and methods of measurement of radio interference characteristics of 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 2025. 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 2025.

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-6754	1/23/2024	2/26/2025
LISN	AFJ	LS16C/10	UCL-2512	7/08/2024	7/08/2025
ISN	Teseq	ISN T800	UCL-2974	7/09/2024	7/09/2025
LISN	AFJ	LS16C\10	UCL-6749	1/29/2024	1/29/2025
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

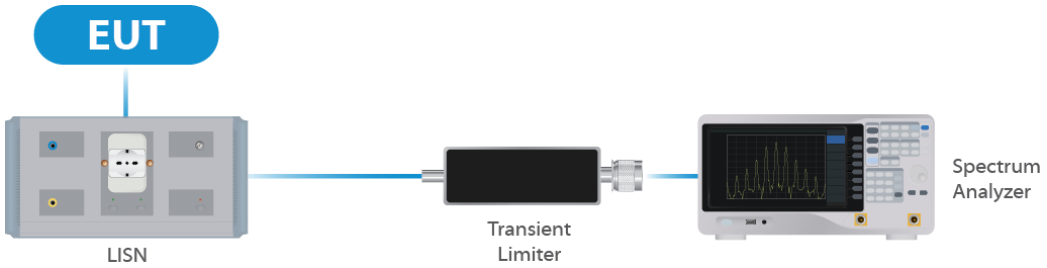


Figure 1: Conducted Emissions Test

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	4/12/2024	4/19/2025
Switch Extension	R&S	OSP-150W	UCL-2870	4/12/2024	4/19/2025

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

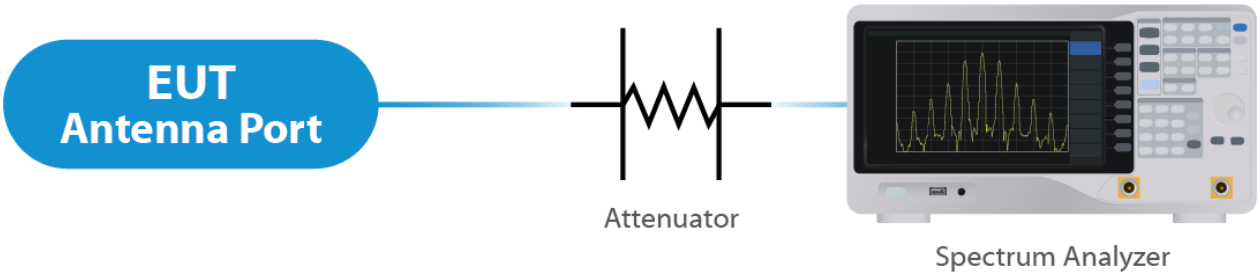


Figure 2: Direct Connect at the Antenna Port Test

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	1/25/2024	1/29/2025
Pre-Amplifier 9 kHz – 1 GHz	Sonoma Instruments	310N	UCL-2889	1/19/2024	1/19/2026
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	3/10/2023	3/10/2025
Log Periodic	Scwarzbeck	STLP 9129	UCL-3068	1/27/2023	1/27/2025
15 - 40 GHz Horn Antenna	Scwarzbeck	BBHA 9170	UCL-2487	3/10/2023	3/10/2025
1 – 18 GHz Amplifier	Com-Power	PAM 118A	UCL-3833	1/19/2024	1/19/2026
Test Software	UCL	Revision 1	UCL-3108	N/A	N/A

Table 3: List of equipment used for Radiated Emissions

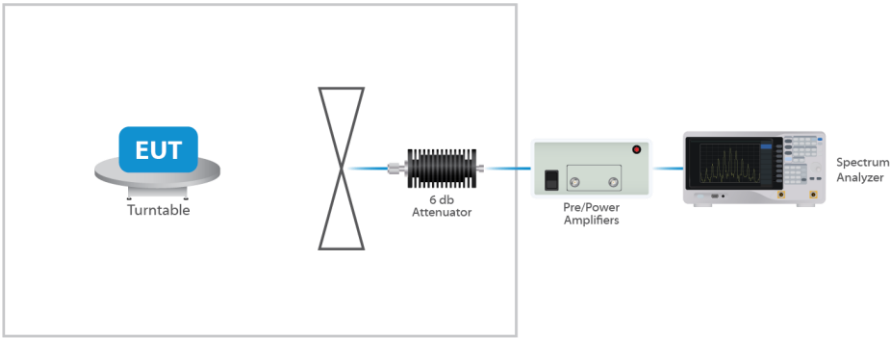


Figure 3: Radiated Emissions Test

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 (± 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 internal antenna. Per the manufacturer, the Maximum gain of the antenna per chain is 4 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.

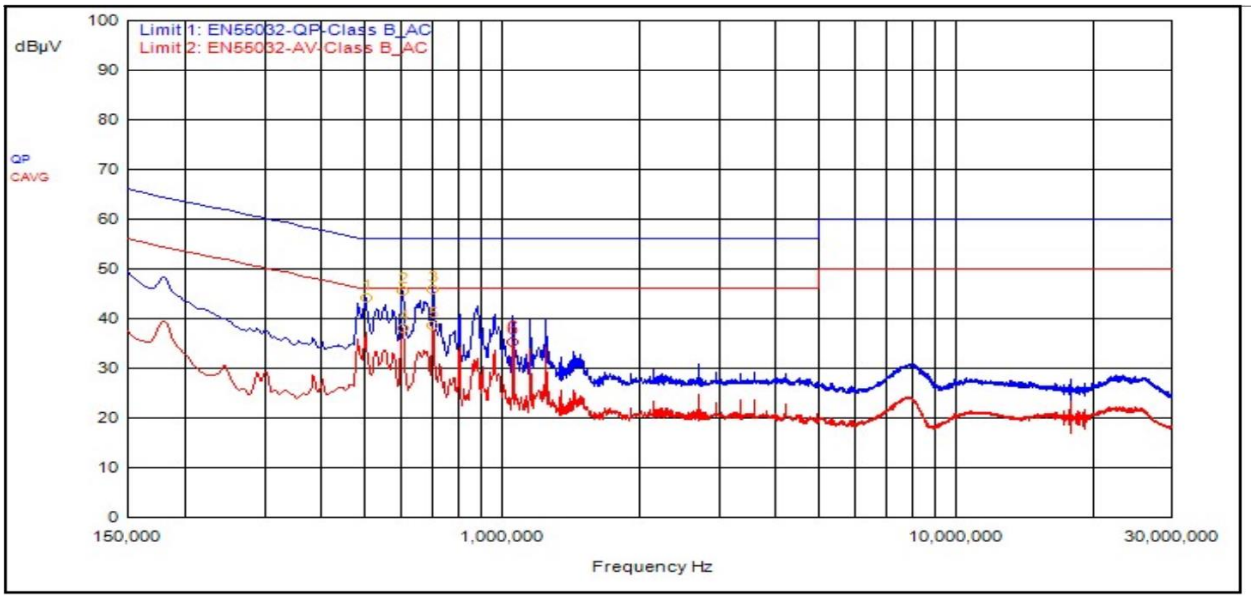
Array Gain = 10 log(NANT/NSS) dB
NANT = number of transmit antennas and
NSS = number of spatial streams. NSS = 1 considered worst case.

For power measurements on IEEE 802.11 devices, Array Gain = 0 dB for NANT ≤ 4;
For PSD measurements when Nss=1: Array Gain = 10 log(NANT/NSS) dB + Antenna Gain (dBi). Or 3.01 dB + 4 dBi = 7.01 dBi.

Results

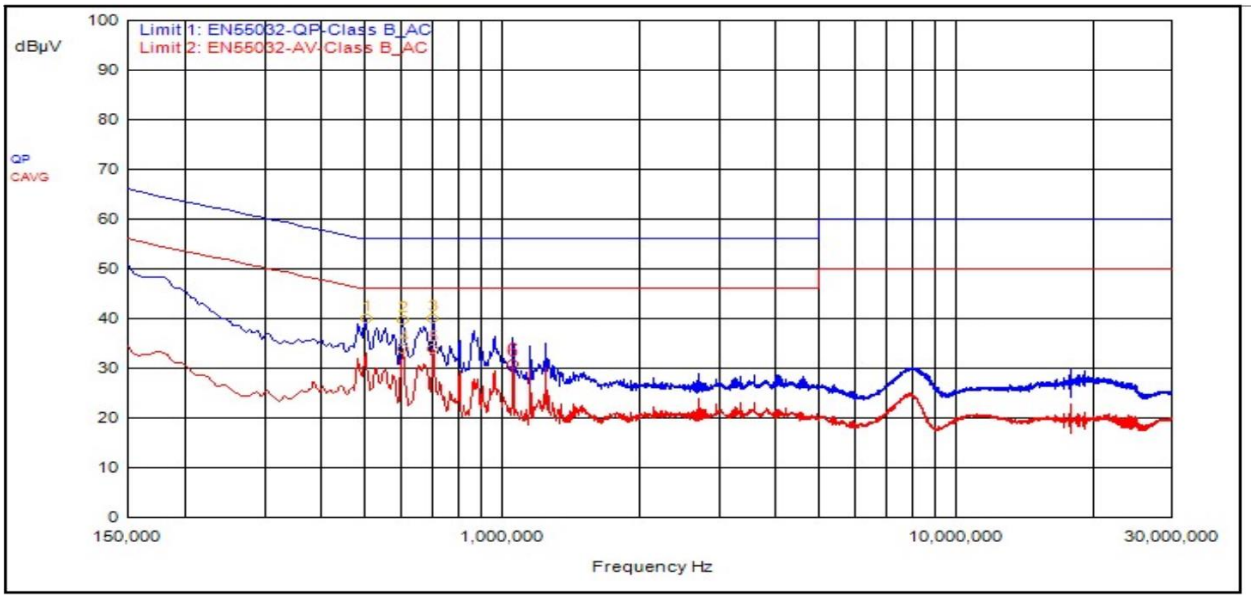
The EUT complied with the specification

5.2 Conducted Emissions at Mains Ports Data



ID	Frequency	Probe	Cable	Atten.	Detector	Meter Read	Meas Level	Limit 1	Limit 1 Dist.	Limit 2	Limit 2 Dist.	P/F
MU	MHz	dB	dB	dB	Type	dBµV	dBµV	dBµV	dB	dBµV	dB	P/F
3	705,000kHz	9.50			QPeak	36.47	45.97	56.00	-10.03			
2	603,000kHz	9.50			QPeak	36.03	45.53	56.00	-10.47			
1	501,000kHz	9.49			QPeak	34.78	44.27	56.00	-11.73			
4	606,000kHz	9.50			C_AVG	28.49	37.99			46.00	-8.01	
5	705,000kHz	9.50			C_AVG	29.04	38.54			46.00	-7.46	
6	1.059	9.58			C_AVG	25.65	35.23			46.00	-10.77	

Graph 1: Conducted Emissions Plot - Neutral



ID	Frequency	Probe	Cable	Atten.	Detector	Meter Read	Meas Level	Limit 1	Limit 1 Dist.	Limit 2	Limit 2 Dist.	P/F
MU	MHz	dB	dB	dB	Type	dBµV	dBµV	dBµV	dB	dBµV	dB	P/F
1	501,000kHz	9.64			QPeak	30.41	40.05	56.00	-15.95			
3	705,000kHz	9.54			QPeak	30.33	39.87	56.00	-16.13			
2	603,000kHz	9.59			QPeak	30.02	39.61	56.00	-16.39			
4	606,000kHz	9.59			C_AVG	24.26	33.85			46.00	-12.15	
5	705,000kHz	9.54			C_AVG	24.44	33.98			46.00	-12.02	
6	1.059	9.56			C_AVG	21.14	30.70			46.00	-15.30	

Graph 2: Conducted Emissions Plot – Line 1

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 662911 D01. Please see associated annex for details on instrument settings.

Mode	Frequency (MHz)	99% Bandwidth (MHz)	6 dB Bandwidth (MHz)
b	2412	13.10	6.75
	2437	12.50	8.15
	2462	13.20	5.05
g	2412	16.60	13.00
	2437	16.80	12.70
	2462	16.80	12.70
n 20	2412	18.00	17.70
	2437	17.80	17.60
	2462	17.60	13.00
n 40	2422	36.25	36.40
	2437	36.60	35.15
	2452	36.50	25.50
ax 20	2412	19.10	19.50
	2437	19.00	19.10
	2462	19.10	19.15
ax 40	2422	37.50	36.70
	2437	37.75	36.50
	2452	38.00	36.35

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 662911 D01. Please see associated annex for details on instrument settings.

The maximum average RF conducted output power measured for this device was 27.37 dBm or 545.76 mW. The limit is 30 dBm or 1 Watt when using antennas with 6 dBi or less gain. The antenna has a gain of 4 dBi.

Modulation (BW)	Frequency (MHz)	Data Rate	TP Setting	Conducted Output Power *	Measured EIRP
b 20	2412	Mcs0	25	27.12	31.12
	2417	Mcs0	25	27.09	31.09
	2422	Mcs0	25	27.10	31.10
	2427	Mcs0	25	27.13	31.13
	2432	Mcs0	25	27.07	31.07
	2437	Mcs0	25	27.10	31.10
	2442	Mcs0	25	26.79	30.79
	2447	Mcs0	25	26.84	30.84
	2452	Mcs0	25	27.04	31.04
	2457	Mcs0	25	27.05	31.05
	2462	Mcs0	25	27.37	31.37
g 20	2412	Mcs0	24	25.82	29.82
	2417	Mcs0	25	26.82	30.82
	2422	Mcs0	25	26.80	30.80
	2427	Mcs0	25	26.73	30.73
	2432	Mcs0	25	26.58	30.58
	2437	Mcs0	25	26.50	30.50
	2442	Mcs0	25	26.51	30.51
	2447	Mcs0	25	26.53	30.53
	2452	Mcs0	25	26.63	30.63
	2457	Mcs0	25	26.76	30.76
	2462	Mcs0	25	26.91	30.91
n 20	2412	Mcs0	24	25.22	29.22
	2417	Mcs0	25	27.24	31.24
	2422	Mcs0	25	26.13	30.13
	2427	Mcs0	25	26.00	30.00
	2432	Mcs0	25	25.81	29.81
	2437	Mcs0	25	25.78	29.78
	2442	Mcs0	25	25.81	29.81
	2447	Mcs0	25	25.78	29.78
	2452	Mcs0	25	27.12	31.12
	2457	Mcs0	25	27.16	31.16
	2462	Mcs0	25	27.32	31.32
n 40	2422	Mcs0	21	23.59	27.59

	2437	Mcs0	24	25.98	29.98
	2452	Mcs0	22	24.44	28.44
ax 20	2412	Mcs0	24	25.30	29.30
	2417	Mcs0	25	27.17	31.17
	2422	Mcs0	25	26.25	30.25
	2427	Mcs0	25	27.13	31.13
	2432	Mcs0	25	27.06	31.06
	2437	Mcs0	25	25.86	29.86
	2442	Mcs0	25	25.89	29.89
	2447	Mcs0	25	25.91	29.91
	2452	Mcs0	25	26.08	30.08
	2457	Mcs0	25	27.15	31.15
	2462	Mcs0	24	25.34	29.34
ax 40	2422	Mcs0	22	24.09	28.09
	2437	Mcs0	24	25.92	29.92
	2452	Mcs0	22	24.59	28.59

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.

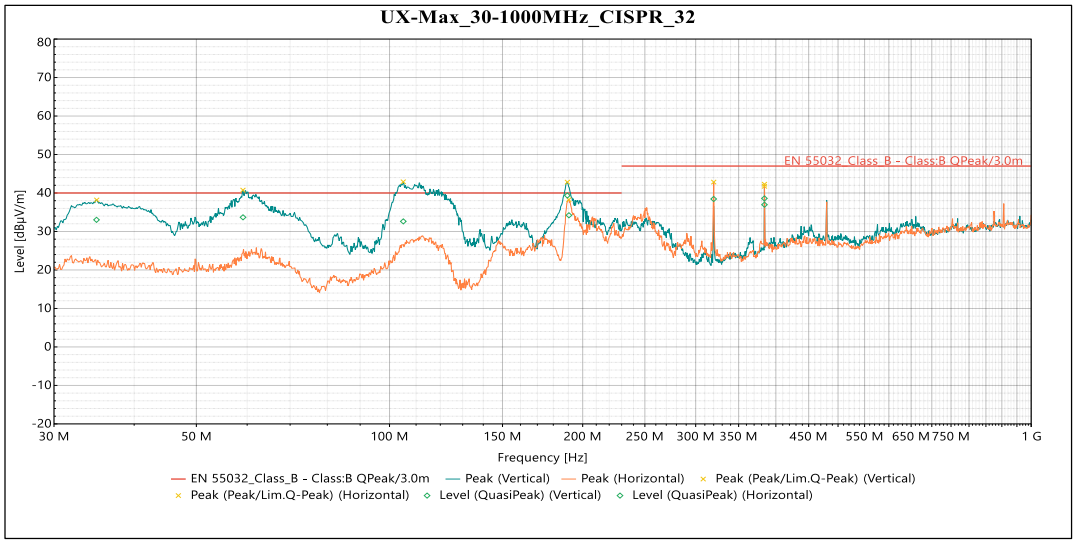
5.5.2 Radiated Spurious Emissions in the Restricted Bands of §15.205

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.

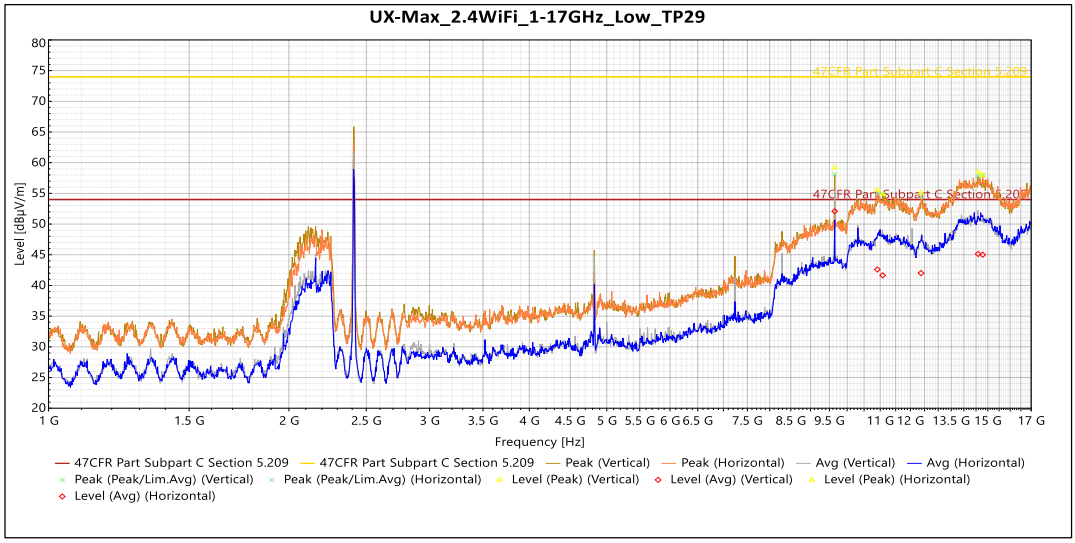
Result

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



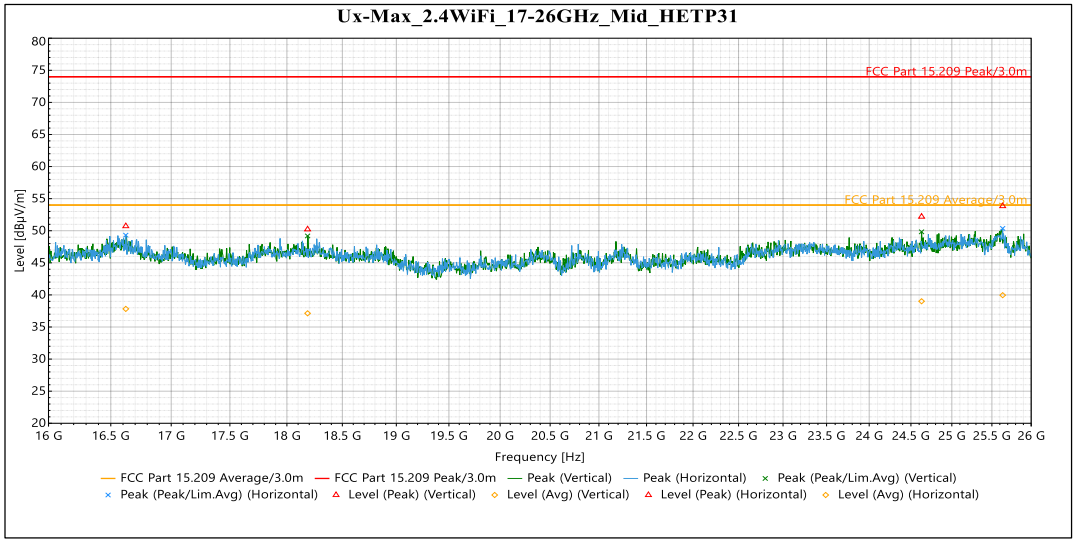
Frequency	SR #	Level (dBµV/m)	Limit (dBµV/m)	Margin	Azimuth (°)	Height	Pol.	RBW (Hz)	Correction (dB)
34.945975 MHz	QP	33.027	40	-6.973	200	1	Vertical	120 kHz	-10.415
59.11511 MHz	QP	33.683	40	-6.317	349	1.13	Vertical	120 kHz	-8.763
105.073162 MHz	QP	32.625	40	-7.375	166	1.13	Vertical	120 kHz	-8.953
189.288564 MHz	QP	39.353	40	-0.647	168	1.13	Vertical	120 kHz	-9.976
383.934924 MHz	QP	38.59	47	-8.41	151	1.13	Vertical	120 kHz	-4.861
190.368388 MHz	QP	34.215	40	-5.785	288	1.35	Horizontal	120 kHz	-9.777
320.023216 MHz	QP	38.442	47	-8.558	109	1.13	Horizontal	120 kHz	-6.691
384.019152 MHz	QP	36.961	47	-10.039	351	2.14	Horizontal	120 kHz	-4.857

Table 4: Radiated Emissions 30MHz-1GHz



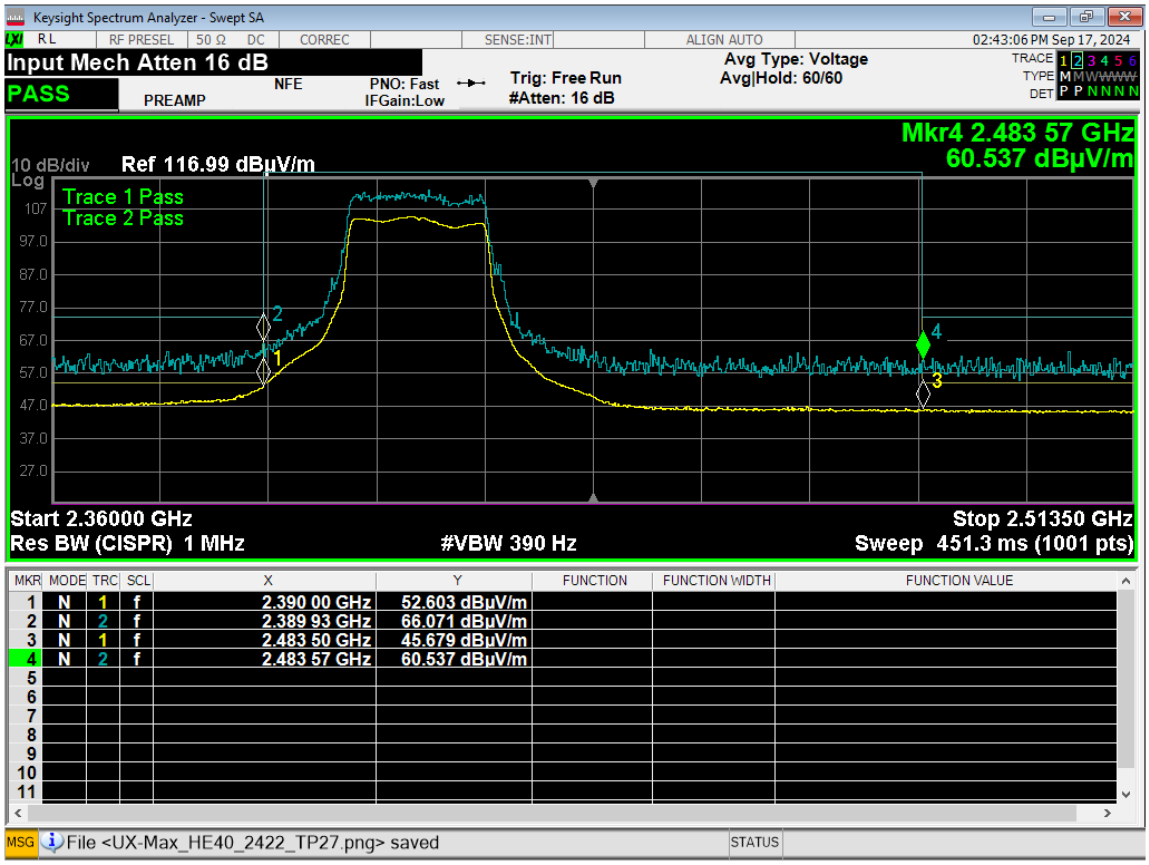
Frequency	SR #	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
9.6479925 GHz	Peak	59.213	74	-14.787	12	2.04	Vertical	6.152
11.0778674 GHz	Peak	54.876	74	-19.124	138	2.292	Vertical	10.346
14.5901865 GHz	Peak	58.45	74	-15.55	145	3.444	Vertical	14.061
9.6479925 GHz	Avg	52.077	54	-1.923	12	2.04	Vertical	6.152
11.0778674 GHz	Avg	41.649	54	-12.351	138	2.292	Vertical	10.346
14.5901865 GHz	Avg	45.129	54	-8.871	145	3.444	Vertical	14.061
10.9104956 GHz	Peak	55.562	74	-18.438	142	3.728	Horizontal	11.328
12.3734455 GHz	Peak	55.096	74	-18.904	286	3.728	Horizontal	11.039
14.7820628 GHz	Peak	57.983	74	-16.017	277	3.728	Horizontal	13.938
10.9104956 GHz	Avg	42.595	54	-11.405	142	3.728	Horizontal	11.328
12.3734455 GHz	Avg	42.015	54	-11.985	286	3.728	Horizontal	11.039
14.7820628 GHz	Avg	45	54	-9.000	277	3.728	Horizontal	13.938

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

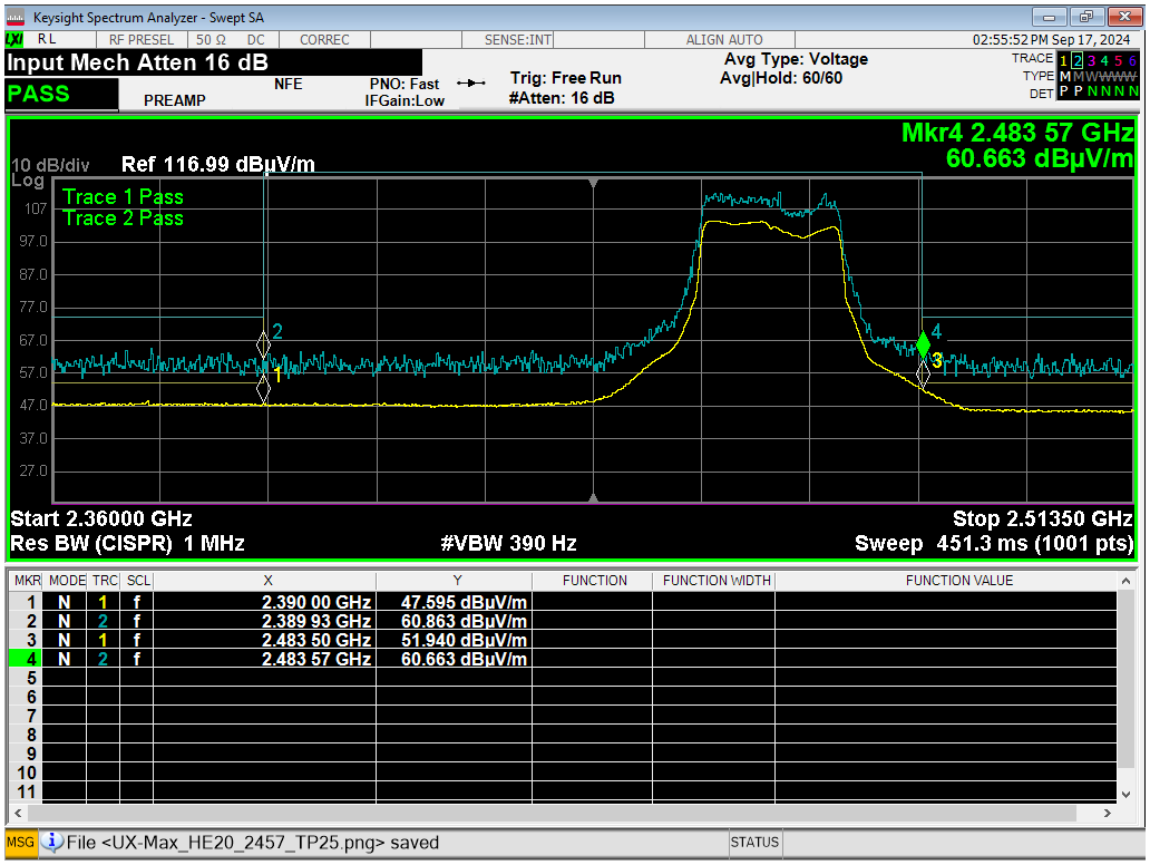


Frequency	SR #	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Pol.	Correction (dB)
18.1848194 GHz	Peak	50.218	74	-23.782	107	Vertical	-0.134
24.6293949 GHz	Peak	52.195	74	-21.805	271	Vertical	2.267
18.1848194 GHz	Avg	37.135	54	-16.865	107	Vertical	-0.134
24.6293949 GHz	Avg	39.012	54	-14.988	271	Vertical	2.267
16.6228933 GHz	Peak	50.715	74	-23.285	220	Horizontal	1.254
25.6364442 GHz	Peak	53.839	74	-20.161	13	Horizontal	3.314
16.6228933 GHz	Avg	37.822	54	-16.178	220	Horizontal	1.254
25.6364442 GHz	Avg	39.958	54	-14.042	13	Horizontal	3.314

Table 6: Transmitting at the Highest Frequency



Graph 3: Radiated Lower Band Edge Plot



Graph 4: 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 662911 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 4 dBi + Array gain of 3.01 dB which is a total of 7.01 dBi.

Mode	Frequency (MHz)	Measurement (dBm)	Criteria (dBm)
b	2412	3.33	8.0
	2437	2.57	8.0
	2462	3.00	8.0
g	2412	-4.23	8.0
	2437	-5.11	8.0
	2462	-5.05	8.0
n 20	2412	-8.43	8.0
	2437	-8.06	8.0
	2462	-4.62	8.0
n 40	2422	-11.33	8.0
	2437	-10.82	8.0
	2452	-10.35	8.0
ax 20	2412	-8.77	8.0
	2437	-8.22	8.0
	2462	-8.90	8.0
ax 40	2422	-12.45	8.0
	2437	-11.30	8.0
	2452	-10.06	8.0

Result

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

-- End of Test Report --