UNIFIED COMPLIANCE LABORATORY

427 West 12800 South
Draper, UT 84020

Test Report

Certification

FCC ID	SWX-UDR7
IC ID	6545A-UDR7
Equipment Under Test	UDR7
Test Report Serial Number	TR9610_01
Date of Test(s)	12 – 13 and 17 – 20 September; 22 October 2024
Report Issue Date	13 December 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	UDR7
FCC ID	SWX-UDR7
IC ID	6545A-UDR7

On this 13th day of December 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. Unified Compliance laboratory is not responsible for incorrect information provided by the manufacturer.

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: Joseph W. Jackson

Reviewed By: Richard L. Winter

Revision History		
Revision	**Description**	**Date**
01	Original Report Release	13 December 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	UDR7
Serial Number	168
Dimensions (cm)	11.0 x 11.0 x 18.4

2.2 Description of EUT

The UDR7 is a UniFi Desk Gateway with integrated WiFi 7 and PoE switching. The UDR7 has one 10 GbE SFP port and 4 RJ45 PoE ports. The UDR7 transmits in the 2.4 GHz, 5 GHz and 6 GHz frequency bands using internal integral antennas. The UDR7 has a Bluetooth transmitter for system management. The UDR7 is powered from 110 – 240 Volts AC Mains.

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: UDR7 SN: 168	Desktop Gateway	See Section 2.4
BN: Dell MN: XPS SN: N/A	Laptop Computer	Ethernet/un-shielded Cat 5

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 Mains	1	2 conductor power cable to AC mains/200 cm
10 GbE SFP WAN	1	Shielded cat 5E/7m
PoE Input	4	Unshielded Cat 5E/7m

2.5 Operating Environment

Power Supply	120 Volts AC Mains
AC Mains Frequency	60 Hz
Temperature	21.2 – 23.9 °C
Humidity	22.5 – 29.5 %
Barometric Pressure	1013 mBar

2.6 Operating Modes

The UDR7 was 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 Bluetooth transceiver.

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

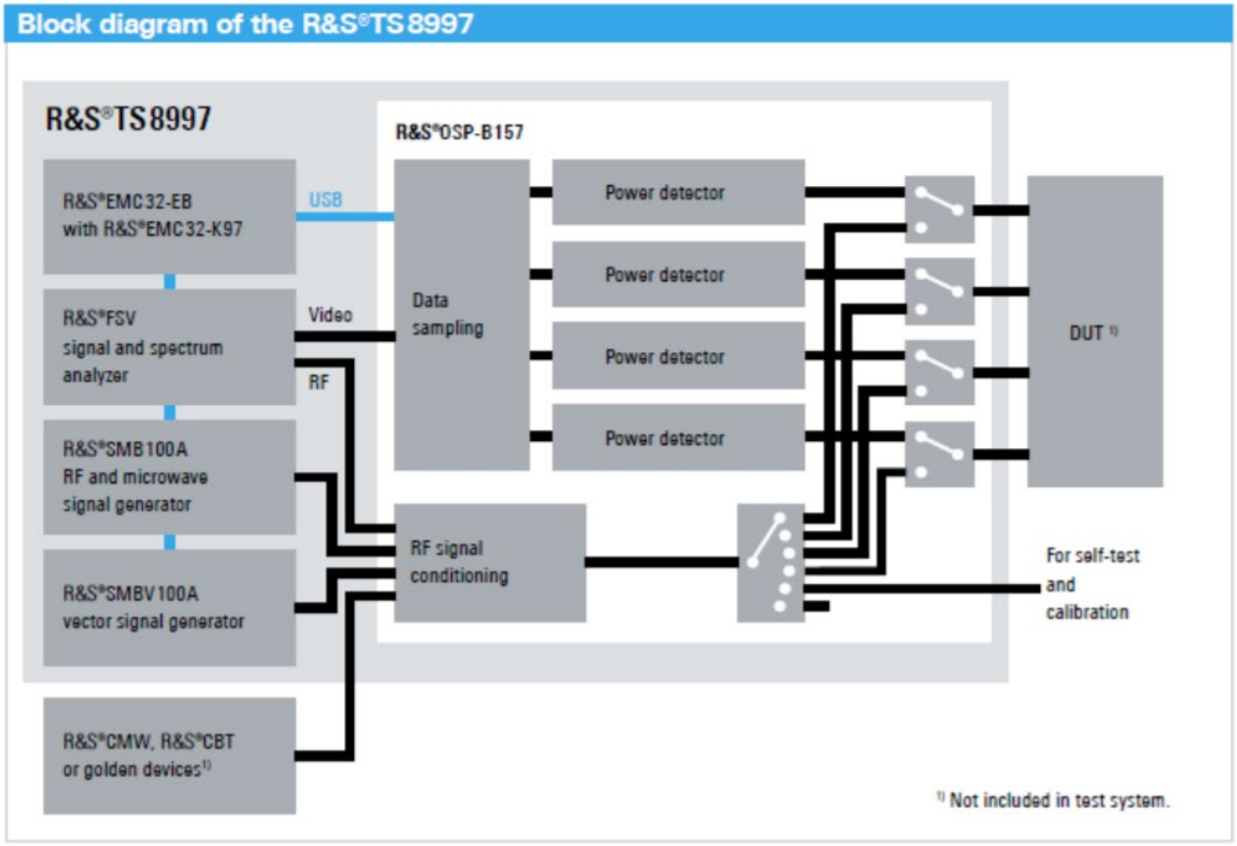


Diagram 1: Test Configuration Block Diagram

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	2400 to 2483.5	Compliant
15.247(b)	RSS-247 § 5.4	Peak Output Power	2400 to 2483.5	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	2400 to 2483.5	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 chambers 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

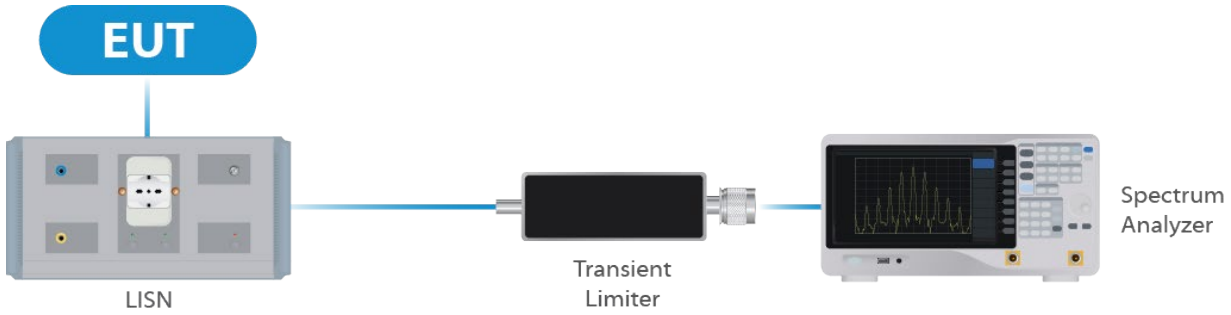


Figure 1: Conducted Emissions Test

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	12/22/2024
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

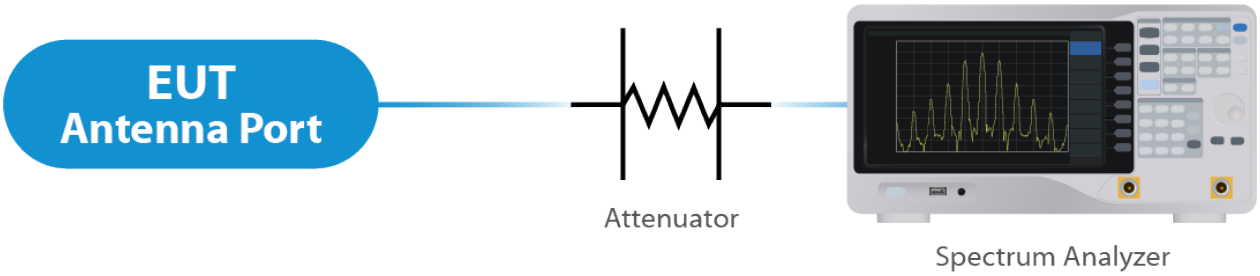


Figure 2: Direct Connect at the Antenna Port Test

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

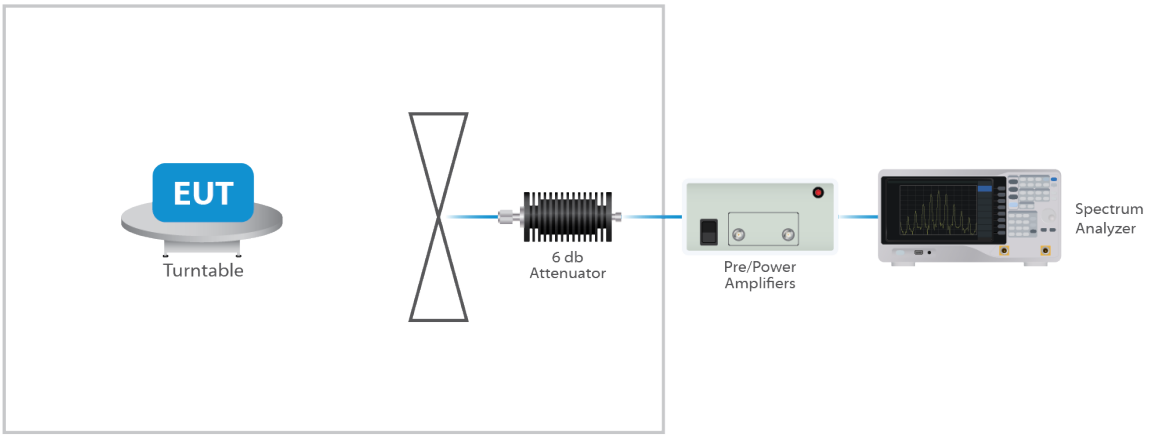


Figure 3: Radiated Emissions Test

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

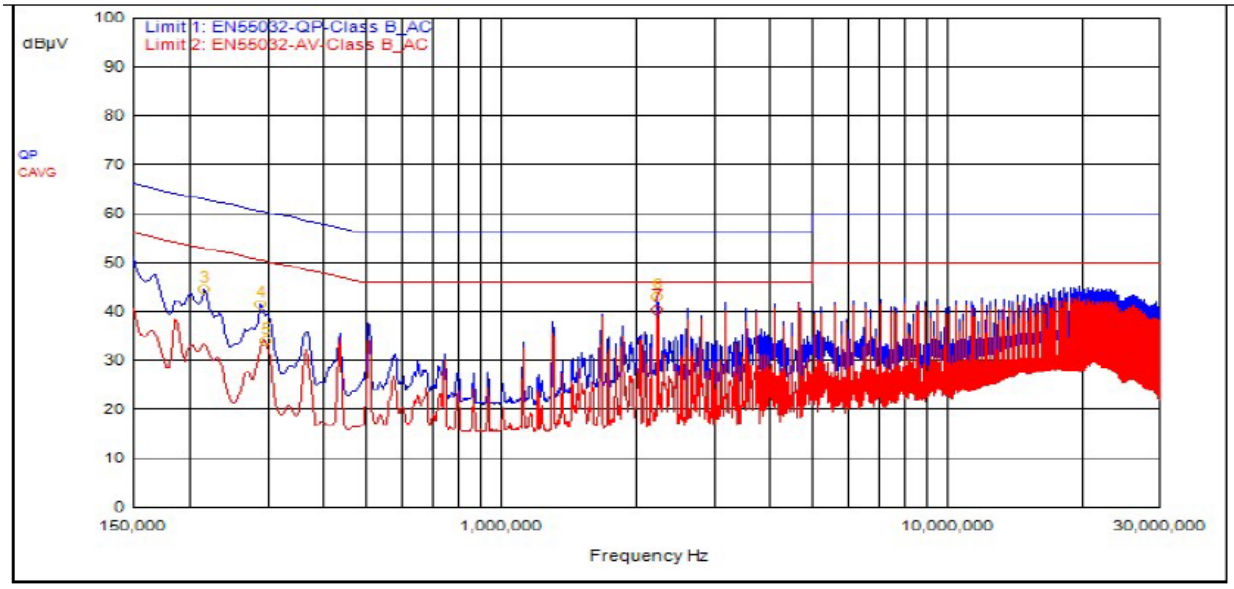
5.1 §15.203 Antenna Requirements

The EUT uses an integrated internal. As per the manufacturer, the Maximum gain of the antenna is 4 dBi. The antenna is not user replaceable.

Results

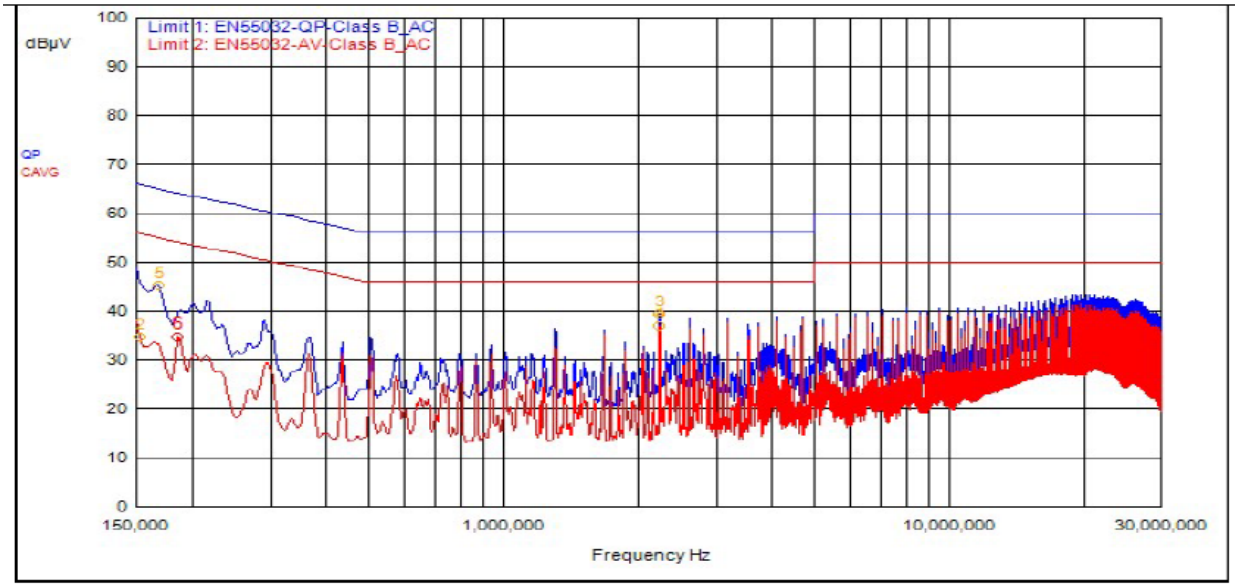
The EUT complied with the specification

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
6	2.244	12.26			QPeak	30.86	43.12	56.00	-12.88			
1	150,000kHz	12.21			QPeak	38.78	50.99	66.00	-15.01			
3	216,000kHz	12.29			QPeak	32.16	44.45	62.97	-18.52			
4	288,000kHz	12.38			QPeak	28.93	41.31	60.58	-19.28			
2	150,000kHz	12.21			C_AVG	28.44	40.65			56.00	-15.35	
5	297,000kHz	12.40			C_AVG	21.47	33.87			50.33	-16.45	
7	2.244	12.26			C_AVG	28.13	40.39			46.00	-5.61	

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
3	2.244	9.59			QPeak	29.98	39.57	56.00	-16.43			
1	150,000kHz	9.49			QPeak	39.46	48.95	66.00	-17.05			
5	168,000kHz	9.49			QPeak	35.88	45.37	65.06	-19.69			
2	153,000kHz	9.49			C_AVG	25.35	34.84			55.84	-21.00	
4	2.244	9.59			C_AVG	27.35	36.94			46.00	-9.06	
6	186,000kHz	9.49			C_AVG	25.10	34.59			54.21	-19.63	

Graph 2: Conducted Emissions Plot – Line 1

Result

The EUT complied with the specification limit.

5.3 §15.247(a)(2) Emissions Bandwidth

Frequency (MHz)	Emissions 6 dB Bandwidth (MHz)	Emissions 99% Bandwidth (MHz)
2402	0.67	1.00
2442	0.71	0.99
2480	0.69	0.99

Result

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

The maximum average RF conducted output power measured for this device was 5.18 dBm or 3.30 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.

Frequency (MHz)	Measured Output Power (dBm)	Output Power (mW)
2402	1.85	1.53
2442	4.66	2.92
2480	5.18	3.30

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).

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 plot(s) 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 (dBi) + Cable Loss (dB) - Pre-Amplifier Gain (dB), 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)
31.28 MHz	36.62	40	-3.38	1	1.13	Vertical	-11.05
44.62 MHz	38.42	40	-1.58	287	1.13	Vertical	-8.07
50.72 MHz	38.38	40	-1.62	7	1.13	Vertical	-8.03
53.55 MHz	35.94	40	-4.06	62	1.13	Vertical	-8.20
96.10 MHz	32.28	40	-7.72	81	1.13	Vertical	-9.60
152.35 MHz	24.69	40	-15.31	360	1.13	Vertical	-12.72
187.05 MHz	23.28	40	-16.73	359	1.13	Vertical	-10.38
338.56 MHz	34.45	47	-12.55	132	1.13	Horizontal	-5.67

Table 4: Radiated Emissions 30 – 1000 MHz

Peak

Frequency	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
14.36 GHz	57.57	74.0	-16.43	335	1.714	Vertical	13.69
10.99 GHz	54.97	74.0	-19.03	41	2.292	Horizontal	10.91
13.87 GHz	57.00	74.0	-17.00	98	2.868	Horizontal	13.33

Avg

Frequency	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
14.36 GHz	44.57	54.00	-9.43	335	1.714	Vertical	13.69
10.99 GHz	41.84	54.0	-12.16	41	2.292	Horizontal	10.91
13.87 GHz	43.71	54.0	-10.29	98	2.868	Horizontal	13.33

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

Peak

Frequency	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
10.97 GHz	55.64	74.0	-18.36	210	1.714	Vertical	11.23
13.78 GHz	57.29	74.0	-16.71	154	3.449	Vertical	13.03
11.01 GHz	54.33	74.0	-19.67	214	3.728	Horizontal	10.71
14.49 GHz	57.64	74.0	-16.36	0	3.728	Horizontal	13.43

Avg

Frequency	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
10.97 GHz	42.15	54.0	-11.85	210	1.714	Vertical	11.23
13.78 GHz	43.74	54.0	-10.26	154	3.449	Vertical	13.03
11.01 GHz	41.74	54.0	-12.26	214	3.728	Horizontal	10.71
14.49 GHz	44.23	54.0	-9.77	0	3.728	Horizontal	13.43

Table 6: Radiated Emissions 1 – 17 GHz at the Middle Frequency

Peak

Frequency	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
12.40 GHz	54.52	74.0	-19.48	257	2.287	Vertical	10.80
11.11 GHz	54.67	74.0	-19.33	70	2.282	Horizontal	10.28
14.12 GHz	56.35	74.0	-17.65	131	2.87	Horizontal	13.16

Avg

Frequency	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
12.40 GHz	41.49	54.0	-12.51	257	2.287	Vertical	10.80
11.11 GHz	40.99	54.0	-13.01	70	2.282	Horizontal	10.28
14.12 GHz	43.26	54.0	-10.74	131	2.87	Horizontal	13.16

Table 7: Radiated Emissions 1 – 17 GHz at the Highest Frequency

Peak

Frequency	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Pol.	Correction (dB)
23.82 GHz	57.70	74.0	-16.30	316	Vertical	1.10
54.78 GHz	52.18	74.0	-21.82	232	Vertical	1.89
25.29 GHz	53.07	74.0	-20.93	264	Vertical	3.16
16.66 GHz	51.03	74.0	-22.97	306	Horizontal	1.04
23.56 GHz	50.49	74.0	-23.51	300	Horizontal	0.02
25.21 GHz	53.27	74.0	-20.73	121	Horizontal	2.97

Avg

Frequency	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Pol.	Correction (dB)
23.82 GHz	52.68	54.0	-1.32	316	Vertical	1.10
54.78 GHz	39.57	54.0	-14.43	232	Vertical	1.89
25.29 GHz	39.86	54.0	-14.14	264	Vertical	3.16
16.66 GHz	37.75	54.0	-16.25	306	Horizontal	1.04
23.56 GHz	37.65	54.0	-16.35	300	Horizontal	0.02
25.21 GHz	39.66	54.0	-14.34	121	Horizontal	2.97

Table 8: Radiated Emissions 17 – 40 GHz at the Lowest Frequency (worse case)

5.6 §15.247(e) Maximum Average Power Spectral Density

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. Results of this testing are summarized.

Frequency (MHz)	Measurement (dBm)	Criteria (dBm)
2402	-4.21	8.0
2442	-1.35	8.0
2480	-0.87	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 --