



427 West 12800 South
Draper, UT 84020

Test Report Certification

FCC ID	SWX-UMR
IC ID	6545A-UMR
Equipment Under Test	UMR
Test Report Serial Number	TR7336_01
Date of Test	26 July 2022
Report Issue Date	27 July 2022

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



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	UniFi
Model Number	UMR
FCC ID	SWX-UMR
IC ID	6545A-UMR

On this 27th day of July 2022, 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: Joseph W. Jackson



Reviewed By: Richard L. Winter

Revision History		
Revision	Description	Date
01	Original Report Release	27 July 2022

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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	Mark Feil
Title	Compliance Manager

1.2 Manufacturer

Company	Ubiquiti Inc. 685 Third Avenue New York, NY 10017 U.S.A.
Contact Name	Mark Feil
Title	Compliance Manager

2 Equipment Under Test (EUT)

2.1 Identification of EUT

Brand Name	UniFi
Model Number	UMR
Serial Number	802AA8D60D3E
Dimensions (cm)	22.1 x 9.8 x 2.88

2.2 Description of EUT

The UMR is a gateway for WAN failover as a LAN device. The UMR is designed for remote areas where mobile networks are required for internet connectivity. It provides a slot for a mobile network Nano SIM card or eSIM. For connection to the mobile network the UMR contains modular transmitters with FCC ID: SWX-RC7611 and IC: 6545A-RC7611. The UMR provides two 802.3at Ethernet ports for PoE+ in and PoE+ out. The UMR is powered from a PoE Power adapter or from a USB-C Power adapter.

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: UniFi MN: U-LTE-Flex (Note 1) SN: 802AA8D60D3E	LTE Gateway	See Section 2.4
BN: Ubiquiti MN: GP-M015-QC SN: N/A	USB-C Power Adapter	See Section 2.4
BN: Ubiquiti MN: UPOE-af SN: N/A	PoE Power Adapter	See Section 2.4
BN: Dell MN: XPS 13 SN: N/A	Laptop Personal Computer	5e cable Ethernet/Unshielded 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 (PoE Injector)	1	3 conductor power cord/80cm
Data	1	Shielded Cat 5e cable/8meters
LAN (PoE Injector)	1	Un-shielded Cat 5e cable/1 meter
AC (USB-C)	1	2 conductor/2 meters

2.5 Operating Environment

Power Supply	120/240 VAC USB-C 120/240 VAC PoE
AC Mains Frequency	50/60 Hz
Temperature	21.3 – 21.5 °C
Humidity	22.3 – 22.7 %
Barometric Pressure	1023 mBar

2.6 Operating Modes

The UMR 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

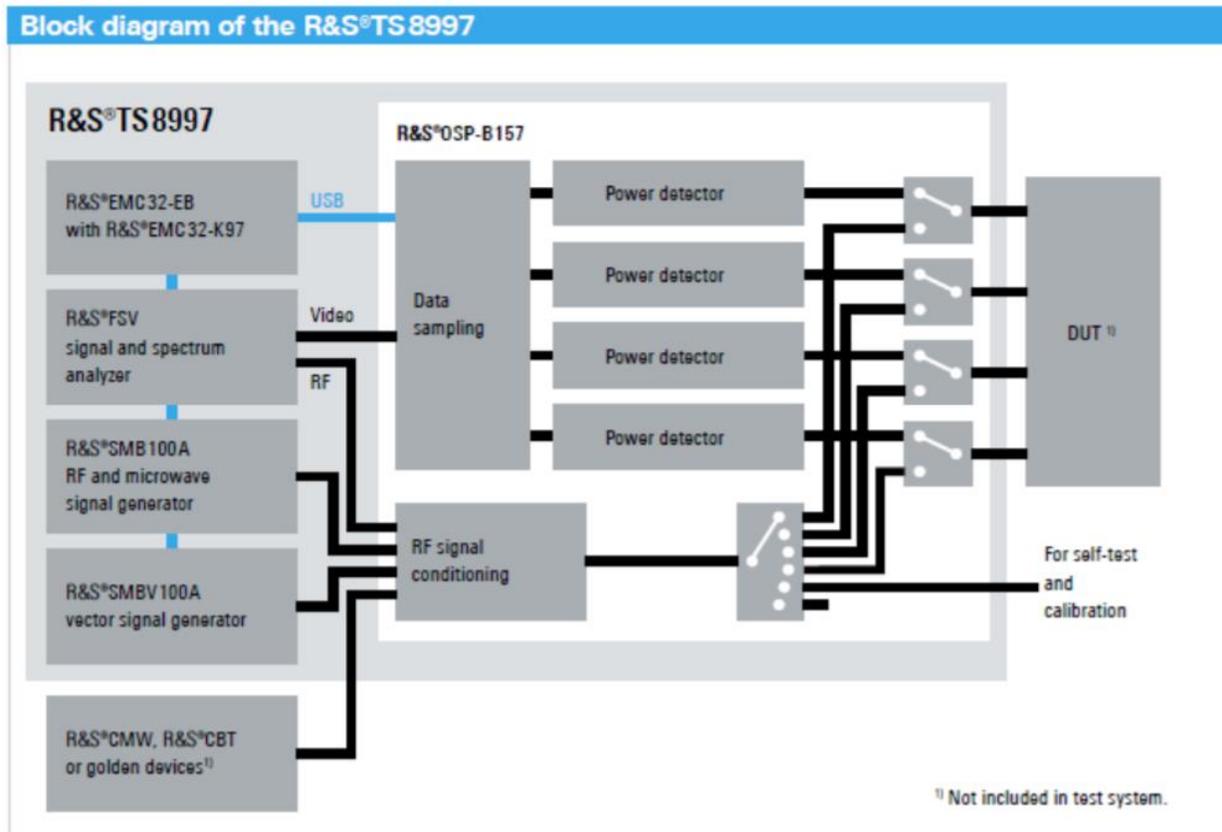


Diagram 1: Test Configuration Block Diagram

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	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 17000	N/A
15.247(d)	RSS-247 § 5.4	Radiated Spurious Emissions	0.009 to 17000	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 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 2023. 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 2023. Unified Compliance Laboratory has been assigned 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	12/8/2021	12/8/2022
LISN	AFJ	LS16C/10	UCL-6749	12/6/2021	12/6/2023
Cat6 ISN	Teseq	ISN T8-Cat6	UCL-2971	1/30/2022	1/30/2023
ISN	Teseq	ISN T800	UCL-2974	6/27/2022	6/27/2023
LISN	Com-Power	LIN-120C	UCL-2612	1/6/2022	1/6/2023
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

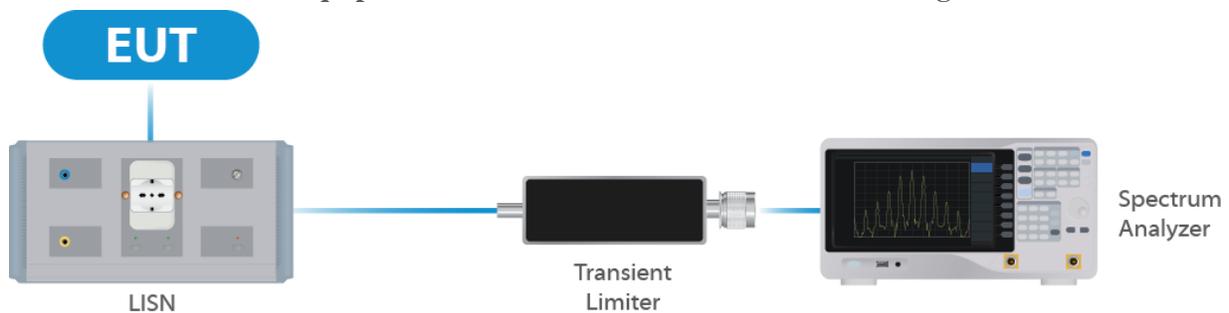


Figure 1: Conducted Emissions Test

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	1/03/2022	1/03/2023
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	1/03/2022	1/03/2023
Switch Extension	R&S	OSP-150W	UCL-2870	1/03/2022	1/03/2023

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

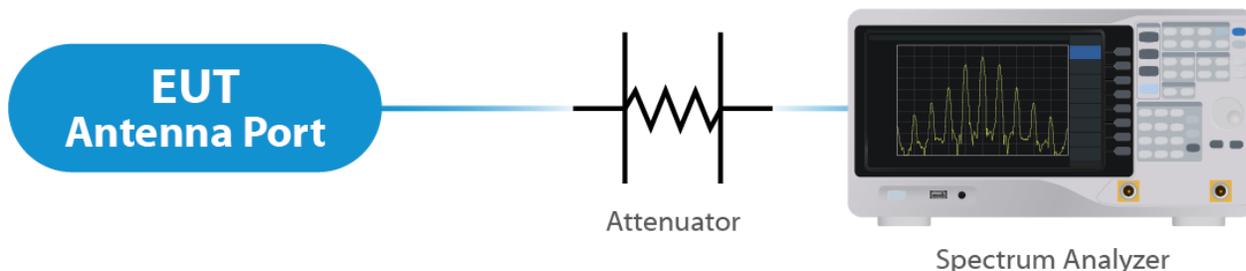


Figure 2: Direct Connect at the Antenna Port Test

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	1/4/2022	1/4/2023
Pre-Amplifier 9 kHz – 1 GHz	Sonoma Instruments	310N	UCL-2889	10/7/2021	10/7/2022
Pre-Amplifier 9 kHz – 1 GHz	Sonoma Instruments	310N	UCL-4793	10/7/2021	10/7/2022
Pre-Amplifier 1 – 18 GHz	Com-Power	PAM 118A	UCL-3833	10/7/2021	10/7/2022
Pre-Amplifier 1 – 18 GHz	The EMC Shop	PA18G	UCL-5896	3/11/3022	3/11/2023
Pre-Amplifier 15 – 40 GHz	L3 Harris	LNA-40-18004000-40-15P	UCL-4465	11/3/2021	11/3/2022
Broadband Antenna	Scwarzbeck	VULB 9163	UCL-3062	8/28/2020	8/27/2022
Broadband Antenna	Scwarzbeck	VULB 9163	UCL-3062	8/28/2020	8/28/2022
Double Ridge Horn Antenna	Scwarzbeck	BBHA 9120D	UCL-3065	7/8/2021	7/8/2022
Log Periodic	Scwarzbeck	STLP 9129	UCL-3068	11/16/2020	11/16/2022
15 - 40 GHz Horn Antenna	ETS-Lindgren	3116C	UCL-7209	6/1/2022	6/6/2024
Test Software	UCL	Revision 1	UCL-3108	N/A	N/A

Table 3: List of equipment used for Radiated Emissions

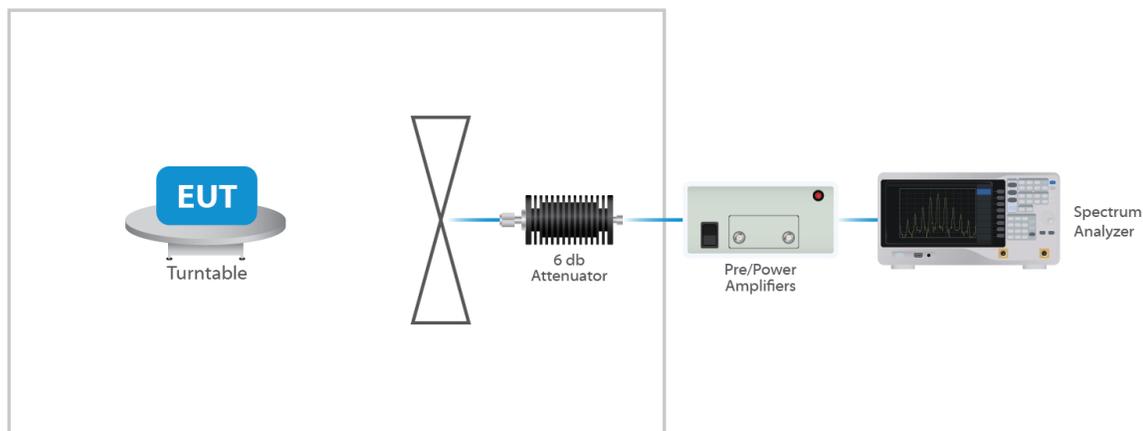


Figure 3: Radiated Emissions Test

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 (\pm 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

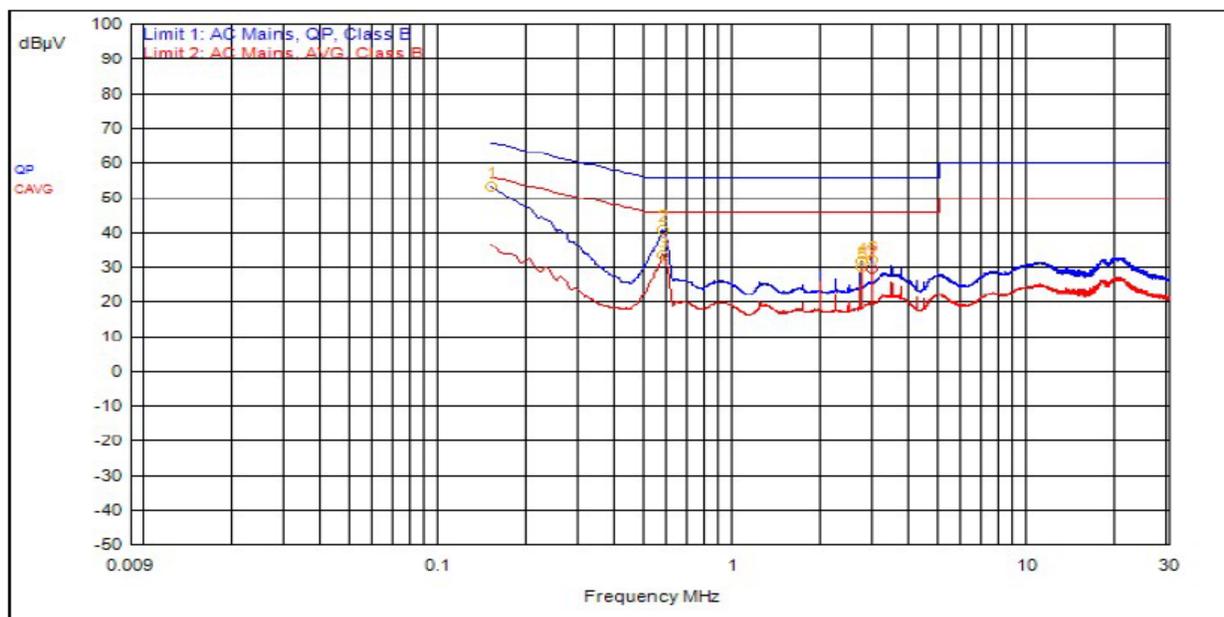
The EUT uses an integral antenna. The maximum gain of the antenna is 4.5 dBi. The antenna is not user replaceable.

Results

The EUT complied with the specification

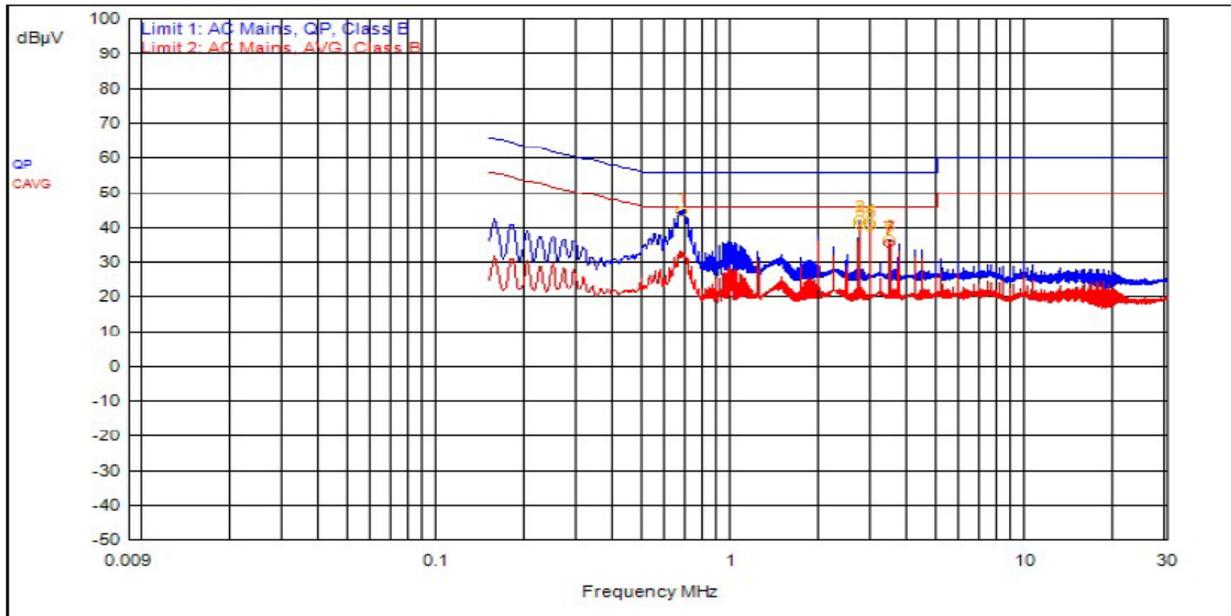
5.2 Conducted Emissions at Mains Ports Data

5.2.1 Hot Lead – PoE



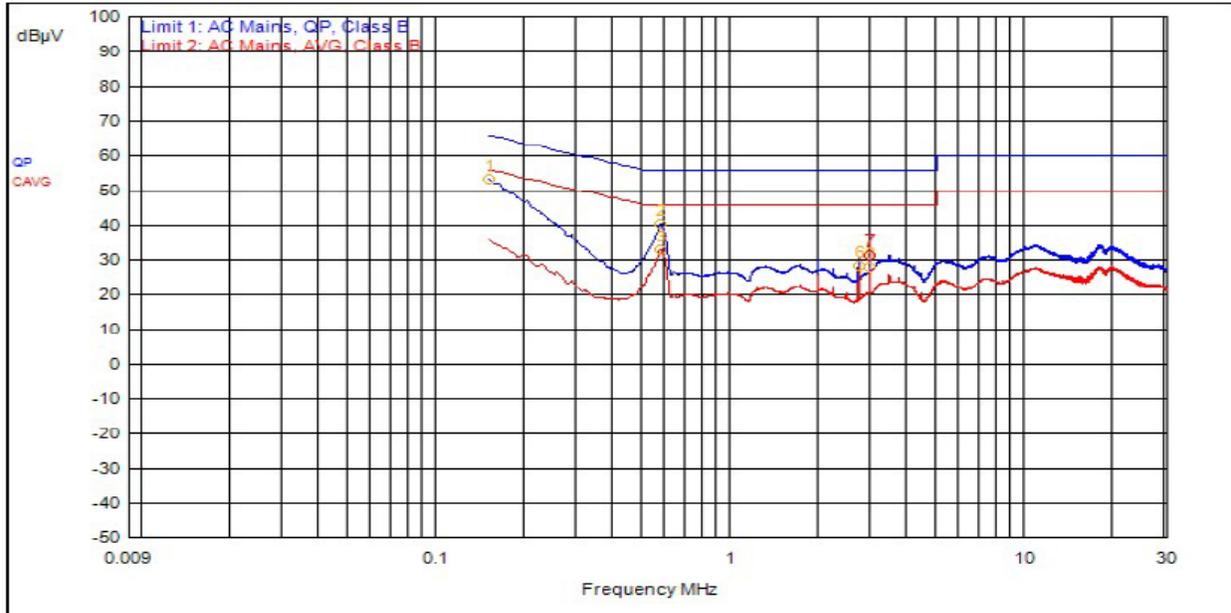
ID	Frequency	Probe	Cable	Atten.	Detector	Meter Read	Meas Level	Limit	Limit Dist.
1	150.000kHz	12.4	0.0		QPeak	41.1	53.5	66.0	-12.5
3	570.000kHz	12.4	0.0		C_AVG	21.1	33.5	46.0	-12.5
2	573.000kHz	12.4	0.0		QPeak	28.3	40.7	56.0	-15.3
5	2.691MHz	12.3	0.1		C_AVG	17.5	29.9	46.0	-16.1
7	2.934MHz	12.3	0.1		C_AVG	17.2	29.6	46.0	-16.4
6	2.934MHz	12.3	0.1		QPeak	19.6	32.0	56.0	-24.0
4	2.691MHz	12.3	0.1		QPeak	19.4	31.8	56.0	-24.2

5.2.2 Hot Lead – USB-C



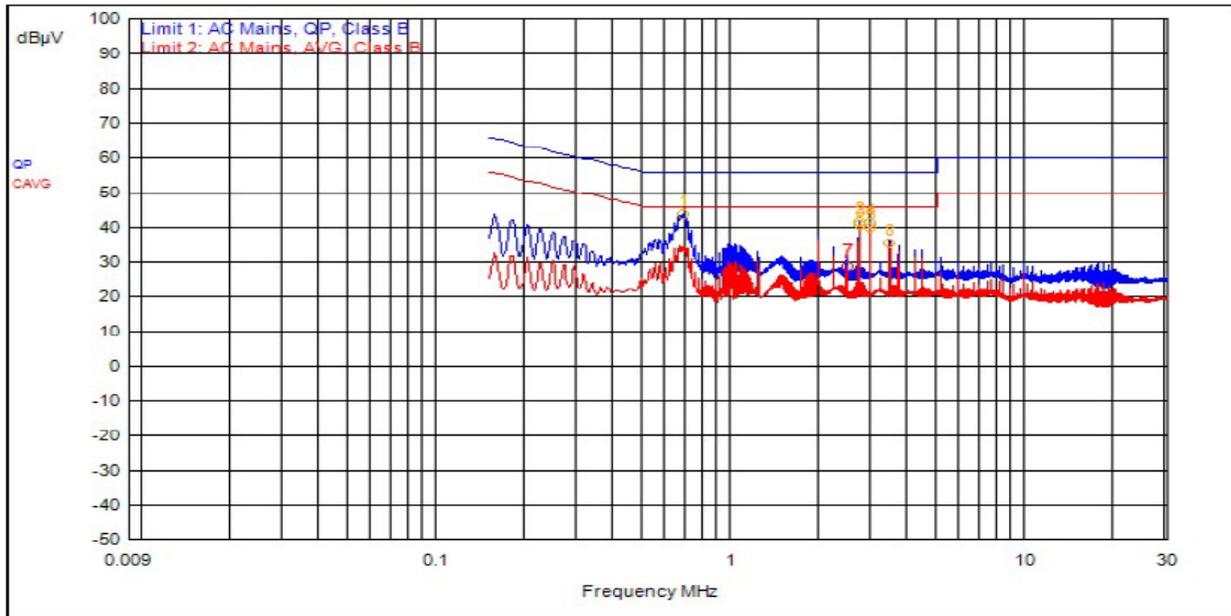
ID	Frequency	Probe	Cable	Atten.	Detector	Meter Read	Meas Level	Limit	Limit Dist.
3	2.691MHz	12.3	0.1		C_AVG	28.6	41.0	46.0	-5.0
5	2.934MHz	12.3	0.1		C_AVG	28.2	40.6	46.0	-5.4
7	3.423MHz	12.3	0.1		C_AVG	23.2	35.6	46.0	-10.4
1	672.000kHz	12.4	0.0		QPeak	32.1	44.5	56.0	-11.5
2	2.691MHz	12.3	0.1		QPeak	29.6	42.0	56.0	-14.0
4	2.934MHz	12.3	0.1		QPeak	28.9	41.3	56.0	-14.7
6	3.423MHz	12.3	0.1		QPeak	24.4	36.8	56.0	-19.2

5.2.3 Neutral – PoE



ID	Frequency	Probe	Cable	Atten.	Detector	Meter Read	Meas Level	Limit	Limit Dist.
1	150.000kHz	12.4	0.0		QPeak	40.9	53.3	66.0	-12.7
3	570.000kHz	12.4	0.0		C_AVG	20.5	32.9	46.0	-13.1
2	573.000kHz	12.4	0.0		QPeak	28.0	40.4	56.0	-15.6
6	2.691MHz	12.3	0.1		C_AVG	15.8	28.2	46.0	-17.8
8	2.934MHz	12.3	0.1		C_AVG	15.6	28.0	46.0	-18.0
7	2.934MHz	12.3	0.1		QPeak	18.8	31.2	56.0	-24.8

5.2.4 Neutral – PoE



ID	Frequency	Probe	Cable	Atten.	Detector	Meter Read	Meas Level	Limit	Limit Dist.
3	2.691MHz	12.3	0.1		C_AVG	28.5	40.9	46.0	-5.1
8	3.423MHz	12.3	0.1		C_AVG	23.2	35.6	46.0	-10.4
1	681.000kHz	12.4	0.0		QPeak	31.5	43.9	56.0	-12.1
2	2.691MHz	12.3	0.1		QPeak	29.4	41.8	56.0	-14.2
4	2.934MHz	12.3	0.1		QPeak	28.8	41.1	56.0	-14.9
5	2.937MHz	12.3	0.1		QPeak	27.6	40.0	56.0	-16.0
7	2.445MHz	12.3	0.1		C_AVG	16.3	28.7	46.0	-17.3

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	0.515	0.845
2442	0.515	0.855
2480	0.515	0.850

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 – 6.9 dBm or 0.10 mW. The limit is 30 dBm or 1 Watt when using antennas with 6 dBi or less gain. The antenna has a gain of 4.5 dBi.

Frequency (MHz)	Measured Output Power (dBm)	Output Power (mW)
2402	-7.4	0.18
2442	-7.2	0.19
2480	-6.9	0.20

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.

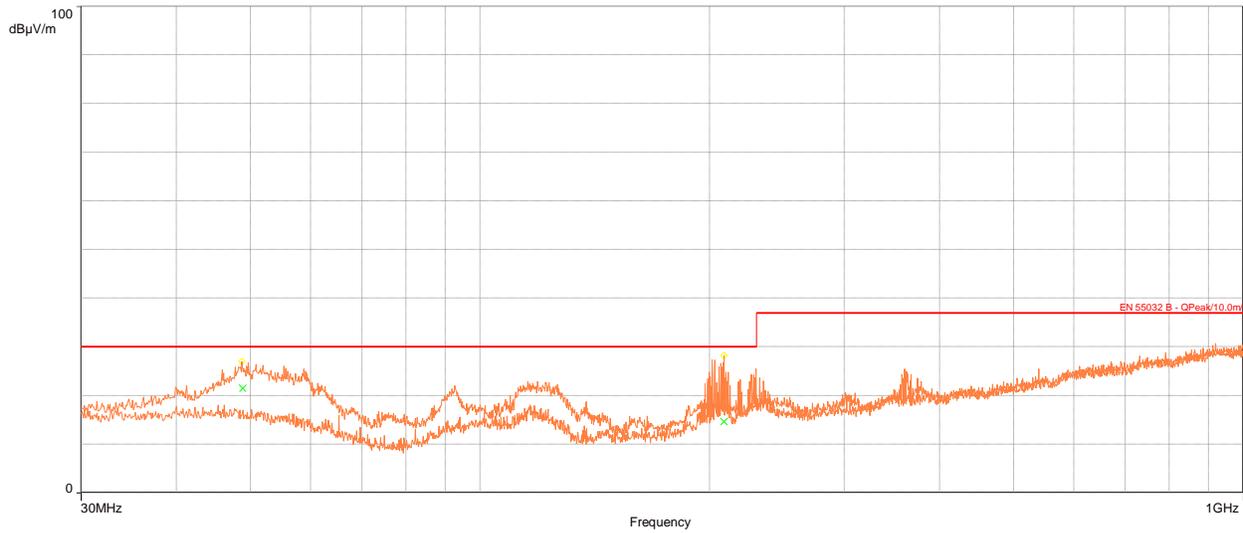
5.5.2 Radiated Spurious Emissions in the Restricted Bands of §15.205

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

Result

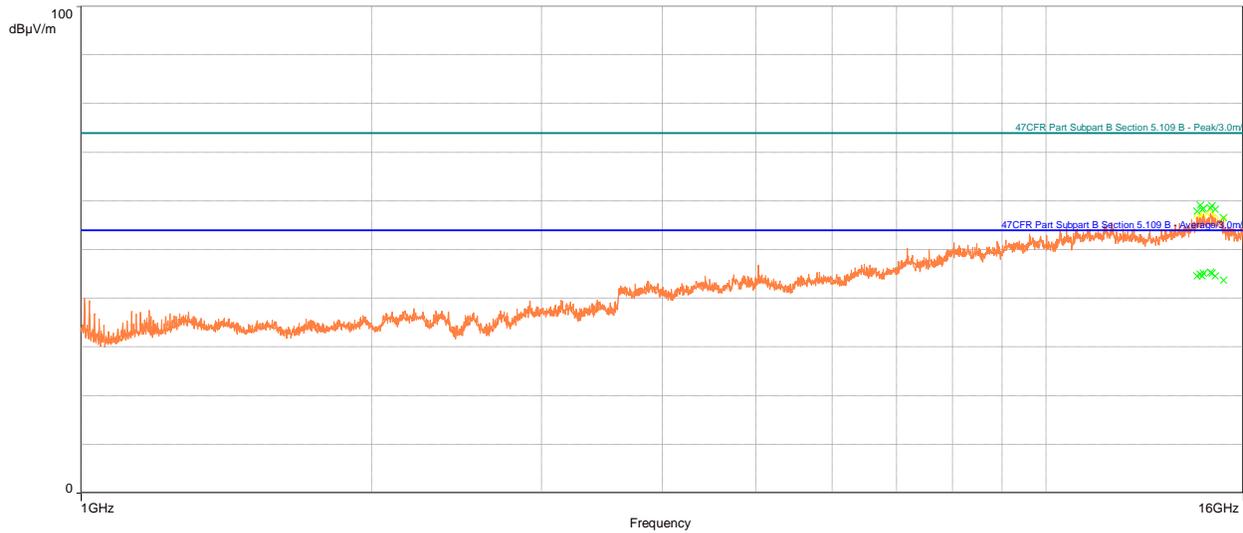
All emissions in the restricted bands of §15.205 met the limits specified in §15.209; therefore, the EUT complies with the specification.



Quasi-Peak

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height	Pol.	Correction (dB)
48.781	21.47	30.00	-8.53	100.00	1.66	Vertical	-11.44
208.8	14.66	30.00	-15.34	238.00	2.31	Horizontal	-14.80

Table 4: Radiated Emissions 30 – 1000 MHz



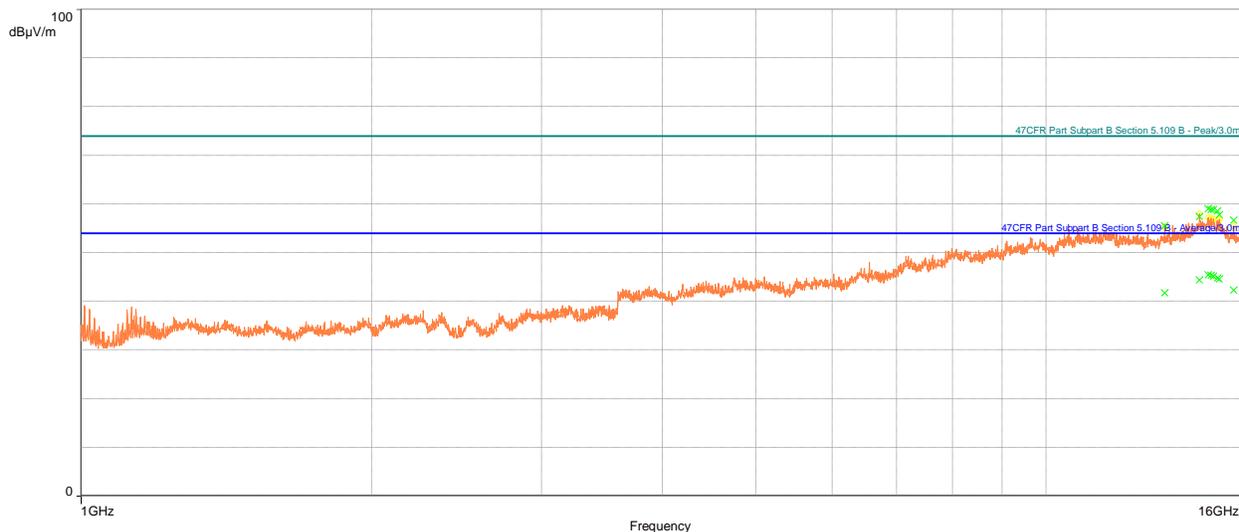
Avg

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
14436	44.96	54.00	-9.04	165.00	1.50	Vertical	17.16
14505	44.64	54.00	-9.36	157.00	2.73	Vertical	16.83
14548	45.11	54.00	-8.89	152.00	2.35	Vertical	17.33
14840	45.12	54.00	-8.88	252.00	3.12	Vertical	17.54
14325	44.60	54.00	-9.40	139.00	3.59	Horizontal	16.57
14789	45.36	54.00	-8.64	248.00	2.74	Horizontal	17.84
14953	44.59	54.00	-9.41	99.00	3.11	Horizontal	17.29
15262	43.75	54.00	-10.25	183.00	3.30	Horizontal	16.13

Peak

14436	59.17	74.00	-14.83	165.00	1.50	Vertical	17.16
14505	58.31	74.00	-15.69	157.00	2.73	Vertical	16.83
14548	58.43	74.00	-15.57	152.00	2.35	Vertical	17.33
14840	59.06	74.00	-14.94	252.00	3.12	Vertical	17.54
14325	57.88	74.00	-16.12	139.00	3.59	Horizontal	16.57
14789	58.60	74.00	-15.40	248.00	2.74	Horizontal	17.84
14953	58.30	74.00	-15.70	99.00	3.11	Horizontal	17.29
15262	56.60	74.00	-17.40	183.00	3.30	Horizontal	16.13

Table 5: Transmitting at the Lowest Frequency 2402 MHz



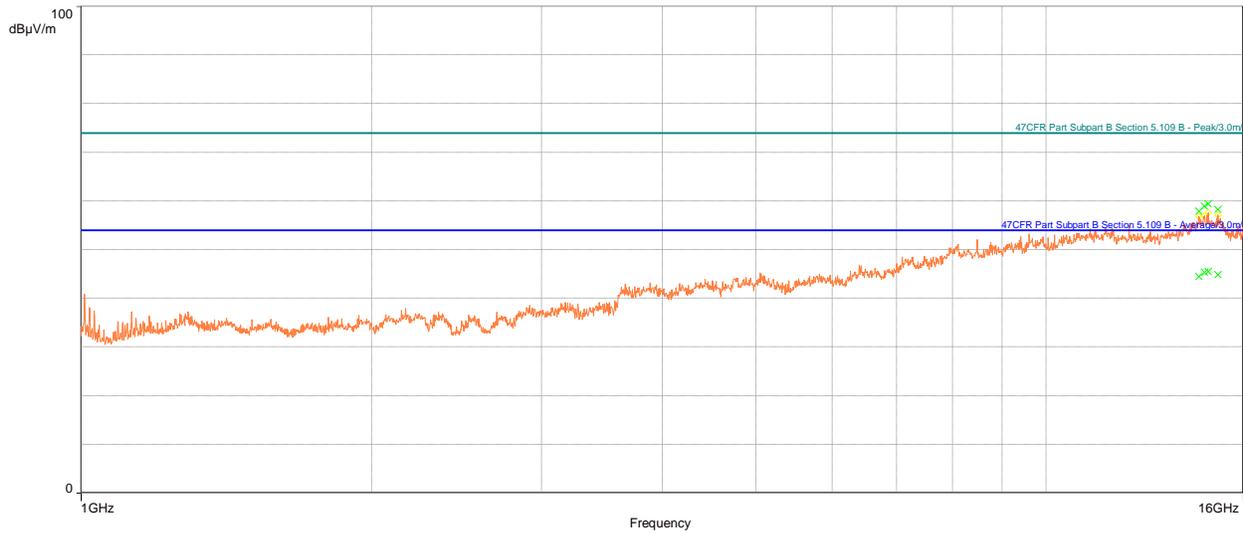
Avg

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
14401	44.42	54.00	-9.58	195.00	3.70	Vertical	16.42
14719	45.43	54.00	-8.57	173.00	3.82	Vertical	17.70
14890	45.17	54.00	-8.83	221.00	1.80	Vertical	17.53
15104	44.63	54.00	-9.37	236.00	2.96	Vertical	16.57
13263	41.69	54.00	-12.31	208.00	2.23	Horizontal	14.40
14809	45.35	54.00	-8.65	59.00	2.50	Horizontal	17.87
15042	44.80	54.00	-9.20	168.00	3.52	Horizontal	17.24
15641	42.35	54.00	-11.65	51.00	2.27	Horizontal	14.43

Peak

14401	57.43	74.00	-16.57	195.00	3.70	Vertical	16.42
14719	58.99	74.00	-15.01	173.00	3.82	Vertical	17.70
14890	58.85	74.00	-15.15	221.00	1.80	Vertical	17.53
15104	57.76	74.00	-16.24	236.00	2.96	Vertical	16.57
13263	55.50	74.00	-18.50	208.00	2.23	Horizontal	14.40
14809	58.83	74.00	-15.17	59.00	2.50	Horizontal	17.87
15042	58.57	74.00	-15.43	168.00	3.52	Horizontal	17.24
15641	56.63	74.00	-17.37	51.00	2.27	Horizontal	14.43

Table 6: Transmitting at the Middle Frequency – 2442 MHz



Avg

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
14391	44.46	54.00	-9.54	31.00	2.99	Vertical	16.32
14589	45.38	54.00	-8.62	2.00	3.93	Vertical	17.53
14720	45.53	54.00	-8.47	141.00	3.93	Vertical	17.69
15065	44.86	54.00	-9.14	28.00	1.79	Vertical	16.95

Peak (4)

14391	57.88	74.00	-16.12	31.00	2.99	Vertical	16.32
14589	58.97	74.00	-15.03	2.00	3.93	Vertical	17.53
14720	59.44	74.00	-14.56	141.00	3.93	Vertical	17.69
15065	58.32	74.00	-15.68	28.00	1.79	Vertical	16.95

Table 7: Transmitting at the Highest Frequency – 2480 MHz

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	-10.8	8.0
2442	-11.1	8.0
2480	-11.3	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 --