



427 West 12800 South
 Draper, UT 84020

Test Report Certification

FCC ID	SWX-U6EPIW
IC ID	6545A-U6EPIW
Equipment Under Test	U6-Enterprise-IW
Test Report Serial Number	TR6787_01
Date of Test(s)	8, 15 November 2021 and 4, 8 January 2022
Report Issue Date	10 January 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	U6-Enterprise-IW
FCC ID	SWX-U6EPIW
IC ID	6545A-U6EPIW

On this 10th day of January 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.

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Unified Compliance Laboratory



Written By: Joseph W. Jackson



Reviewed By: Richard L. Winter

Revision History		
Revision	Description	Date
01	Original Report Release	10 January 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	U6-Enterprise-IW
Serial Number	68D79A0505E9
Dimensions (cm)	16.0 x 15.7 x 3.4

2.2 Description of EUT

The U6-Enterprise-IW is an in-wall mounted access point with four-stream WiFi 6 that provides up to 5.3+ Gbps aggregate throughput rate. The U6-Enterprise-IW has 2.4 GHz (2x2), 5 GHz (4x4) and 6 GHz (4x4) transmitters. The U6-Enterprise-IW has an Ethernet port for data transfer and is powered by an 802.3at PoE Power Adapter. The U6-Enterprise-IW has a Bluetooth management radio to achieve setup and operation. The U6-Enterprise-IW is designed for indoor use.

This report covers the Bluetooth Low Energy portion of the U6-Enterprise-IW 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: U6-Enterprise-IW (Note 1) SN: 68D79A0505E9	WiFi Access Point	See Section 2.4
BN: Ubiquiti MN: UPOE-at SN: N/A	PoE Power Adapter	Shielded or Un-Shielded Cat 5e cable (Note 2)
BN: Dell MN: XPS 13 SN: N/A	Laptop Personal Computer	Shielded or 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
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PoE	1	Shielded or Un-Shielded Cat 5e Cable/> 3 Meters
Data	1	Shielded or Un-Shielded Cat 5e Cable/> 3 Meters

2.5 Operating Environment

Power Supply	120 Volts ac to 48 Volts PoE Power
AC Mains Frequency	60 Hz
Temperature	22.1 – 23.3 °C
Humidity	16.9 – 30.0 %
Barometric Pressure	1019 mBar

2.6 Operating Modes

The U6-Enterprise-IW was connected to a personal computer laptop and tested using test software in order to enable to constant duty cycle of the Bluetooth transceiver. The measurements within this report are corrected to reference a 100% duty cycle.

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

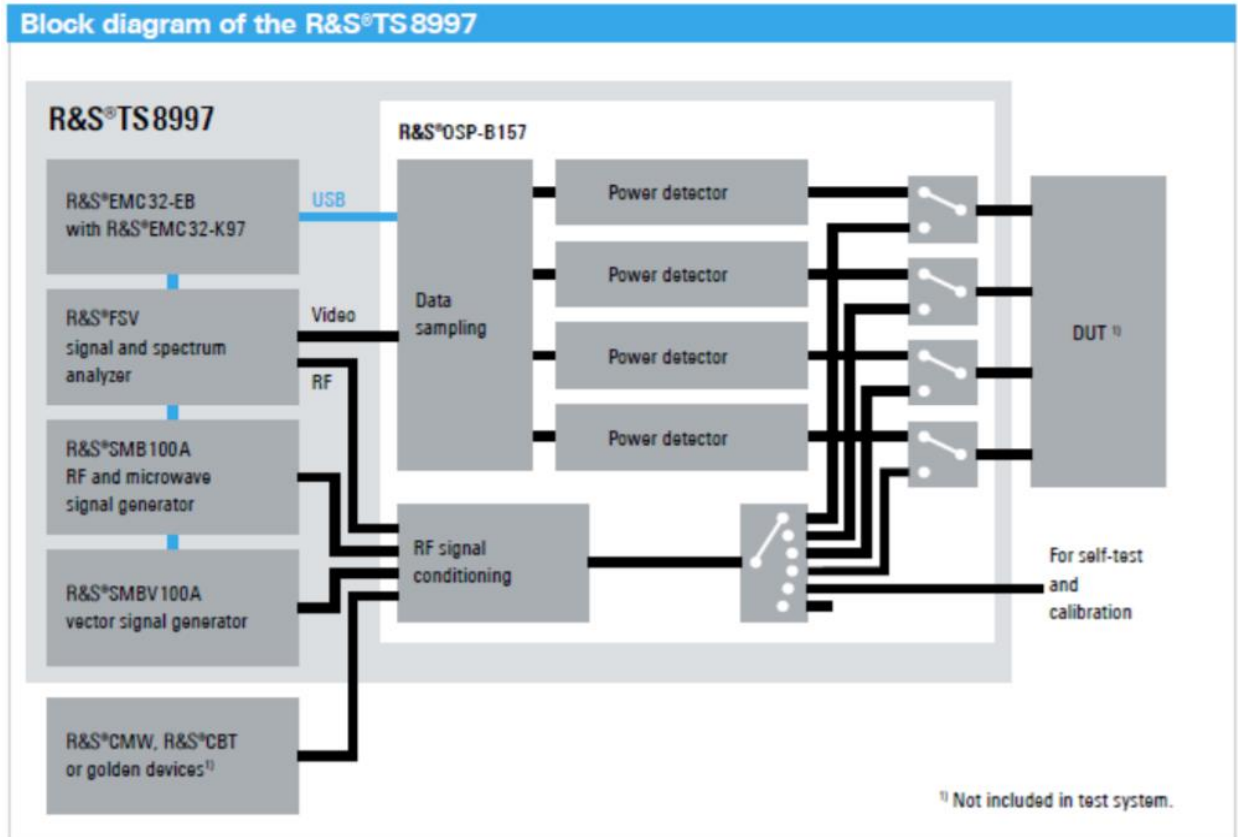


Diagram 1: Test Configuration Block Diagram

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 2022. 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 2022. 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-2500	9/18/2020	3/17/2022
LISN	AFJ	LS16C/10	UCL-2512	5/26/2020	5/26/2022
Cat6 ISN	Teseq	ISN T8-Cat6	UCL-2971	5/18/2020	5/18/2022
ISN	Teseq	ISN T800	UCL-2974	6/4/2021	6/4/2022
LISN	Com-Power	LIN-120C	UCL-2612	5/19/2021	5/19/2022
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

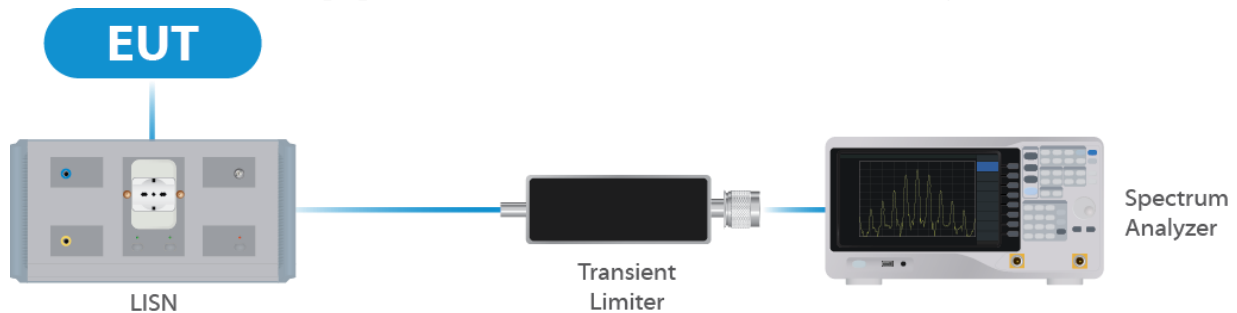


Figure 1: Conducted Emissions Test

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	12/17/2021	12/16/2022
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	1/6/2022	1/6/2023
Switch Extension	R&S	OSP-150W	UCL-2870	3/3/2021	3/3/2022

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

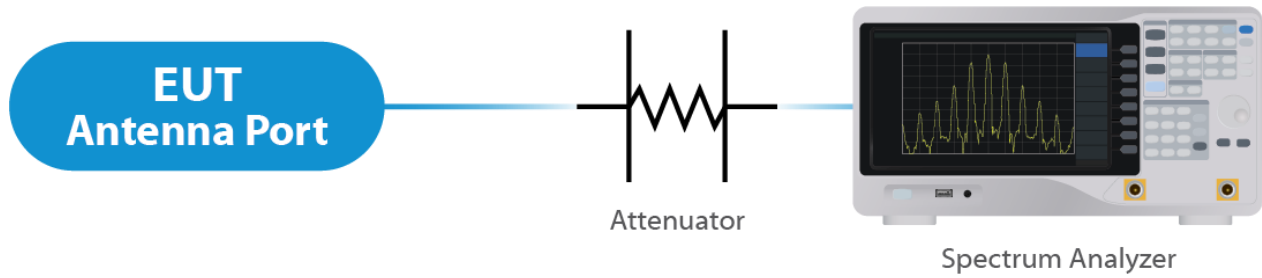


Figure 2: Direct Connect at the Antenna Port Test

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	6/21/2021	6/21/2022
Pre-Amplifier 9 kHz – 1 GHz	Sonoma Instruments	310N	UCL-2889	10/7/2021	10/7/2022
Broadband Antenna	Scwarzbeck	VULB 9163	UCL-3062	8/28/2020	8/27/2022
Broadband Antenna	Scwarzbeck	VULB 9163	UCL-3071	5/19/2020	5/19/2022
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	Scwarzbeck	BBHA 9170	UCL-2487	5/21/2020	5/21/2022
1 – 18 GHz Amplifier	Com-Power	PAM 118A	UCL-3833	10/7/2021	10/7/2022
Test Software	UCL	Revision 1	UCL-3108	N/A	N/A

Table 3: List of equipment used for Radiated Emissions

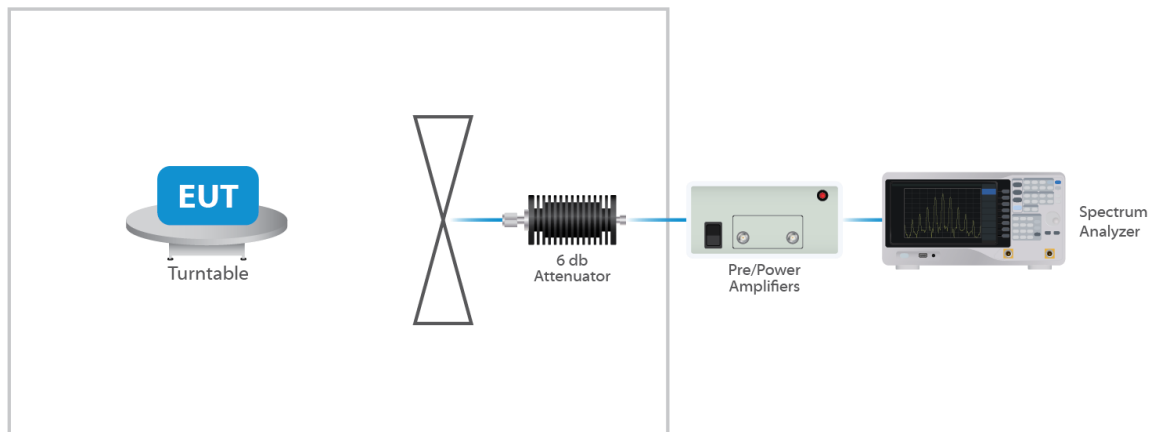


Figure 3: Radiated Emissions Test

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

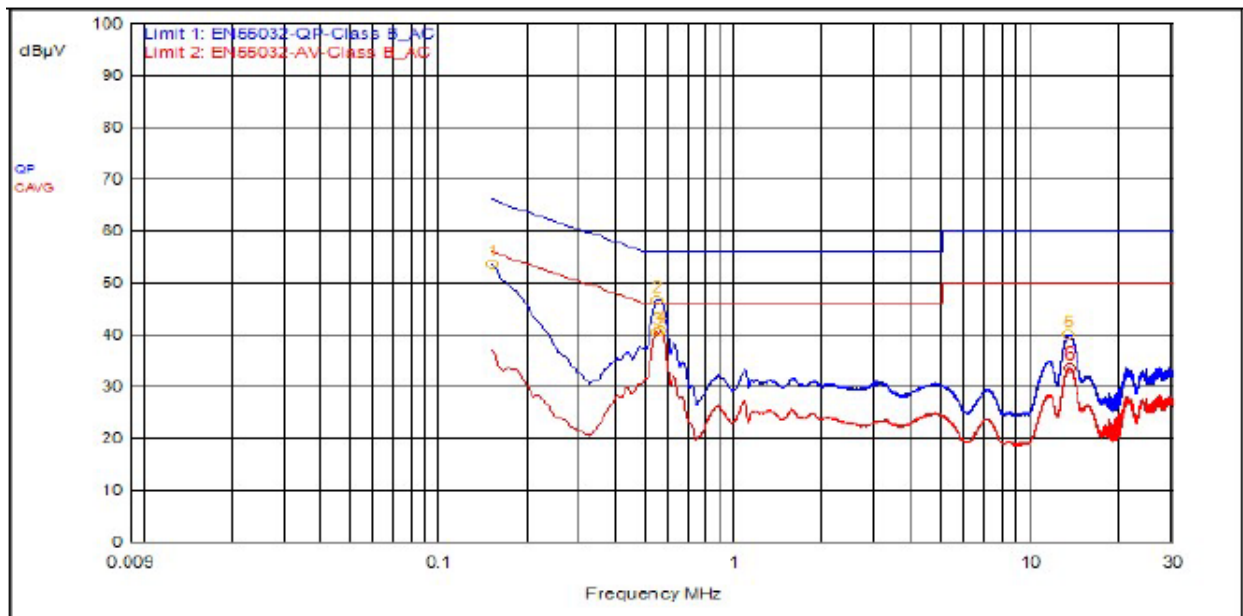
5.1 §15.203 Antenna Requirements

The EUT uses an integral. The Maximum gain of the antenna is 4.0 dBi. The antenna is not user replaceable.

Results

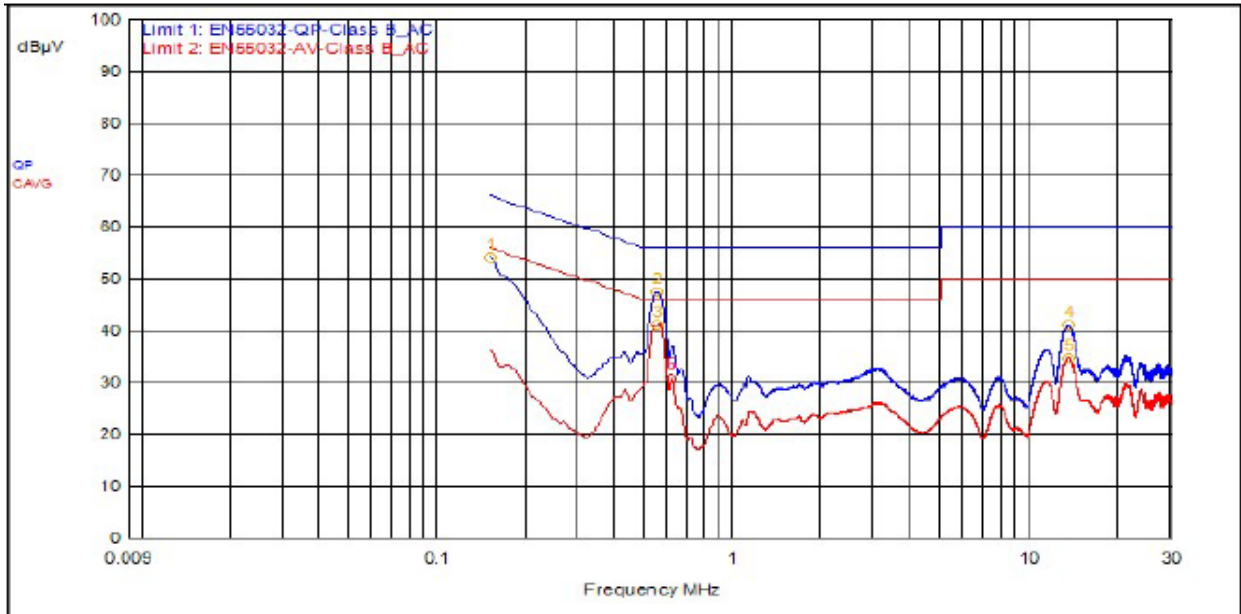
The EUT complied with the specification

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.
2	543,000kHz	9.5	0.1		QPeak	37.1	46.7	56.0	-9.3		
1	150,000kHz	9.5	0.0		QPeak	44.2	53.7	66.0	-12.3		
5	13.161MHz	9.6	0.3		QPeak	30.0	39.9	60.0	-20.1		
3	540,000kHz	9.5	0.1		C_AVG	30.8	40.5			46.0	-5.5
4	558,000kHz	9.5	0.1		C_AVG	31.0	40.7			46.0	-5.3
6	13.260MHz	9.6	0.3		C_AVG	23.6	33.5			50.0	-16.5

Graph 1: Conducted Emissions Plot – Line 1



ID	Frequency	Probe	Cable	Atten.	Detector	Meter Read	Meas Level	Limit 1	Limit 1 Dist.	Limit 2	Limit 2 Dist.
2	549,000kHz	9.5	0.1		QPeak	37.9	47.5	56.0	-8.5		
1	150,000kHz	9.5	0.0		QPeak	44.6	54.1	66.0	-11.9		
4	13.266MHz	9.6	0.3		QPeak	31.1	41.0	60.0	-19.0		
3	549,000kHz	9.5	0.1		C_AVG	31.5	41.2			46.0	-4.8
5	13.260MHz	9.6	0.3		C_AVG	24.9	34.8			50.0	-15.2
6	612,000kHz	9.5	0.2		C_AVG	21.0	30.7			46.0	-15.3

Graph 2: Conducted Emissions Plot – Neutral

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	0.732	1.03
2442	0.713	1.02
2480	0.713	1.02

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 12.5 dBm or 17.78 mW. The limit is 30 dBm or 1 Watt when using antennas with 6 dBi or less gain. The antenna has a gain of 4.0 dBi.

Frequency (MHz)	Measured Output Power (dBm)	Output Power (mW)
2402	12.5	17.78
2442	12.1	16.22
2480	11.8	15.14

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

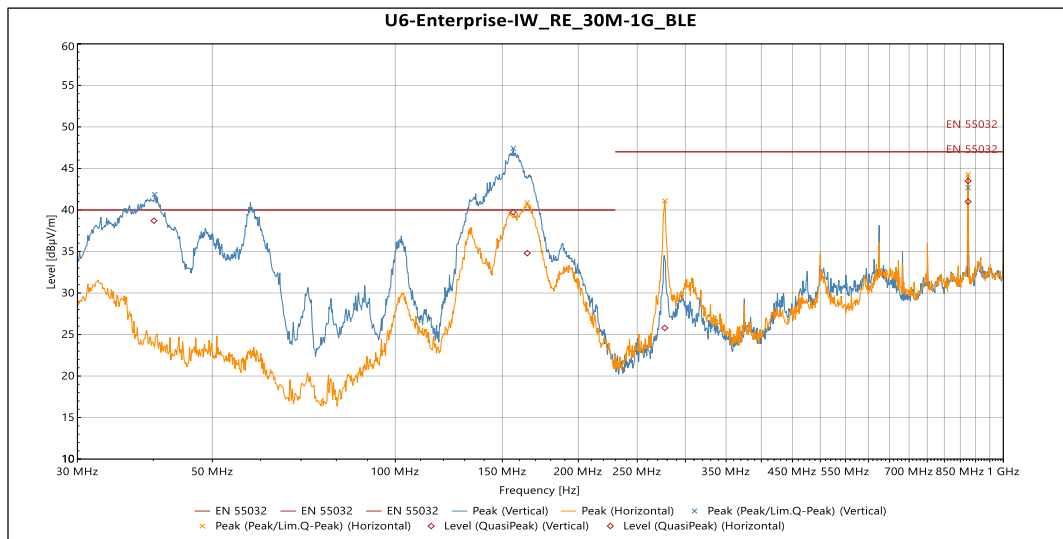
Conducted spurious emissions were attenuated 30 dB or more below the fundamental; therefore, the EUT complies with the specification.

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 bands 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.

Result

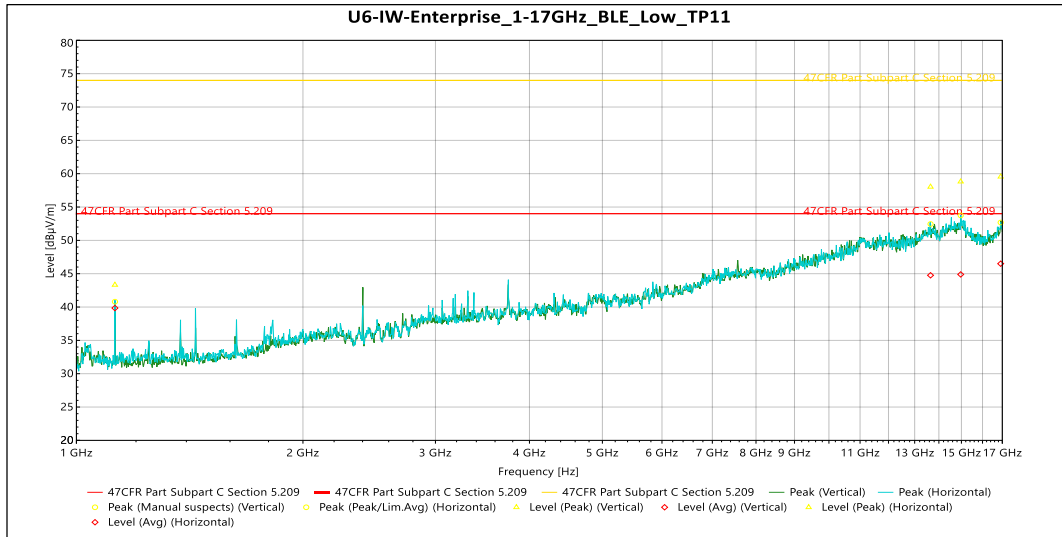
All emissions in the restricted bands of §15.205 met the limits specified in §15.209; therefore, the EUT complies with the specification.



QuasiPeak

Frequency	Level (dBµV/m)	Limit (dBµV/m)	Margin	Azimuth (°)	Height	Pol.	Correction (dB)
40.093 MHz	38.695	40	-1.305	323	1.134	Vertical	-6.283
156.27 MHz	39.728	40	-0.272	183	1	Vertical	-12.25
875 MHz	41.003	47	-5.997	207	1.858	Vertical	2.897
164.82 MHz	34.788	40	-5.212	186	2.602	Horizontal	-11.693
277.52 MHz	25.79	47	-21.21	66	3.292	Horizontal	-7.248
875.02 MHz	43.49	47	-3.51	97	2.246	Horizontal	2.897

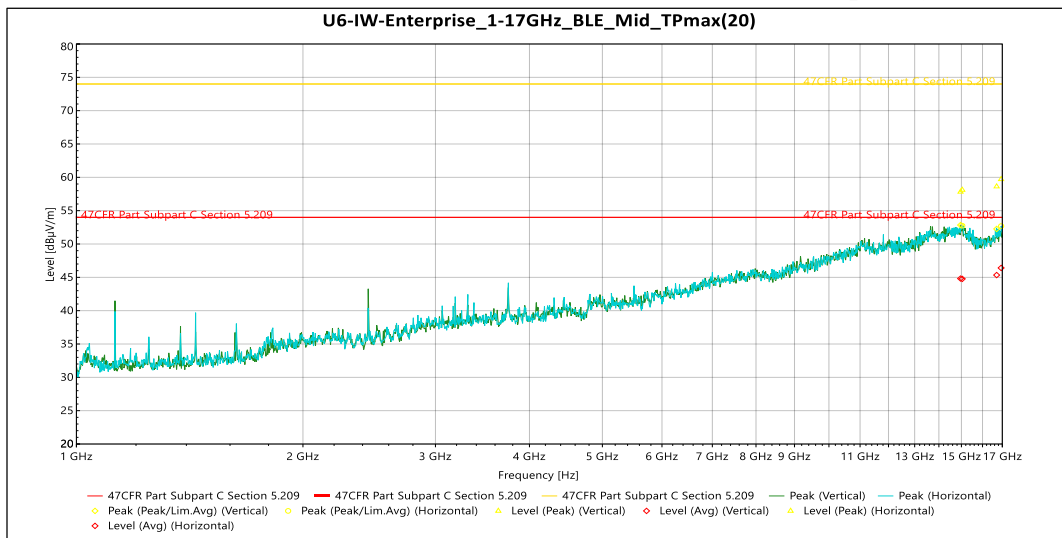
Table 4: Radiated Emissions 30 – 1000 MHz


Peak

Frequency	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
1.125 GHz	43.323	74	-30.677	8	2.734	Vertical	-10.736
13.647 GHz	58.031	74	-15.969	228	3.44	Vertical	15.589
14.967 GHz	58.81	74	-15.19	215	3.798	Horizontal	15.871
16.915 GHz	59.547	74	-14.453	274	2.548	Horizontal	18.502

Avg

Frequency	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
1.125 GHz	39.849	54	-14.151	8	2.734	Vertical	-10.736
13.647 GHz	44.76	54	-9.24	228	3.44	Vertical	15.589
14.967 GHz	44.893	54	-9.107	215	3.798	Horizontal	15.871
16.915 GHz	46.503	54	-7.497	274	2.548	Horizontal	18.502

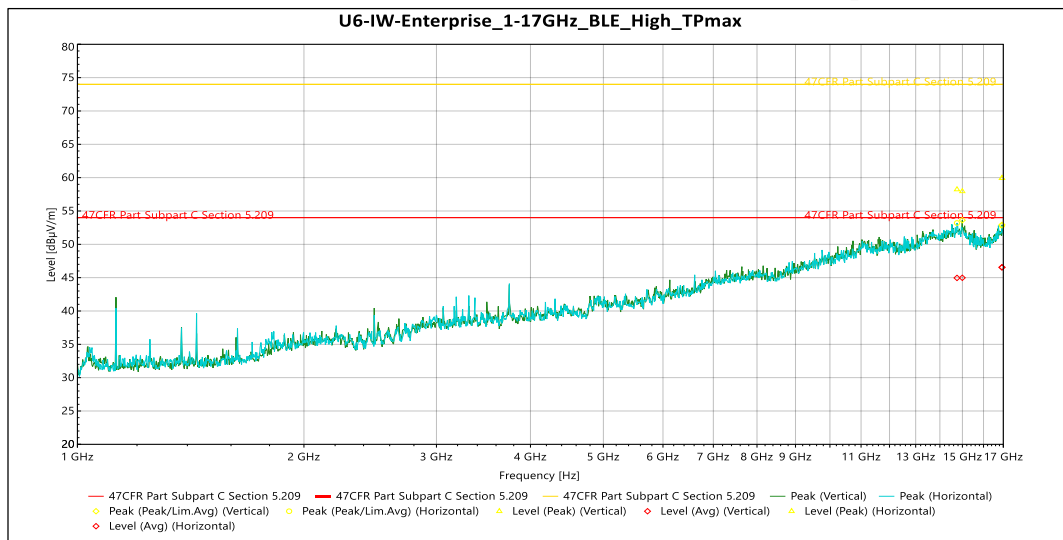
Table 5: Radiated Emissions 1 – 17 GHz Lowest Frequency

Peak

Frequency	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
14.96 GHz	57.835	74	-16.165	288	2.393	Vertical	15.827

Frequency	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Azimuth ($^{\circ}$)	Height (m)	Pol.	Correction (dB)
16.707 GHz	58.625	74	-15.375	305	2.729	Vertical	17.238
15.039 GHz	58.105	74	-15.895	171	2.532	Horizontal	15.911
16.938 GHz	59.714	74	-14.286	71	3.083	Horizontal	18.471

Avg

Frequency	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Azimuth ($^{\circ}$)	Height (m)	Pol.	Correction (dB)
14.96 GHz	44.823	54	-9.177	288	2.393	Vertical	15.827
16.707 GHz	45.338	54	-8.662	305	2.729	Vertical	17.238
15.039 GHz	44.766	54	-9.234	171	2.532	Horizontal	15.911
16.938 GHz	46.415	54	-7.585	71	3.083	Horizontal	18.471

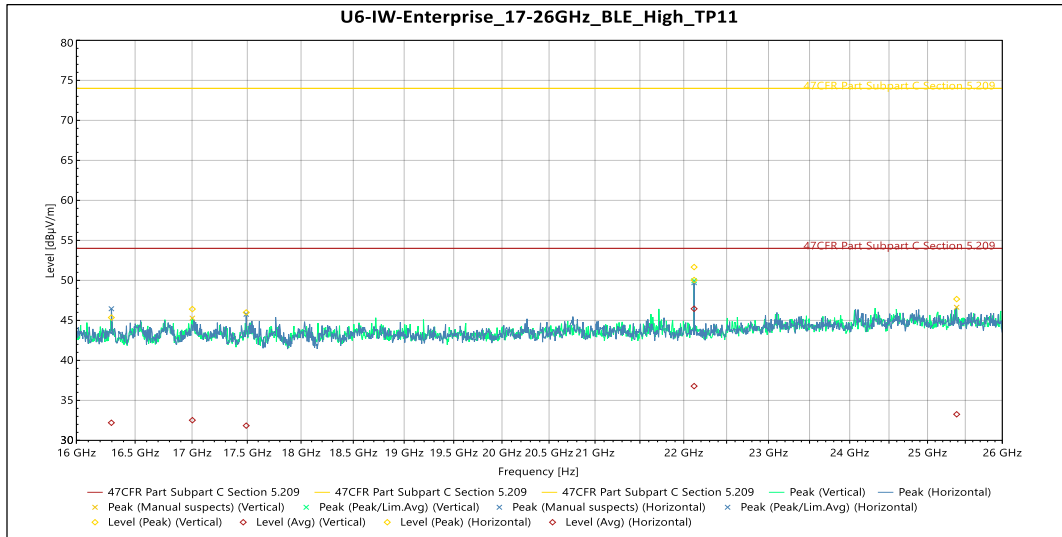
Table 6: Radiated Emissions 1 – 17 GHz Middle Frequency

Peak

Frequency	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Azimuth ($^{\circ}$)	Height (m)	Pol.	Correction (dB)
14.994 GHz	57.948	74	-16.052	1	3.444	Vertical	16.042
16.929 GHz	59.927	74	-14.073	55	2.204	Vertical	18.52
14.753 GHz	58.231	74	-15.769	244	1.5	Horizontal	15.861
16.931 GHz	59.916	74	-14.084	91	2.915	Horizontal	18.509

Avg

Frequency	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Azimuth ($^{\circ}$)	Height (m)	Pol.	Correction (dB)
14.994 GHz	44.975	54	-9.025	1	3.444	Vertical	16.042
16.929 GHz	46.559	54	-7.441	55	2.204	Vertical	18.52
14.753 GHz	44.961	54	-9.039	244	1.5	Horizontal	15.861
16.931 GHz	46.536	54	-7.464	91	2.915	Horizontal	18.509

Table 7: Radiated Emissions 1 – 17 GHz Highest Frequency


Peak

Frequency	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Pol.	Correction (dB)
17.003 GHz	46.41	74	-27.59	116	Vertical	-5.085
22.12 GHz	50.04	74	-23.96	9	Vertical	-5.679
25.385 GHz	47.659	74	-26.341	39	Vertical	-5.378
16.296 GHz	45.346	74	-28.654	359	Horizontal	-4.37
17.49 GHz	45.991	74	-28.009	281	Horizontal	-6.03
22.12 GHz	51.656	74	-22.344	355	Horizontal	-5.679

Avg

Frequency	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Pol.	Correction (dB)
17.003 GHz	32.524	54	-21.476	116	Vertical	-5.085
22.12 GHz	36.781	54	-17.219	9	Vertical	-5.679
25.385 GHz	33.264	54	-20.736	39	Vertical	-5.378
16.296 GHz	32.203	54	-21.797	359	Horizontal	-4.37
17.49 GHz	31.844	54	-22.156	281	Horizontal	-6.03
22.12 GHz	46.446	54	-7.554	355	Horizontal	-5.679

Table 8: Radiated Emissions 17 – 40 GHz Highest 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	0.42	8.0
2442	0.13	8.0
2480	-0.07	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 --