



427 West 12800 South
Draper, UT 84020

Test Report Certification

FCC ID	SWX-ULTEBP / Contains FCC ID: SWX-RC7611
IC ID	6545A-ULTEBP / Contains IC: 6545A-RC7611
Equipment Under Test	U-LTE-Backup Pro
Test Report Serial Number	TR6367_06
Date of Tests	15 January 2020; 20, 26 July and 5 August 2021
Report Issue Date	26 January 2022

Test Specification	Applicant
47 CFR FCC Part 15, Subpart C	Ubiquiti Inc. 685 Third Avenue New York, NY 10019 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	U-LTE-Backup Pro
FCC ID	SWX-ULTEBP / Contains FCC ID: SWX-RC7611
IC ID	6545A-ULTEBP / Contains IC: 6545A-RC7611

On this 26th 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.

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: Clay Allred



Reviewed By: Richard L. Winter

Revision History		
Revision	Description	Date
01	Original Report Release	11 August 2021
02	Added FCC and IC ID's	16 November 2021
03	Amend Antenna Gain	17 November 2021
04	Model Number Changed to U-LTE-Backup Pro	26 January 2022
05	Added Serial Number to Sections 2.1 and 2.3	28 January 2022
06	Updated Section 5.1	11 April 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	U-LTE-Backup Pro
Serial Number	74ACB9BC9B0E
Dimensions (cm)	6.60 x 20.21 x 3.22

2.2 Description of EUT

The U-LTE-Backup Pro is a PoE-powered WAN over LTE failover solution with a slot for Nano SIM card. It features a Cat4 4G LTE module supporting European LTE, WCDMA, and GSM bands. The U-LTE-Backup Pro provides Ethernet and POE passthrough ports as well as a 2.4 GHz WiFi and Bluetooth interface. It is managed by UniFi Controller Software and is capable of connecting to an external SMBA antenna. The EUT is powered by the Ubiquiti POE-48W-G-WH PoE supply.

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-Backup Pro (Note 1) SN: 74ACB9BC9B0E	LTE Gateway	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
PoE In	1	Shielded or Unshielded Cat 5e cable/7 meters
Secondary Ethernet	1	Shielded or Unshielded Cat 5e cable/7 meters

2.5 Operating Environment

Power Supply	120 Volts ac to 48 Volts PoE Power
AC Mains Frequency	60 Hz
Temperature	25.5 – 26.1 °C
Humidity	34.69 – 45.34 %
Barometric Pressure	1008 mBar

2.6 Operating Modes

The U-LTE-Backup Pro 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

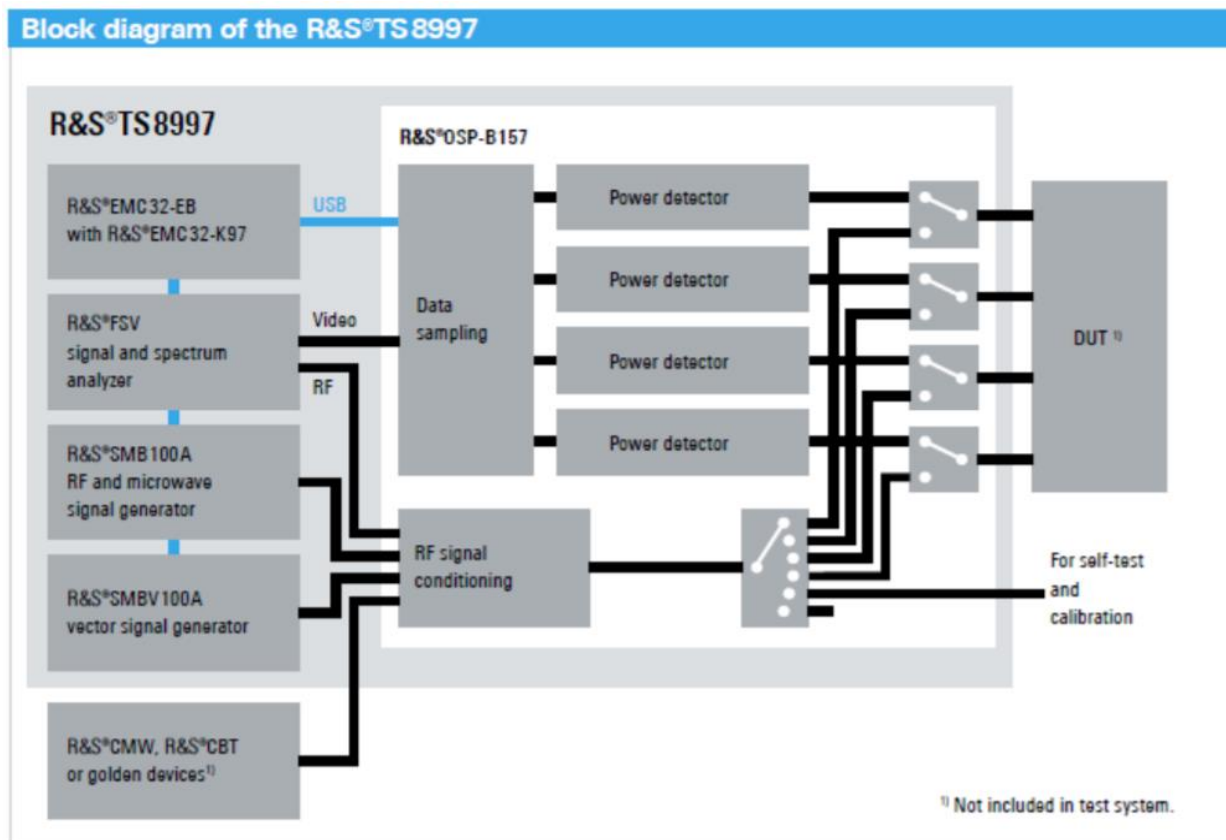


Diagram 1: Test Configuration Block Diagram

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	2402 to 2480	Compliant
15.247(b)	RSS-247 § 5.4	Peak Output Power	2402 to 2480	Compliant
15.247(d)	RSS-247 § 5.4	Antenna Conducted Spurious Emissions	30 to 26000	Compliant
15.247(d)	RSS-247 § 5.4	Radiated Spurious Emissions	30 to 26000	Compliant
15.247(e)	RSS-247 § 5.2	Peak Power Spectral Density	2402 to 2480	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 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	9/17/2021
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

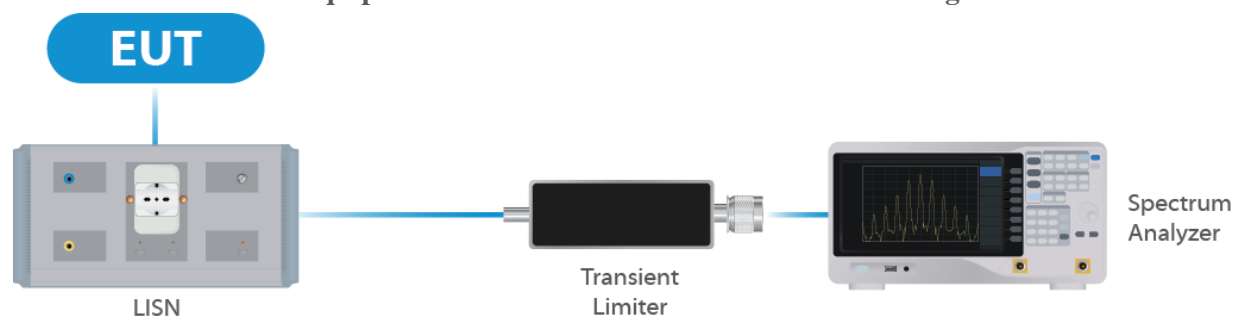


Figure 1: Conducted Emissions Test

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	8/24/2020	8/24/2021
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	9/8/2020	9/8/2021
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

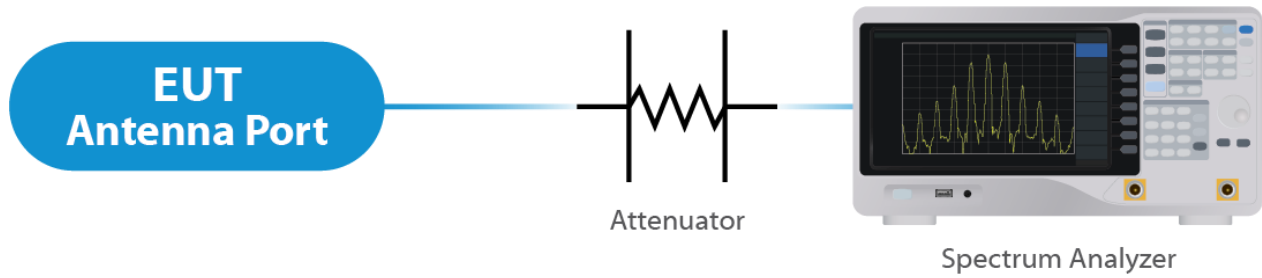


Figure 2: Direct Connect at the Antenna Port Test

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	9/10/2020	9/10/2021
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	11/16/2021
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	9/29/2020	9/29/2021
Test Software	UCL	Revision 1	UCL-3108	N/A	N/A

Table 3: List of equipment used for Radiated Emissions

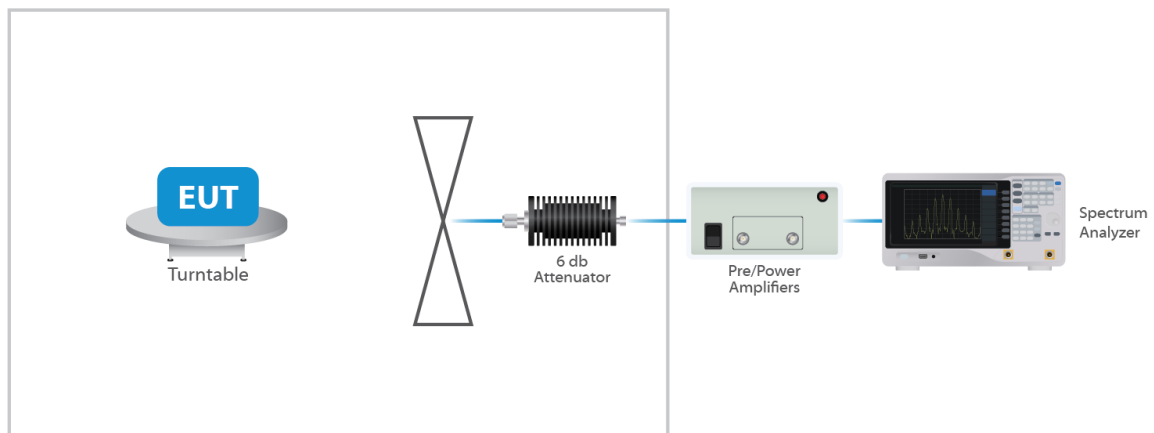


Figure 3: Radiated Emissions Test

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

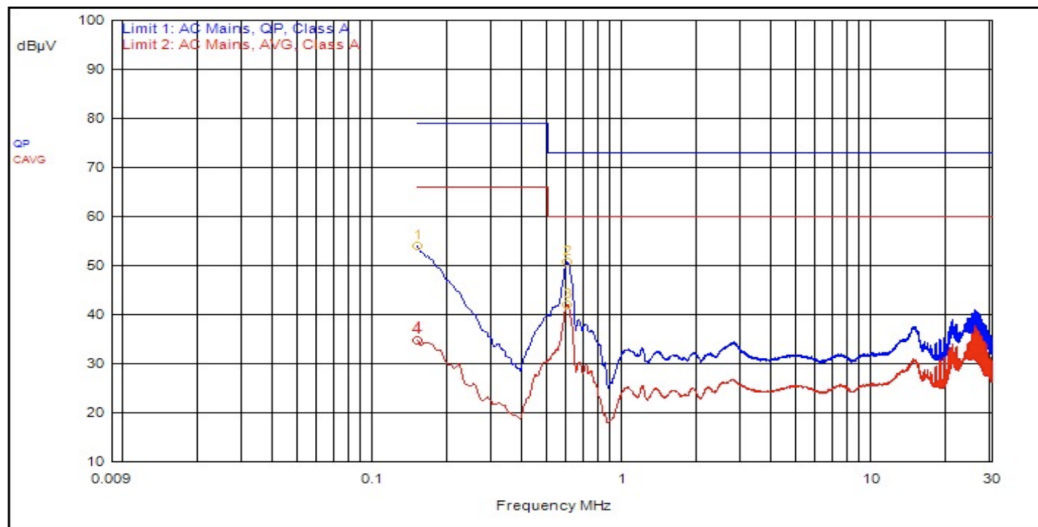
5.1 §15.203 Antenna Requirements

The EUT uses a chip antenna for the Bluetooth transmitter. The Maximum gain of the antenna is 0 dBi. The antenna is not user replaceable.

Results

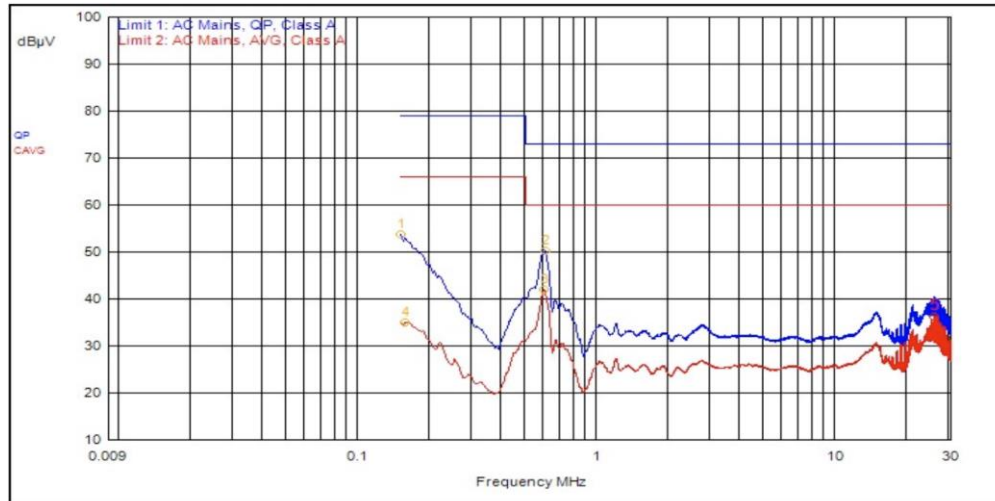
The EUT complied with the specification

5.2 Conducted Emissions at Mains Ports Data



ID	Frequency	Probe	Cable	Atten.	Detector	Meter Read	Meas Level	Limit	Limit Dist.
3	591.000kHz	12.3	0.0		C_AVG	29.6	41.9	60.0	-18.1
2	594.000kHz	12.3	0.0		QPeak	38.4	50.7	73.0	-22.3
1	150.000kHz	12.2	0.0		QPeak	41.6	53.9	79.0	-25.1
4	150.000kHz	12.2	0.0		C_AVG	22.4	34.7	66.0	-31.3

Graph 1: Conducted Emissions Plot - Neutral



ID	Frequency	Probe	Cable	Atten.	Detector	Meter Read	Meas Level	Limit	Limit Dist.
3	594.000kHz	12.3	0.0		C_AVG	29.7	42.0	60.0	-18.0
2	603.000kHz	12.3	0.0		QPeak	37.9	50.2	73.0	-22.8
1	150.000kHz	12.2	0.0		QPeak	41.6	53.8	79.0	-25.2
4	156.000kHz	12.2	0.0		C_AVG	22.7	35.0	66.0	-31.0
5	25.533MHz	12.1	0.2		QPeak	23.9	36.2	73.0	-36.8

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	0.59	0.99
2442	0.59	0.99
2480	0.63	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 -4.15 dBm or 0.38 mW. The limit is 30 dBm or 1 Watt when using antennas with 6 dBi or less gain. The antenna has a gain of 0 dBi.

Frequency (MHz)	Measured Output Power (dBm)	Output Power (mW)
2402	-4.15	0.38
2442	-3.95	0.40
2480	-3.21	0.48

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 ranges from the lowest frequency generated or used in the device to the tenth harmonic of the highest fundamental frequency were investigated to measure any antenna-conducted emissions. The table shows 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

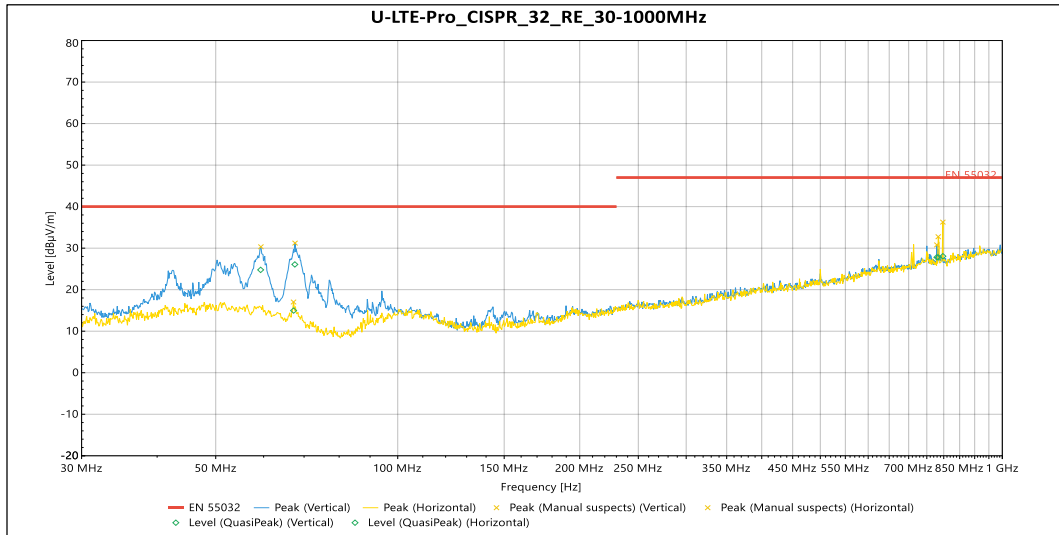
Conducted spurious emissions were attenuated 30 dB or more below the fundamental; therefore, the EUT complies with the specification.

5.5.2 Radiated Spurious Emissions in the Restricted Bands of §15.205

The frequency ranges from the lowest frequency generated or used in the device to the tenth harmonic of the highest fundamental emissions were 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.

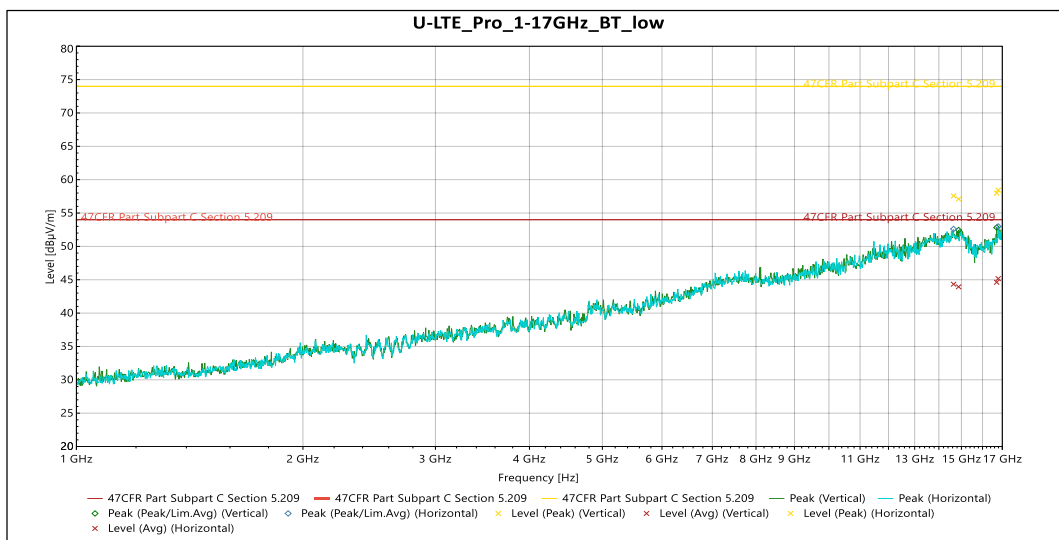
Result

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

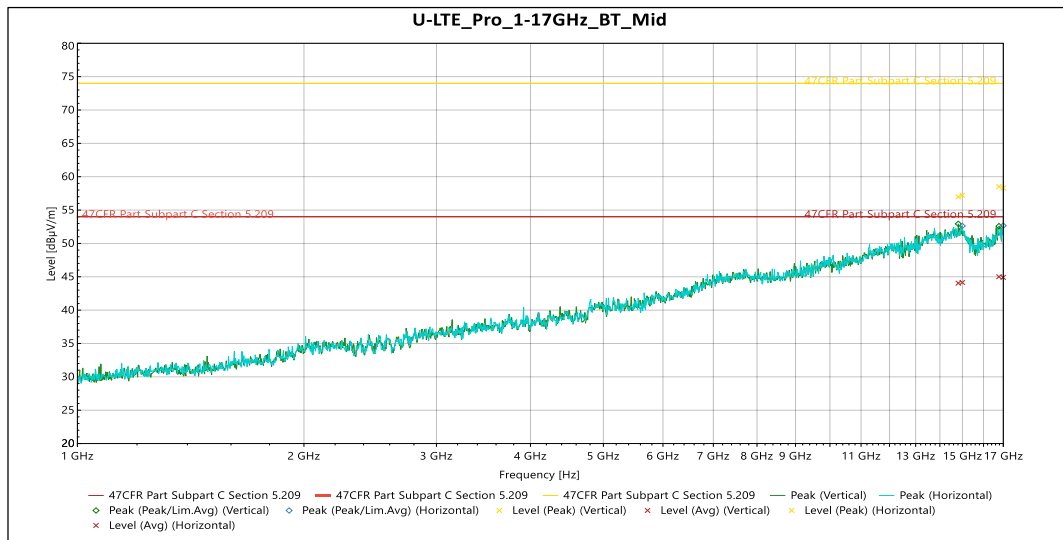


Source	Frequency	Level (dBµV/m)	Limit (dBµV/m)	Margin	Azimuth (°)	Height	Pol.	Meas. Time	RBW	Meas.Time	Correction (dB)
QuasiPeak	59.329 MHz	24.77	40	-15.23	359	2.338	Vertical	15	120000	0.001	-13.306
QuasiPeak	67.584 MHz	26.081	40	-13.919	41	3.694	Vertical	15	120000	0.001	-15.489
QuasiPeak	779.42 MHz	27.797	47	-19.203	75	1.472	Vertical	15	120000	0.001	-2.983
QuasiPeak	67.264 MHz	14.972	40	-25.028	7	2.809	Horizontal	15	120000	0.001	-15.378
QuasiPeak	783.42 MHz	27.767	47	-19.233	4	1.099	Horizontal	15	120000	0.001	-2.989
QuasiPeak	797.44 MHz	28.058	47	-18.942	232	2.269	Horizontal	15	120000	0.001	-2.684

Table 4: Radiated Emissions 30-1000 MHz

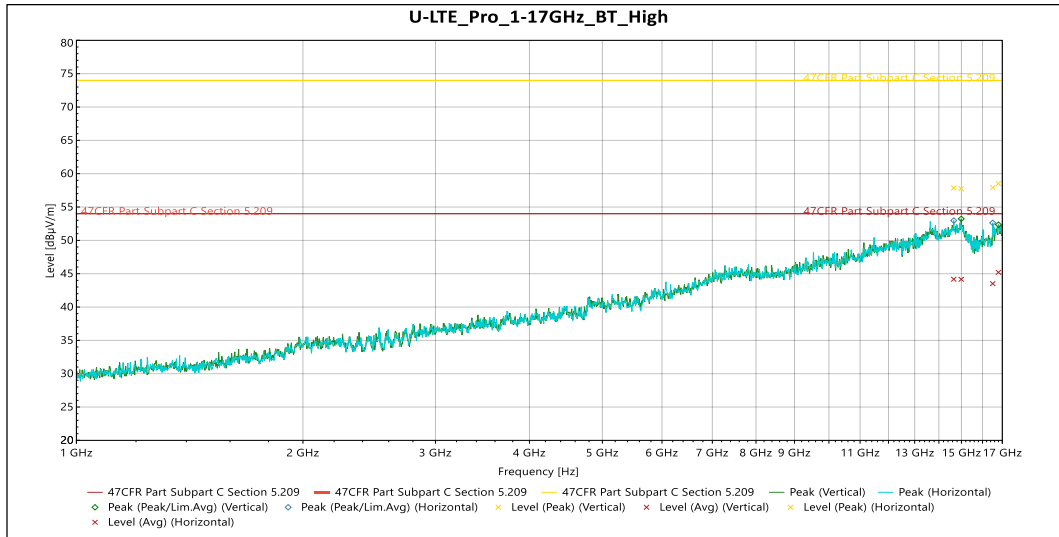


Source	Frequency	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Meas. Time (s)	RBW	Meas.Time	Correction (dB)
Peak	14.871 GHz	57.103	74	-16.897	114	2.023	Vertical	5	1000000	0	14.994
Peak	16.709 GHz	57.966	74	-16.034	20	1.837	Vertical	5	1000000	0	16.311
Avg	14.871 GHz	43.937	54	-10.063	114	2.023	Vertical	5	1000000	0	14.994
Avg	16.709 GHz	44.622	54	-9.378	20	1.837	Vertical	5	1000000	0	16.311
Peak	14.644 GHz	57.575	74	-16.425	51	2.544	Horizontal	5	1000000	0	15.135
Peak	16.788 GHz	58.436	74	-15.564	52	2.009	Horizontal	5	1000000	0	16.845
Avg	14.644 GHz	44.332	54	-9.668	51	2.544	Horizontal	5	1000000	0	15.135
Avg	16.788 GHz	45.168	54	-8.832	52	2.009	Horizontal	5	1000000	0	16.845

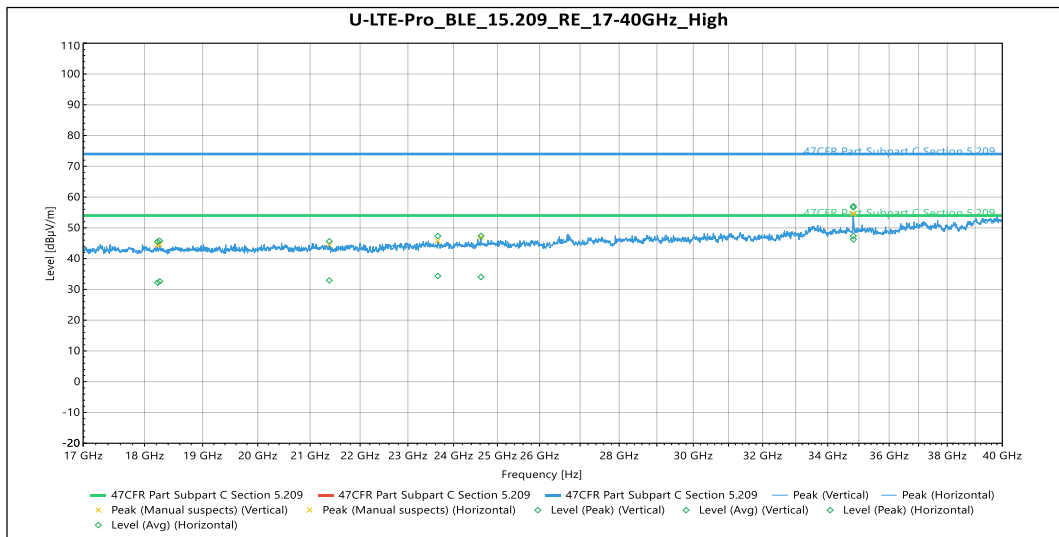
Table 5: Transmitting on 2402 MHz – 1-17GHz Radiated Emissions


Source	Frequency	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Meas. Time (s)	RBW	Meas.Time	Correction (dB)
Peak	14.813 GHz	56.98	74	-17.02	336	2.195	Vertical	5	1000000	0	15.025
Peak	16.775 GHz	58.523	74	-15.477	142	1.674	Vertical	5	1000000	0	16.709
Avg	14.813 GHz	44.038	54	-9.962	336	2.195	Vertical	5	1000000	0	15.025
Avg	16.775 GHz	45.013	54	-8.987	142	1.674	Vertical	5	1000000	0	16.709
Peak	14.994 GHz	57.222	74	-16.778	235	3.758	Horizontal	5	1000000	0	14.866
Peak	16.994 GHz	58.303	74	-15.697	311	2.742	Horizontal	5	1000000	0	16.767
Avg	14.994 GHz	44.149	54	-9.851	235	3.758	Horizontal	5	1000000	0	14.866
Avg	16.994 GHz	44.91	54	-9.09	311	2.742	Horizontal	5	1000000	0	16.767

Table 6: Transmitting on 2442 MHz – 1-17GHz Radiated Emissions



Source	Frequency	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Meas. Time (s)	RBW	Meas. Time	Correction (dB)
Peak	14.992 GHz	57.746	74	-16.254	309	3.798	Vertical	5	1000000	0	14.894
Peak	16.8 GHz	58.509	74	-15.491	358	3.798	Vertical	5	1000000	0	16.962
Avg	14.992 GHz	44.155	54	-9.845	309	3.798	Vertical	5	1000000	0	14.894
Avg	16.8 GHz	45.196	54	-8.804	358	3.798	Vertical	5	1000000	0	16.962
Peak	14.652 GHz	57.874	74	-16.126	355	3.789	Horizontal	5	1000000	0	15.029
Peak	16.507 GHz	57.92	74	-16.08	72	3.096	Horizontal	5	1000000	0	15.066
Avg	14.652 GHz	44.166	54	-9.834	355	3.789	Horizontal	5	1000000	0	15.029
Avg	16.507 GHz	43.515	54	-10.485	72	3.096	Horizontal	5	1000000	0	15.066

Table 7: Transmitting on 2480 MHz – 1-17GHz Radiated Emissions


Source	Frequency	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Azimuth (°)	Pol.	Meas. Time (s)	RBW	Meas. Time	Correction (dB)
Peak	18.219 GHz	45.524	74	-28.476	57	Vertical	5	1000000	0	-6.146
Peak	23.65 GHz	47.371	74	-26.629	127	Vertical	5	1000000	0	-4.576
Peak	34.82 GHz	57.048	74	-16.952	271	Vertical	5	1000000	0	0.98
Avg	18.219 GHz	32.195	54	-21.805	57	Vertical	5	1000000	0	-6.146
Avg	23.65 GHz	34.37	54	-19.63	127	Vertical	5	1000000	0	-4.576
Avg	34.82 GHz	47.374	54	-6.626	271	Vertical	5	1000000	0	0.98
Peak	21.378 GHz	45.632	74	-28.368	105	Horizontal	5	1000000	0	-5.449
Peak	24.621 GHz	47.362	74	-26.638	207	Horizontal	5	1000000	0	-5.48
Peak	34.821 GHz	56.628	74	-17.372	62	Horizontal	5	1000000	0	0.96
Avg	18.256 GHz	32.587	54	-21.413	154	Horizontal	5	1000000	0	-6.203
Avg	21.378 GHz	32.916	54	-21.084	105	Horizontal	5	1000000	0	-5.449
Avg	24.621 GHz	34.006	54	-19.994	207	Horizontal	5	1000000	0	-5.48
Avg	34.821 GHz	46.243	54	-7.757	62	Horizontal	5	1000000	0	0.96

Table 8: Transmitting on 2480 MHz – 17-40GHz Radiated Emissions

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	-12.43	8.0
2442	-12.16	8.0
2480	-11.29	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 --